



MKUKUTA BASED MDG COSTING FOR THE WATER AND SANITATION SECTOR

MINISTRY OF WATER AND LIVESTOCK DEVELOPMENT

- DRAFT REPORT -

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Foreword

Various studies and routine data system indicate that improvement in water supply and sanitation coupled with enhanced hygienic behaviors has extensive and multi-dimensional health benefits to communities. Health is one of the most important reasons for increasing investments in water supply and sanitation. If emphasis for investments is done in water supply only, leaving out both the hardware and software parts of sanitation sub sector under funded, then poverty will not be derailed from the vicious cycle trap. This is because water itself can affect health if it is fetched from unprotected and untreated sources. Water from unprotected sources are easily contaminated with pathogens, which transmit communicable water borne diseases such as diarrhoea and cholera, water washed diseases such as trachoma, scabies and water based diseases such as schistosomiasis and malaria. Health records indicate that more than 70% of the hospital attendances are caused by consequences of inadequate water supply and sanitation services. Researches have also indicated that treated water and improved sanitation can contribute to health stability and health improvement of HIV/AIDS patients.

Although the water sector has made commendable strides in improving water supply service coverage, which is now 74% in the 20 main urban centers and 53.5% in rural areas, many problems resulting from inadequate supply and inadequate household storage technologies persist especially in areas where most of poor people live. The central problem that will need more focus to tackle during implementation of MKUKUTA/MDG framework is the acute shortage of water supply and poor sanitation facilities in cities and other urban areas, especially squatter and slum areas. The life in these areas is so pathetic because people are compelled by situation to purchase water from vendors at relatively higher prices compared to the people with household connections. Since vendors normally take water from unreliable sources, the possibility of selling contaminated water is undeniable, leading to dwellers to become main victims of epidemic diseases.

The consequences of shortage of water supply services are more pathetic in rural areas. The people, especially women and children, walk long distances to search and fetch water and suffer losses in terms of time for productive activities. The drudgery of fetching water from long distances forces them to use water carefully and sparsely, to the extent of denying some of the important hygiene practices.

Although statistics from official surveys indicate a high percentage of households owning toilet facilities, prevalence of diseases associated with poor sanitation is still high. This contradiction means that most of the latrines used in Tanzania especially in the rural areas and slum areas are both substandard and unusable or the knowledge and hygienic behaviours of latrine users is low.

It is my belief that the MKUKUTA based MDG costing will serve as a planning tool for future investment programmes, which will be striving to tackle the above-narrated problems. The efficiency of execution of activities will depend much on stakeholder collaboration, working under proper coordination principles that emulate the intersectoral linkages and synergies forecasted in MKUKUTA.

It can be done, play your part.

Edward N. Lowassa
Minister of Water and Livestock Development

Acknowledgement

After approval of the National Strategy for Growth and Reduction of Poverty (also known as MKUKUTA in Kiswahili), the Government prepared its implementation framework, with the Government budget being the main mechanism for resource allocation.

The Government recognizes the fact that achievement of MKUKUTA and MDG targets presents an overwhelming challenge for the people of Tanzania to achieve the desired development aspirations. This ambition needs to be matched by an equally ambitious financing plan that estimates and mobilizes the resources needed to implement actions for achievement of operational targets. It is in this respect that the water sector complied with the government directive to develop a sector-led MKUKUTA based MDG costing of interventions and actions, based on “what it will take” to meet MKUKUTA operational targets by 2010 and MDG desired targets by 2015.

Water and Sanitation sector MKUKUTA based MDGs needs assessment and costing is a joint endeavour of the Ministry of Water and Livestock Development, under coordination from the Vice President’s Office and the UN Country Team, supported by the Millennium Project. For best results, the Ministry decided to nominate a team of water sector experts who understand the sector, to work with few key stakeholders, supported by a consultant from the German Development Institute / UN Millennium Project sponsored by KfW. The team identified policy priorities in MKUKUTA and MDGs, sequenced and linked them to the Water Sector Development Strategy (NWSDS) and generated approximate estimates of resources needed to meet the targets, developed a snap shot of a long-term financing strategy for achieving the MDGs (2015), and developed suggestions for the international and local advocacy coordination mechanism required for increasing international financial assistance for the water sector MKUKUTA/MDG-related investments.

This document is the outcome of a collective responsibility and cooperation of many parties interested in water sector development. I would like to thank the Deputy Permanent Secretary, all the Directors, Assistant Directors, Heads of Units and all resource persons for their invaluable contributions and cooperation during the preparation of this document.

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Vincent Mrisho

Permanent Secretary

Acronyms

BWO	Basin Water Office
COWSO	Community Owned Water Supply Organization
DDCA	Drilling and Dam Construction Authority
EWURA	Energy and Water Utilities Regulation Authority
GoT	Government of Tanzania
HQ	Headquarter
IWRM	Integrated Water Resources Management
JAS	Joint Assistance Strategy
KfW	German Development Bank
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MKUKUTA	National Strategy for Growth and Reduction of Poverty
MoH	Ministry of Health
MoWLD	Ministry of Water and Livestock Development
MP	UN Millennium Project
MTEF	Medium Term Expenditure Framework
NAWAPO	National Water Policy
NGO	Non-Governmental Organization
NEHHSAS	National Environmental Health, Hygiene and Sanitation Strategy
NRWSSP	National Rural Water Supply and Sanitation Project
NSGRP	National Strategy for Growth and Reduction of Poverty
NWSDS	Water Sector Development Strategy
O&M	Operations and Maintenance
ODA	Official Development Assistance
PER	Public Expenditure Review
PRS	Poverty Reduction Strategy
SBAS	Strategic Budget Allocation System
SWAP	Sector Wide Approach
TAC	Technical Advisory Committee
UWSBs	Urban Water and Sewerage Boards
UWSD	Urban Water Supply and Sewerage Departments
VPO	Vice President's Office
WSSA	Water Supply and Sewerage Authority
WSSD	World Summit on Sustainable Development
WUE	Water User Entities

1 Introduction

In its ambitious and determined pursuit to fight poverty, Tanzania has adopted the MDGs and the National Strategy for Growth and Reduction of Poverty (MKUKUTA). Both are widely accepted among stakeholders and contain demanding, specific and quantified targets to be reached by 2015 and 2010, respectively. As the central strategic document for poverty reduction, MKUKUTA also identifies tailored cluster strategies and intervention packages which are well suited to attain both sets of targets. Thus, for Tanzania's development aspirations, there is consensus on what to achieve, and on how to achieve it.

Within this context, the MKUKUTA based MDG costing is fundamental because it aims at answering the question about what it will take to meet the targets. Since the MKUKUTA based MDG costing is an essential policy tool, it was incorporated in the MKUKUTA implementation strategy. Education, agriculture, health as well as water and sanitation have been chosen as the pilot sectors for costing.

The MKUKUTA based MDG costing for the water and sanitation sector is structured as followed:

- The second chapter narrates on the general policy context, specific sector policy issues, institutional development and regulatory arrangements.
- The third chapter explains the overall objectives, the guiding principles and general methodologies of the MKUKUTA based MDG costing employed during the course of the exercise.
- The fourth chapter critically reviews existing MDG costing initiatives that were conducted by various stakeholders in different periods of time.
- The fifth chapter develops a detailed analytical framework for the MKUKUTA based MDG costing in the water and sanitation sector by identifying targets and interventions to be costed. Additionally, cross-sectoral linkages, cross-cutting issues and constraints are explored.
- The sixth chapter explains the computations for the price tag of each intervention required for meeting the MDGs by 2015 and MKUKUTA by 2010 and presents overall results.
- Chapter seven explores financing-related issues including the financing gaps and possibilities for financing strategies.
- Chapter eight contains conclusions and recommendations.

2 The Water and Sanitation Sector

2.1 Recent Developments and Current Status

2.1.1 Water Resources

2.1.1.1 *Availability of Water Resources in Tanzania*

Tanzania's annual renewable water resources are 89 cubic kilometres or 2,700 cubic meters of water per person per year (World Resources 2000- 2001). Based on projected population from estimated 33 million in year 2001 to about 59.8 million by the year 2025, annual average available water per capita will be reduced by 45% to about 1,500 cubic meters per person per year which shows that the country will face a water stress situation, considering that below 1,700 cubic meters per person per year signifies water scarcity.

Water resources in the country include rivers, lakes, wetlands, springs, natural reservoirs, groundwater aquifers and transboundary Rivers that are shared with neighbouring countries. The drainage areas of these international water bodies cover over 43.5% of the country's land area.

More than half of the country receives on the average less than 800mm of rain per year. The monsoon type of climate prevailing in the country causes extreme temporal variability in rainfall and even more extreme variability in river flows. The annual mean rainfall shows that the eastern coastal areas receive well over 1000mm per year while most parts of the drier interior receive less than 600mm.

2.1.1.2 *Establishment of Water Basins*

Since both the National Water Policy of 1991 and NAWAPO 2002 advocate the establishment of autonomous water basins to effectively manage the integrated water resources development in the country, affirmative efforts have been taken since 1991 resulting in the operation of basin water offices in all 9 basins. The nine Water Basin Offices include:

- (i) Pangani and its associated Coast Rivers
- (ii) Wami/Ruvu and its associated Coast Rivers
- (iii) Rufiji and its associated Coast Rivers
- (iv) Ruvuma and Southern Coast Rivers
- (v) Lake Nyasa
- (vi) Lake Rukwa,
- (vii) Lake Tanganyika
- (viii) Lake Victoria, and
- (ix) Internal drainage basins of Lake Eyasi, Manyara and Bubu Complex

2.1.1.3 *Water Resources Monitoring Network*

The Ministry of Water and Livestock Development currently operates a network of 216 hydrometric, 65 climatic, 40 groundwater and 93 rainfall stations. The climatic stations are operating side by side with 25 meteorological stations owned by the Tanzania Meteorological Agency. Groundwater monitoring is not systematically done in the whole country. At only a few places ground water level fluctuations are monitored and only in limited areas monitoring of groundwater flow and recharge is

being done. At present there is no systematic water quality-monitoring network in place for monitoring ambient conditions of water bodies including silt content in rivers.

2.1.1.4 Water Resources Allocation and Utilization in Water Basins

Water shortages in Tanzania have been attributed to several factors, including:

- Increasing demand for water, energy and products that require water for rapidly growing populations
- Drought
- Poor coordination between sectoral planners and stakeholders
- Inadequate management of the available water resources
- Lack of priority of use

As a consequence of competing demands for water for the major sectors, water resources managers are facing a variety of conflicts between sectoral users of water and interest that effect water use. Conflicts are bound to intensify in the future if management practices remain the same, conflict resolution intervention are not put into place and demand for water rises. It is important to understand the nature and the causes of the conflicts in order to develop rational policies and strategies for managing the nation's water resources in a socially equitable, economically efficient and environmentally sustainable manner.

2.1.2 Rural Water Supply and Sanitation

2.1.2.1 Establishment of Water User Entities in Rural Areas

Rural Water Supplies were constructed and maintained by the Government. Many of them stopped working or worked below expectations due to shortage of funds for their operations and maintenance. A study carried out by the Ministry in the early 1990s indicated that a solution to these problems is to manage them at the lowest appropriate level. To this effect, Act number 8 of 1997 gave mandate for rural communities to establish legal water user entities in the rural areas. This led to establishment of legal water entities in the rural areas, owned operated and maintained by the water users. Registration of these entities has started in various regions.

Promotion of communities has enabled 41 entities to register, with another 15 at various stages in the registration process. It is expected that 2624 village water committees out of an estimated total of 5360 would be promoted to the registration stage of the entities. This would be achieved through respective district authorities staff.

2.1.2.2 Development of the National Rural Water Supply Programme

The National Rural Water Supply and Sanitation Programme (NRWSSP) goal is to reduce poverty and improve the health and quality of life of the rural population by increasing the number of people that have sustained and equitable access to safe water and basic sanitation.

The NRWSSP will be implemented under the overall responsibility of MoWLD.

The MoWLD in close consultation with counterpart ministries and other key stakeholders are developing the NRWSSP. The draft of the NRWSSP is based on experience gained in the sector over a number of decades and on recent policy and strategy related developments within the sector. In

summary, the programme includes sector and sub-sector strategies, current status of the RWSS sub-sector, NRWSSP investment requirements, NRWSSP implementation plan as well as the institutional framework that is required to successfully carry out the programme.

2.1.2.3 Donor Coordination

Technical Advisory Committee (TAC) has recently been set-up under the Rural Water Supply and Sanitation Project to cater for the water sector coordination in which key stakeholders exchange experience and simultaneously advise sector issues. Finally, the adoption of SWAP to be set up within MoWLD for implementation of the NRWSSP will further increase donor coordination in the sector.

2.1.3 Establishment of Urban Water and Sewerage Authorities

The low level of urban water supply and sewerage service delivery in the early 1990s reflected an inappropriate institutional and financial framework with no clear definition of responsibilities between central, regional and local agencies. Urban Water Departments were dependent on Central Government (GoT) budget allocations which were insufficient to cover their operation and maintenance (O&M) costs.

In order to improve operation and maintenance of urban water supply and sewerage systems, the then Ministry of Water through in house team of experts conducted a study in 1992 on financing and management of operation and maintenance of urban water supply and sewerage systems in Tanzania. Major recommendations of the study were to:

- Establish urban water supply and sewerage departments (UWSD) in 18 regional towns and allowing the departments to collect and spend money accrued from the sale of water and charges from waste water disposal to meet O&M costs, and
- Create advisory boards namely Urban Water and Sewerage Boards (UWSBs) to oversee the activities of the established UWSDs.

2.2 Policy Framework

2.2.1 Wider Policy Context

The subsequent operational policy framework responds to the targets of the Tanzania Development Vision 2025, the Millennium Development Goals (MDGs) by 2015 as well as the five-year Tanzanian National Strategy for Growth and Reduction of Poverty (NSGRP), popularly abbreviated as MKUKUTA in Kiswahili, with operational targets to be achieved by the year 2010.

The Government of Tanzania approved MKUKUTA in February 2005. It identifies broad based clusters, operationalized targets and cluster strategies that are strongly linked. The strategy has put forward key prerequisites for its successful implementation, mostly as departures from its predecessor – PRS I. The main departure elements include:

- a move from “priority sector” approach to “priority outcome” which is a result-based approach
- recognition of cross-sectoral contribution to outcomes and inter-sectoral linkages and synergies
- mainstreaming cross-cutting issues

- integration of MDGs policy actions into cluster strategies
- a five-year implementation period instead of three year term
- a greater emphasis on economic growth in poverty reduction

2.2.2 Sector Specific Policy Issues

The current policy framework for water and sanitation in Tanzania is guided by the National Water Policy (NAWAPO) of 2002, whereas the National Water Sector Development Strategy (NWSDS) is a policy implementation tool.

NAWAPO contains a comprehensive framework for sustainable development and management of water resources as well as principles for sustainable provision of water supply and sanitation services in both rural and urban areas. It sets a number of broad sector objectives. In addition to the policy directives guiding water supply service provision, the National Water Policy of 2002 strongly suggests integration of water supply provision with hygiene and sanitation education to the communities with a view of reducing communicable and non-communicable diseases that are mainly water borne and water related. The general multisectoral policy framework for sanitation is closely guided by the provisions of the National Health Policy, specifically the National Environmental Health, Hygiene and Sanitation Policy Guidelines of 2004. Other policies that touch base on sanitation include Local Government Reform Policy and the National Education Policy.

The main objectives of NAWAPO 2002 can be summarized as:

- To address cross-sectoral interests in water, watershed management and participatory integrated approaches in water resources planning, development and management
- To lay a foundation for sustainable development and management of water resources under the changing roles of the Government from service provider to that of coordination, policy and guidelines formulation, and regulation
- To ensure full cost recovery in urban areas with considerations for provision of water supply services to vulnerable groups through various instruments including lifeline tariffs
- To ensure full participation of beneficiaries in planning, construction, operation, maintenance, and management of community based domestic water supply schemes in rural areas

The National Water Sector Development Strategy has been prepared with a time horizon of up to 2015 so as to guide policy implementation countrywide. It sets a number of specific targets for both integrated water resources management and improvement of water supply and sanitation services.

Generally, the policy framework provides a strategic background for implementation plans and interventions for achievement of national and international targets. The sector legislation is being reviewed to be in harmony with the policy and its strategy.

2.2.3 Institutional Framework

The National Water Policy 2002 reflects the changing roles of Government in the context of the decentralisation process for both water supply and sanitation as well as water resources management. Within this context, the institutional sector reforms redefines the Ministry's roles in the provision of water supply and sanitation from that of a direct provider to that of facilitator, regulator and monitor of various actors including communities, districts, non-governmental actors and the private sector.

In water resources management, the policy addresses cross-sectoral interests in water, watershed management and integrated participatory approaches for water resources planning, development and management through decentralisation of decision making from the national level, autonomous basin boards, catchments and subcatchment committees and water user associations that are regarded as the lowest appropriate levels.

2.2.4 Regulatory Framework

The regulation of water supply and sewerage service provision is crucial for protecting the rights of consumers. In Tanzania, the institutionalization of the Public Sector reviews and subsequent legislation amendments paved the way for the Energy and Water Utilities Regulatory Act No 11 of 2001 which introduces an independent regulation of service provision by the private sector and by water supply utilities.

With the same purpose, the regulation of rural water supply and sanitation services is still the responsibility of the government, which can be delegated to Local Government Authorities as amongst appropriate authorities.

The regulation of water resources is also very important especially with regard to the ever-increasing water resources demands due to various socio-economic needs. Regulation is done to ensure water conservation as well as water resources protection against pollution and depletion. This is a direct responsibility of the Government as stipulated in the Water Utilisation (Control and Regulation) Act No. 42 of 1974, which underwent series of amendments to form various levels of water resources governance.

3 Introduction to MKUKUTA Based MDG Costing

The implementation of MKUKUTA starts in the financial year 2005/2006 with the Government budget as the main mechanism of resource allocation. To meet the operational targets of the strategy, the future financing plan will refer to well-costed MKUKUTA based interventions and actions to reach the MDGs. The costing process will clearly define “what it will take” to meet the targets. For the purpose of ensuring proper costing frameworks within Tanzania’s MKUKUTA context, the Government of the United Republic of Tanzania has decided to implement the costing exercise starting with water and sanitation, health, education and agriculture as pilot sectors for later replications in other sectors.

3.1 General Objectives of the MKUKUTA Based MDG Costing

The MKUKUTA based MDG costing primarily assesses the needs and costs of implementing MKUKUTA interventions and of reaching the MDGs. It will clearly define “what it will take” to meet the targets. This is of key importance for several reasons:

- The alignment of the national budget, sectoral plans, local government plans and foreign aid with the MKUKUTA targets is highly facilitated.
- Synergies between the sectors arising from cross-sectoral linkages and cross-cutting interventions and actions can be more easily revealed.
- The alignment and harmonization of MKUKUTA, PER/MTEF and JAS can be enhanced.

- The costing provides guidance for a snap shot of a long-term strategy 2005-2015 building on MKUKUTA which includes an outline of the key policies, institutions, and investments needed to achieve the targets by 2015.
- Based on the historical trend of levels of domestic and ODA resource mobilization, it is evident that there will be a financing gap to meet the desired goals and targets. Tanzania is well positioned to access additional external resources if MKUKUTA and MDGs are well and transparently costed.

In view of the importance of costing, it is critical to develop capacity for needs assessment in Tanzania in Government Ministries, Departments and other public organizations to effectively implement MKUKUTA and to institutionalize needs assessments.

3.2 Guiding Principles

In order to meet the objectives mentioned above, the MKUKUTA based MDG costing follows several guiding principles. Generally speaking, interventions and actions for achieving the MKUKUTA targets and the MDGs are tagged with resource estimates. The specific principles used in the costing process include:

- Cost estimates are made within the MKUKUTA context; strong reference to interventions and actions needed to meet MDGs and MKUKUTA targets is maintained.
- Costing work follows a participatory process, driven by the sector ministry and key stakeholders, with support from consultants, to ensure that results are broadly accepted.
- A clear distinction between costing and financing aspects must be ensured. Other key elements of costing observed throughout the process include:
 - ownership versus partnership
 - relative versus absolute costing
 - domestic versus external funding
 - short- and medium-term versus long-term costing
- Transparency in terms of assumptions and methodologies must be applied.
- The Millennium Project methodology for costing serves as guidance; but this methodology will be augmented with other approaches used to compute previous costing initiatives both in Tanzania and outside Tanzania so as to provide a unique methodology for Tanzania, which is based on MKUKUTA.
- The costing strives for highly disaggregated results (e.g. between urban and rural, by year, by gender, etc).
- Sequencing of the scale-up of interventions is based on targets as well as on non-financial constraints

4 Review of Existing Costings and Ongoing Studies in the Water and Sanitation Sector

4.1 Overview

The MKUKUTA based MDG Costing in the Water and Sanitation Sector builds on documents that are already available, especially in terms of data used, in order to avoid a duplication of efforts. Existing studies also provide a reference for comparison.

In recent years, several costings have been undertaken that estimate the resource needs to carry out various sets of interventions in the water and sanitation sector to achieve the MDGs. They include

- A costing undertaken by the National Rural Water Supply and Sanitation Programme (NRWSSP) in 2004
- A costing included in the Tanzania Country Strategy for Attaining MDGs and WSSD Targets for the Water and Sanitation Sector (MoWLD, 2003)
- The Cost of Water and Sanitation MDGs for Tanzania (WaterAid, 2005)
- The Millennium Project Case Study in Tanzania (preliminary only, 2004)
- A costing included in the Country Assessment – Tanzania (MoWLD / World Bank, 2003)

Additionally, a costing will be included in the National Urban Water Supply and Sewerage Strategy which will be finalized later in 2005.

However, the scope of the costings strongly varies in terms of spatial coverage, in terms of the areas of interventions considered as well as in terms of the time horizon the costing covers. Table 1 provides an overview:

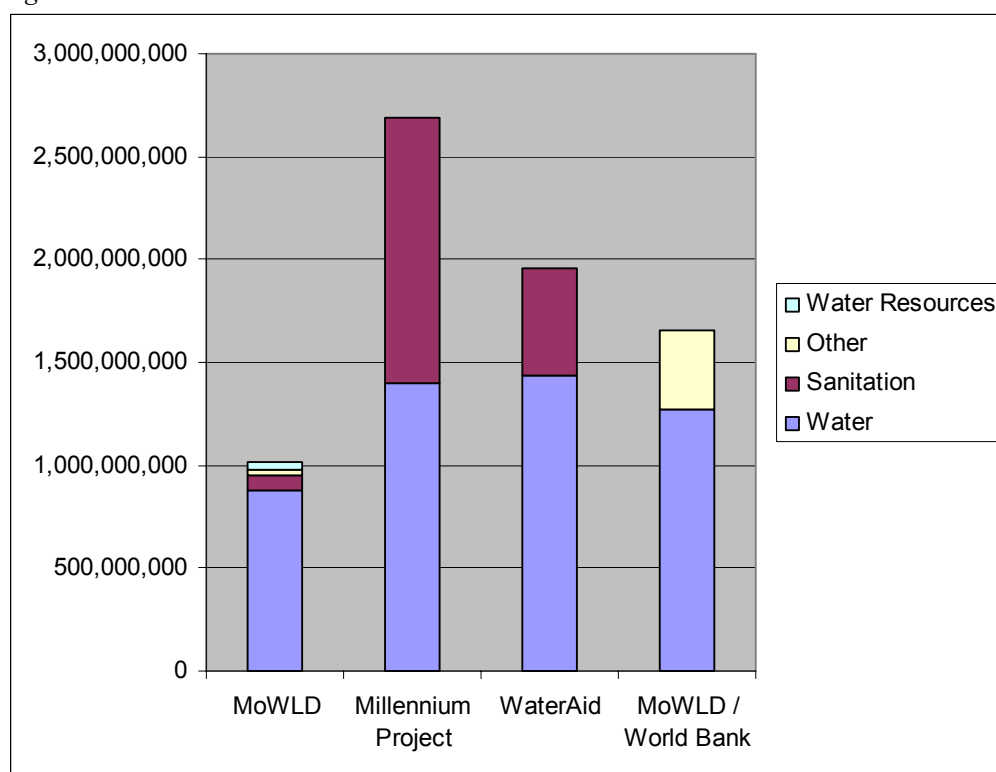
Table 1

	MoWLD	NRWSSP	Millennium Project	WaterAid	MoWLD / World Bank
Costed goals	MDGs	MDGs / Development Vision	MDGs	MDGs	MDGs
Timeframe	2004/2005-2015	2003/2004-2015 / 2025	2005-2015	2000-2015	2000-2015
Geographical scope	Tanzania Mainland and Island (Dar es Salaam excluded)	Mainland	Tanzania	Mainland	Tanzania
Rural / urban	rural and urban	rural	rural and urban	rural and urban	rural and urban

Areas of interventions costed	Water Supply Sanitation Awareness Raising IWRM	Water Supply Sanitation	Water Supply Sanitation Wastewater Treatment Hygiene Education	Water Supply Sanitation	Water Supply
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Given the different references of the costings, the results as shown in Figure 1 strongly differ. At the same time, the significance of this comparison is limited for the same reason. All results are in current US Dollars. Since the NRWSSP costing only considers rural areas, it is not included in the comparison.

Figure 1



Note: Since the NRWSSP costing only considers rural areas, it was excluded in the comparison.

4.2 Analytical Comparison of Data, Methodologies and Assumptions

In order to better understand how the costs were derived, and in order to better be able to build on the existing studies, an analytical comparison of key parameters used in the calculations is necessary. Even though the strikingly different results are also due to the different scope and due to different interventions costed, different data and methodologies also account for differences. Additionally, this analysis facilitates the usage of existing costings as a data source and a basis for the MKUKUTA and MDG costing. A detailed comparison is difficult because many parameters differ. For sanitation, water resources and other costs, data cannot be compared in a more detailed way.

4.2.1 Methodologies

The methodologies to derive the results differ. The Millennium Project, the MoWLD, the NRWSSP and the MoWLD / World Bank costings define interventions and cost them by multiplying the unit cost with the specific coverage targets. The transparency of the calculations as well as the level of detail differs. The MoWLD costing takes another approach. For the most part, it determines the cost by district for the interventions which are then multiplied with the number of districts. However, in terms of the interventions costed, it is much more comprehensive and detailed.

The WaterAid and the MoWLD / World Bank costing do not include an investment plan meaning that they only provide an overall cost for the entire period and do not differentiate the calculations by year. The Millennium Project, MoWLD and NRWSSP costings contain a detailed projection of costs per year so that they are suitable as a basis for an investment plan.

4.2.2 Demographic Parameters

Some of the costings are partially based on demographic data including the size of the current population, the shares of rural and urban populations, and demographic forecasts. To derive the overall costs, the per capita unit costs (which sometimes differ between rural and urban areas) are multiplied with the population to be served. The assumptions and figures regarding population have thus a significant influence on the results of the costings.

The costings differ in terms of the demographic data and assumptions. The figures are not fully comparable since they partially refer to different geographical regions (Tanzania or mainland only) and to different periods of time. However, differences are also due to different data sources used and to different demographic projections.

Table 2

Costing Parameter	MoWLD	NRWSSP	Millennium Project	WaterAid	MoWLD / World Bank
Base year population	33,517,000	-	38,364,837	31,898,000	33,517,000
Share of rural population	82.7%	-	62.6%	80.0%	77.8%
Base year rural population	28,600,000	29,815,330	24,002,898	25,519,000	22,500,000
Projected population growth rate	3.15%	-	1.8%	2.3%	2.3%
Projected rural population growth rate	2.9%	2.8%	0.7%	1.435%	1.4%

4.2.3 Costing of Water Supply Infrastructure

The number of people to be served additionally

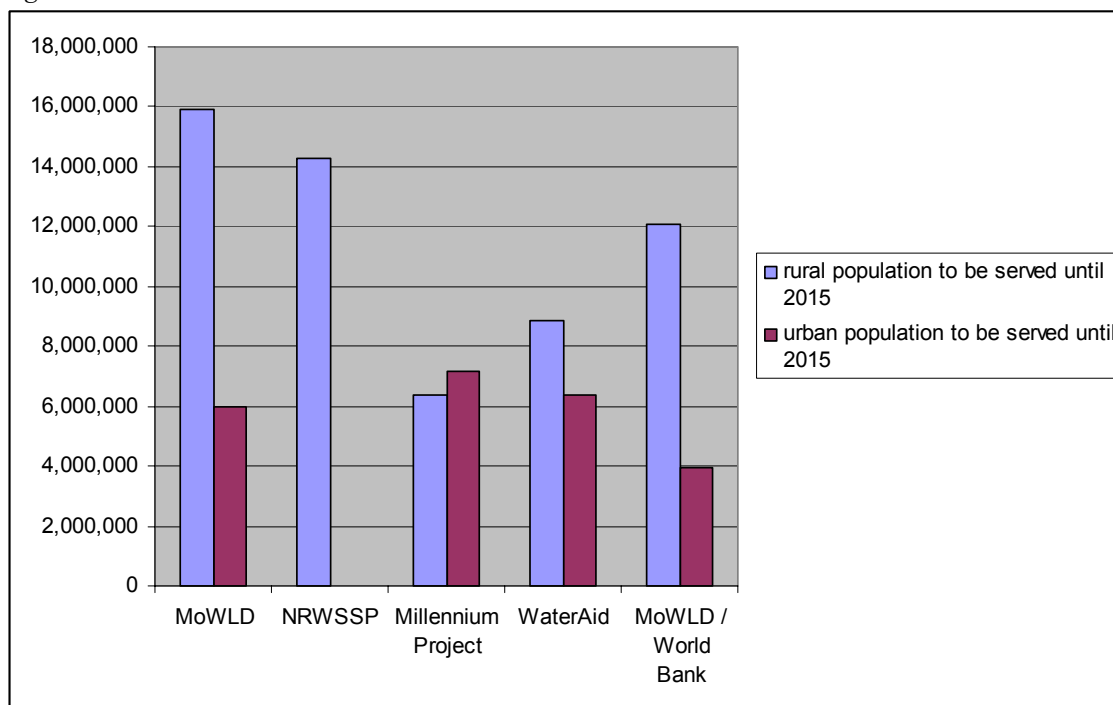
The cost of expanding access to safe water critically depends on the number of people that must be served additionally. This figure is determined by current and target coverage as well as by the demographic parameters presented in the previous section.

Assumed current coverage refers to the percentage of the population with access to clean and safe water; the desired target coverage is derived from the MKUKUTA targets and the MDGs. Differences in base year coverage are due to differing definitions of coverage (in some cases, people with access to

defective infrastructure are included), different base years and different data sources. The MDG target coverage differs because different reference years were used (e.g. 1990 or 2000) and because in case the reference year was identical, historical coverage figures differ according to the data sources used. Figure 2 compares the number of people to be served additionally as assumed in the costings.

Whereas the MoWLD costing assumes that roughly 16 million people are to be served additionally in rural areas in order to attain the MDGs, the Millennium Project bases its calculation on the assumption that only 6 million people living in rural areas need to be served additionally to achieve the MDGs. These striking differences must be reconciled.

Figure 2



Note: NRWSSP figures are taken from draft report

Water Supply Technologies and Unit Costs

Water can be supplied by different technologies. The technology mix refers to the population covered and reflects the percentage share of each technology in existing schemes or in the schemes to be constructed. The additional number of schemes of one particular technology to be constructed depends on current coverage and the current percentage share of the technology as well as on their target values. In other words, the current technology mix and the desired technology mix are critical since every technology has a different cost. The technologies considered in the costings are shown in Table 3. The MoWLD costing does not differentiate between technologies.

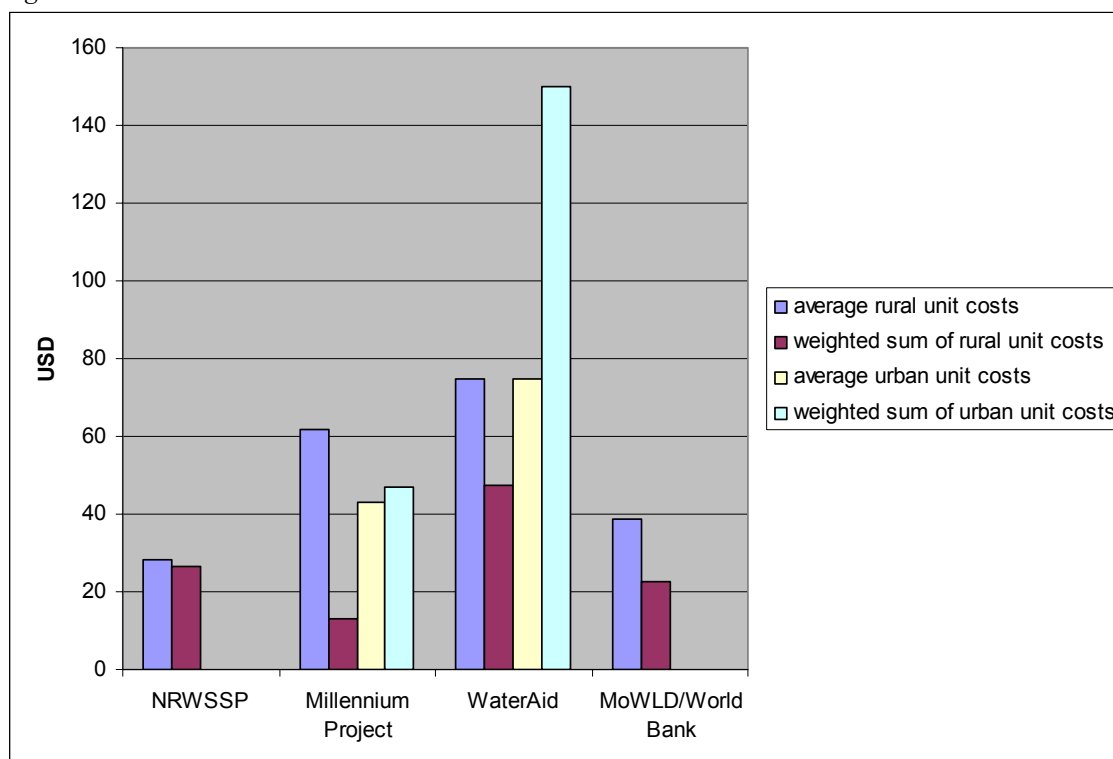
Table 3

MoWLD	NRWSSP	Millennium Project	WaterAid	MoWLD / World Bank
<i>different technologies are not distinguished</i>	<ul style="list-style-type: none"> - Shallow well with hand pump - Borehole with hand pump - Single community gravity fed system - Multiple community gravity fed system - Single community pumped / piped system - Multiple community pumped / piped system - Protected springs - Windmills 	<ul style="list-style-type: none"> - Protected dug well - Boreholes with handpumps - Public stand post - Household connection - Rainwater collection 	<ul style="list-style-type: none"> - Point sources - Piped surface - Piped borehole 	<ul style="list-style-type: none"> - Shallow well - Protected dug well - Protected spring - Borehole - Public standpipe - Household connection - Rainwater collection

Every technology has a unique per capita unit cost which refers to the cost of providing one person with access to clean and safe water. It is difficult to compare the unit costs since the interventions differ between the costings.

Instead, it is possible to compare the average and the weighted sum of the unit costs. The weights can be derived from the current as well as desired technology mix and refer to the share of the technology of the infrastructure to be constructed. A comparison of the weighted sum of the unit costs shows if unit costs account for the differences in the results of the costing. By comparing the average unit costs and the weighted sum of the unit costs for each costing, it is possible to reveal if there is a bias for low or high cost technologies in the calculations. If relatively expensive technologies are favoured, then the weighted sum is larger than the simple average of the unit costs. For the MowLD/World Bank costing, no figures are available for urban areas.

Figure 3



Differences in average unit costs per capita are especially due to differing assumption about the cost of piped schemes and in particular of household connections. Average unit costs per capita are very low in the NRWSSP because to a significant extent, they only contain hardware costs. Water Aid unit costs may contain additional components.

The Millennium Project unit costs are in average relatively high; however, by favouring low cost technologies for rural areas, the overall costs become smaller. The Water Aid costs are very high because only the most expensive technology included in the costing is assumed to be suitable for urban areas.

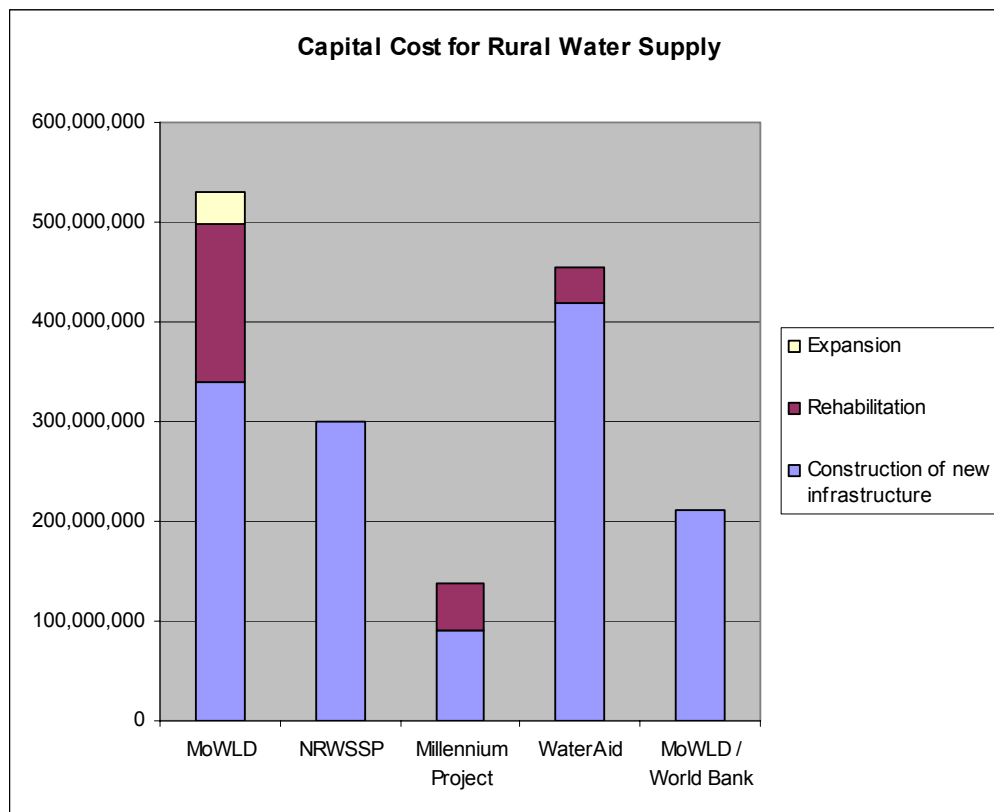
Costs for Rehabilitation and Expansion of Schemes

Expansion costs are only considered separately in the MoWLD costing. The Water Aid and the Millennium Project costings both take rehabilitation into account. Whereas Water Aid only calculates the costs to rehabilitate those newly constructed schemes which break down, the Millennium Project study assumes that some of the existing schemes need rehabilitation. Definitions differ too much so that the figures are hardly comparable.

Comparison of Infrastructure Costs for Rural Water Supply

A detailed comparison of the costs for rural water supply infrastructure is useful. The figures are comparable because they refer to the same interventions and they roughly include the same cost components. Capital costs include cost for construction, rehabilitation and expansion.

Figure 4



Note: NRWSSP figures correspond to draft report and have been adjusted to exclude inflation. The MoWLD / World Bank figures have been adjusted to exclude the capacity building component.

Considering the earlier analysis, it is not surprising that the Millennium Project assumes the lowest costs. In the costing for rural water supply, there is a clear bias for low cost technologies, and the size of the rural population to be served is assumed to be very small.

Operations and Maintenance Costs

The Millennium Project and the NRWSSP costings both take into account operations and maintenance.

Capacity Constraints

Only two costings consider capacity constraints. The MoWLD costing assumes that the water and sanitation sector at the Ministry level does not have the sufficient technical personnel and estimates the cost of additional recruitments. The NRWSSP costing also considers capacity aspects. The capacities of the districts for implementing the different interventions have been reflected in two ways. First, the investments will be undertaken slowly implying that the number of people to be served additionally in the first year is low and then increases in subsequent years. This approach takes into account the time needed to build up implementation capacities in the districts. Secondly, strengthening district management as part of capacity building has been costed.

4.2.4 Costing Sanitation Interventions

The set of interventions related to sanitation fundamentally differs between the costings.

The MoWLD costing takes into account requirements for sewerage, wastewater treatment and hygiene education. Construction of on-site sanitation is not costed.

The NRWSSP study only comprises district level sanitation and hygiene promotion including district staff training, latrine demonstration, mason training, sanitation and hygiene promotion in the community and schools, and proper use of the installed facilities

The Millennium Project preliminary study includes cost for construction of sanitation facilities and sewerage connections, wastewater treatment and hygiene education. Several sanitation technologies are considered including conventional sewerage, simplified sewerage, septic tank, pour flush toilet or latrine VIP and improved pit latrine. Hygiene education is split up into advocacy at primary school level and mass media campaigns.

The Water Aid study only considers the cost of construction of on-site sanitation (basic pit latrine or permanent facility). However, it claims that costs for hygiene education are not significant.

4.2.5 Costing Water Resources and the Consideration of Other Costs

Costs for water resource related interventions are only taken into account in the MoWLD costing. A number of activities for water resource management are costed. In addition, the MoWLD costing takes into account costs for awareness creation beyond hygiene education considered within sanitation ranging from the conduction of seminars on HIV/AIDS to the promotion of political will at all levels on issues pertaining to the water and sanitation sector.

The NRWSSP costing includes contingency costs as an overhead component.

The MoWLD / World Bank costing assumes that 30% of capital costs for water infrastructure must be added for management, planning, design, construction supervision and capacity building.

4.2.6 Analysis of Overall Costing Results

Since the NRWSSP costing only covers rural areas, its overall costs cannot be compared to the other studies. Disregarding the relatively low costs for rural water supply, the MP study has the highest

overall costs followed by Water Aid. Both fully cost sanitation facilities and they both assume that a relatively large number of people must be served in urban areas. Whereas Water Aid assumes a comparably high per capita unit cost for urban areas, the MP also costs operations and maintenance. However, despite the high overall costs, both costings do not necessarily overestimate the needs. Rather, their costings can also be seen as independent and financially unconstrained.

4.3 The Need for Harmonization

As narrated above, there have been a number of attempts to estimate the resource requirements. However, these costings involved different approaches, methodologies, stakeholders, and periods of time hence resulting in different figures.

As a result, at the Annual Water Experts Conference held at Tabora from the 19th to 22nd January 2005, different cost estimates were presented which illustrated the need to harmonize different costing approaches in order to ultimately come out with agreed costs scenarios. Thus, the harmonized costing is expected to provide a single reference for resource estimation for the water and sanitation sector. Previous costings were finished before the drafting and the approval of MKUKUTA which is the central strategic document for poverty reduction in Tanzania. It is essential to carry out a MDG costing which is fully MKUKUTA based and which will be integral part of the MKUKUTA implementation strategy.

The MKUKUTA based costing for the water and sanitation sector must also be comprehensive and exhaustive implying that all relevant interventions are costed. The costing exercise itself must involve directly or indirectly all stakeholders and it must be as transparent as possible so that the results are as widely accepted and approved as MKUKUTA itself.

5 Analytical Framework for the Costing in the Water and Sanitation Sector

5.1 Overview

The analytical framework serves as a basis and reference for the costing. It includes overall choices and the structure for the costing, and it determines the indicators, targets, cross-sectoral linkages, cross-cutting issues, interventions, constraints and quick wins to be considered.

The costing covers nine fiscal years, starting with 2006/07 and ending with 2014/15. Solely the needs for mainland Tanzania will be calculated.

For the purpose of costing, the water and sanitation sector will be divided into three interrelated sub-sectors:

- Water Resources
- Water Supply
- Sanitation and Sewerage

This sub-sectoral division corresponds to the way in which the MKUKUTA water and sanitation targets are clustered. The analytical framework is developed by sub-sector and consists of the identification of indicators and targets including cross-sectoral linkages, interventions, constraints and quick wins. It provides reference for the subsequent MKUKUTA based MDG costing.

Relevant goals, indicators, operational targets will be identified for each sub-sector based on MKUKUTA. Additionally, corresponding MDG targets will be added. Targets of other sectors strongly depend on the water and sanitation sector; in fact without the appropriate interventions in the water and sanitation sector many of these targets cannot be achieved. Therefore, in this context, not only the sub-sector specific targets will be taken into account, but also the requirements due to cross-sectoral linkages. This section answers the question about what must be achieved in the water and sanitation sector.

As a next step, the interventions that will be costed are identified. All interventions related to the water and sanitation sector that are critical to attain the water and sanitation targets and to fulfil the cross-sectoral requirements are taken into account. Other crucial interventions that may even be a precondition for any water and sanitation related activities (e.g. the construction of roads to facilitate the transport of equipment to rural areas) are not considered. Whereas environmental sustainability is mainstreamed in the targets and interventions, gender and HIV/AIDS cut across all three sub-sectors so that additional interventions must be considered. The list of interventions is primarily MKUKUTA based, but was amended by elements of the Water Sector Development Strategy. Costed interventions cover operational activities; processes and one-time activities related to regulation (e.g. the setting of guidelines) which involve a comparably small cost have already been costed previously and are omitted. This section answers the question of how the targets can be achieved.

For each intervention, the conditions for scaling-up must be known. First, possible non-financial constraints and obstacles that inhibit the attainment of the targets must be identified. Appropriate interventions must be carried out to remove capacity constraints in the medium term. Secondly, for the scaling-up, priorities and the sequencing are determined through the identification of 'quick wins'. Quick win interventions are anticipated to bring major gains to the Tanzanian people in the short term at a relatively low cost and can be easily implemented.

5.2 Water Resources

5.2.1 MDGs and MKUKUTA Cluster Goals, Targets, Indicators and Cross-Sectoral Issues

Water is among the key factors in the socio-economic development and the fight against poverty in the country. The Water Resources Sub-Sector accords top priority to poverty eradication with the aim to promote sustainable and equitable economic growth and socio-economic development that will ensure poverty alleviation with the ultimate objective of its eradication.

Adequate availability of water resources contributes directly and indirectly to poverty reduction through many cross-sectoral linkages. Among them are the following:

Water Supply

The availability of water resources in sufficient quantities and in sufficient quality is a precondition to improve water supply for domestic use.

Poverty and Hunger

Water is a factor of various economic activities, for example as a direct input to irrigation for expanded grain production and for increased livestock production. Water resource management can also help to reduce vulnerability of the poor by mitigating disasters such as floods and droughts. Therefore, water resources can contribute directly and significantly to poverty reduction.

Gender and HIV/AIDS

Water Resource must be allocated in an equitable way. Additionally, HIV/AIDS and gender issues require awareness among stakeholders in the water resource sub-sector.

Health

Non-withstanding the importance for water supply, water resources have other direct impacts on health. Fresh water pools and open water sources provide breeding grounds for mosquitos which transmit malaria as well as other diseases and for snails which transmit worms causing diarrhea once they enter the human organism. Both cause a very high burden of disease. Water resource management must ensure to the extent possible that open water sources in or near to human settlement can no longer serve as breeding grounds.

Water Resources and Environmental sustainability

Water resources are vital for the environment. Improved water management, including pollution control and water conservation, is a key factor in maintaining ecosystems integrity. Water resource management can further contribute to biodiversity conservation and to combating desertification.

The following list of MDGs and MKUKUTA targets correspond to these issues:

Table 4

MKUKUTA Cluster and broad outcomes	MKUKUTA Goal	MKUKUTA Operational Targets	Corresponding MDG Targets
Cluster 1: Growth and reduction of income poverty ➤ Broad based and equitable growth is achieved and sustained	Goal 2: Promoting sustainable and broad-based growth	➤ Increased agricultural growth from 5% in 2002/03 to 10% by 2010 ➤ Increased growth rate for livestock sub sector from 2.7% in 2000/01 to 9% by 2010	Goal 1: Eradicate extreme poverty and hunger ➤ Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day ➤ Target 2: Halve, between 1990 and 2015, the proportion of people who suffer from hunger
	Goal 4: Reducing income poverty of both men and women in rural areas	not specified	
	Goal 5: Reducing income poverty of both men and women	not specified	
Cluster 2: Improvement of Quality and Social Well Being ➤ Improved quality of life and social well-being, with particular focus on the poorest and most vulnerable groups ➤ Reduced inequalities (e.g. education, survival, health) across geographic, income, age, gender and other groups	Goal 2: Improved survival, health and well-being of all children and women and of especially vulnerable groups	➤ Reduce hospital-based malaria-related mortality amongst under fives from 12% in 2002 to 8% in 2010	Goal 6: Combat HIV/AIDS, malaria and other diseases ➤ Target 8: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
	Goal 3: Increased access to clean, affordable and safe water, sanitation, decent shelter and a safe and sustainable environment and thereby, reduced vulnerability from environmental risk.	➤ Increased proportion of rural population with access to clean and safe water from 53% in 2003 to 65% 2009/10 within 30 minutes of time spent on collection of water. ➤ Increased urban population with access to clean and safe water from 73% in 2003 to 90% by 2009/10.	Goal 7: Ensure environmental sustainability ➤ Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources ➤ Target 10: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and sanitation
		➤ Reduced water related environmental pollution levels from 20% in 2003 to 10% in 2010. ➤ Reduction in harmful industrial and agricultural effluents.	
		➤ Reduced vulnerability to environmental disasters. ➤ Natural resources and other ecosystems that people depend upon for production and reproduction conserved. ➤ Reduction in land degradation and loss of biodiversity.	
	Goal 5: Systems in place to ensure effective universal access to quality public services that are affordable and available.	➤ Skilled personnel in social sectors infrastructure and utilities are attending to their tasks and executing their obligations accordingly	

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

MKUKUTA Cluster and broad outcomes	MKUKUTA Goal	MKUKUTA Operational Targets	Corresponding MDG Targets
Cluster 3: Governance and Vulnerability ➤ Good governance and the rule of law are ensured ➤ Leaders and public servants are accountable to the people through the effective reduction of corruption and public access to information ➤ Democracy and political and social tolerance are deepened	Goal 2: Equitable allocation of public resources with corruption effectively addressed	➤ Public resources are allocated, accessible and used in an equitable, accountable and transparent manner	Goal 3. Promote gender equality and empower women

5.2.2 Interventions

Integrated water resources planning, development and river basin management shall be implemented to ensure that water resources of acceptable quality are maintained in the country and that the targets previously identified including the overall objective of poverty reduction are achieved. Various interventions have been identified based on the National Water Sector Development Strategy and National Strategy for Growth and Reduction of Poverty (MKUKUTA). The main groups of interventions for the water resources sub-sector are described below.

Water Resource Assessment

Given the crucial role that water resources play in achieving socio-economic development, the evaluation and monitoring of water resources including the determination of sources, quality, dependability and extent must be improved. Availability of accurate as well as timely data and information is crucial for effective water resources development and management to sustain the desired pattern of socio-economic activities and to facilitate an evaluation of the possibilities of utilization and control of water resources.

The result of not addressing this strategic need is increased cost, increased uncertainty and less than optimal decision-making. For example, the loss of long-term stream gauges impacts the accuracy of flood frequency data that can cause underestimation or overestimation of flood risk. Either case can cost significantly in terms of resources and at times the loss of life.

Therefore, the strengthening of water resources monitoring networks for quality, quantity and pollution control, development of computerised databases and mechanisms for sharing of information in water resources are given due attention for management purposes.

Water quantity and water quality maps will be prepared and these together with other water resources information will be made easily accessible to users, stakeholders and decision makers including those involved in negotiations related to the use of international shared water sources. The continued collection of long-term water resources data, effective management of the data and easy access to data and information therefore have been identified as critical interventions to informed decision making by communities, public officials, regulators, consultants, business and industry representatives.

Water Quality Management

Ensuring that water quality corresponds to acceptable standards is essential. The various human activities taking place in the basins threaten the rivers with increasing pollution and degradation. Strategies will be developed to facilitate systematic monitoring and assessment of the status of water quality. Pollution of water resources from point and non point sources contributes to the diminishing of water available for various uses and would therefore require specific interventions.

Guidelines, legal and administrative actions for pollution control and compliance with abstraction rights will be enforced in conjunction with standards for in-stream flows, industrial effluents as well as influents and other waste discharges for meeting environmental objectives. Properly equipped laboratories must be in place which is an essential condition for sound water quality management.

Conservation (Quantity)

Sufficient water resources must be available. Therefore, conservation measures must be taken. These comprise mechanisms for leakage control, water pricing and installation of bulk meters on all individual and communal customer connections. Catchments restoration, protection and management including providing community level support to planting water friendly trees for watershed protection will be implemented.

Alternative Resource Development

Water shortages are growing across many regions particularly in the five basins of Rufiji, Pangani, Wami/Ruvu, Internal Drainage and Lake Victoria, which together cover about 61 percent of the country. The interventions to be considered for development in the short, medium and long terms include rainwater harvesting and storage, surface water harvesting and storage in catchments, inter-basin water transfer, defluoridation, desalination, and recycling. However, desalination and water recycling are expensive alternatives that need to be considered only when very necessary and when resources permit.

Integrated Water Resources Management (Demand Management, Water Utilization and Allocation)

The Integrated Water Resources Management (IWRM) approach is an ecosystem-based approach that considers the interrelationships between natural resource systems and biophysical processes, socio-economic systems and objectives. It also takes into account factors outside the water sector such as the development of agriculture or energy, which impact on the use and allocation of water resources and services. In implementing IWRM, and recognizing that water is a scarce resource that integrates the linkage between land use and water use, multi-sectoral and interdisciplinary river basin management will be employed. The interventions in integrated water resources management call for strengthening of strategies for efficient equitable water resources allocation and use.

In this view integrated water resources development and management plans that consider environmental sustainability will be developed for each basin to ensure that water does not become a constraint to national development. The development of IWRM plans will provide opportunity to assess the state of affairs and to lay out issues and priority actions in line with the current country situation and needs for demand management, water utilisation and allocation. All water abstractions and effluent discharges into receiving water bodies shall be subject to a "water use permit" or "discharge permit" to be issued for determined beneficial use and for a specific duration.

Additionally, IWRM must aim at eliminating mosquito breeding sites especially at ponds that were created during road constructions and in charcos. The former can and must be dried out which requires awareness creation among the planners of roads and among construction workers. Charcos are vital for the poor because they provide water for livestock so that other kinds of actions are required. Possibilities include chemical treatment, the planting of special trees and plants in the surrounding, the introduction of gambusia (a mosquito larvae eating fish) and their brief drying out shortly before the rains start. As intervention packages, awareness creation and community support with equipment are necessary.

Transboundary Water Resources

One of the important features of Tanzania is the presence of transboundary rivers, natural reservoirs and consequential groundwater resources. The drainage areas of these international water bodies cover over 43.5% of the country's land area. Water issues within transboundary basins have inter-riparian significance. Decisions made in one country frequently affect other neighbouring countries. As population in the transboundary basins grow and their water demands increase, the need to coordinate the development and management of the shared watercourses is of primary importance, without which there could be substantial economic losses and potential for conflict.

Disaster Management

Disasters may occur due to lack of preparedness to manage droughts and floods on a basin-wide basis. Droughts are endemic to Tanzania and often trigger serious hydrological imbalances causing loss or damage to crops, a shortage of water for people, livestock and wildlife as well as famine and disease. Drought exerts a wide range of environmental and economic activities.

Floods devastate parts of the country resulting in massive damage to physical infrastructure, crops, livestock, loss of lives and public health hazards due to water related diseases.

The ability to monitor and forecast changes in climatic patterns and to internalise climatic variability in water resources planning and management as well as decision making will be enhanced by developing mechanisms for flood and drought forecasting including early warning systems. Mapping of vulnerable areas, disaster mass preparedness, administration of safety of dams and contingency plans for minimising the impact of disasters will be instituted in order to improve the security of the people and economy.

Cross-Cutting Issues

HIV/AIDS is a threat to individuals and families in the water resources sub-sector. The goal is to decrease the number of HIV/AIDS infected and affected individuals so that HIV/AIDS is no longer a threat to their health and productivity. The intervention focuses on the incidence of HIV/AIDS infection and the socio-economic impact of HIV/AIDS. The main strategy is to halt this trend by promoting HIV/AIDS awareness and voluntary testing.

Gender bias particularly in favour of men will prohibit meaningful women participation in IWRM contributing to poverty reduction. The intervention will facilitate the achievement of substantive equality between women and men in the water resources sub-sector through mainstreaming gender into the water resources management programmes and activities. Awareness creation on gender policy and institutional frameworks, women's human and legal rights, gender mainstreaming, women's empowerment policies and strategies, access to and control of resources, and access to decision-making positions shall be implemented. Training on gender budgeting and gender disaggregated data will also be carried out along with the interventions.

Organizational Development and Capacity Building at headquarter and basin level (catchment level included)

The alignment of national water resource programs by river basin, along with partnering between all levels of water management players have been identified as a strategic intervention. Effective regulatory and voluntary programs will be carried out in cooperation with local officials and communities because they play a key role in the health of a river basin through decisions that affect the type and location of human activity within a river basin. Therefore, cooperation among all water management players is a key to the success of river basin management. Achieving environmental objectives regarding national surface and groundwater requires addressing this strategic need for river basin management.

Coordination mechanisms will be established and supported to facilitate water resource planning on the basis of river basins, to use an integrated multi-sectoral approach, to involve stakeholders and to consider requirements for bio-diversity and human health. Capacities of the main levels of planning (national, river basin offices including catchments and community or water user association level) and of the Water Resources Institute will be strengthened. The provision of adequate working gear including a sufficient number of vehicles, adequate incentive package for retaining and attracting the professional capacity as well as tailored training for enhancing governance and accountability ethics, for disaster and emergency preparedness and for training in negotiation and conflict resolution are among the major interventions for building capacity in the water resources sub-sector. Also, measures will be taken to ensure empowerment of the poor, not least poor women, as a precondition for their meaningful participation in IWRM contributing to poverty reduction.

Awareness Creation

Water resources education and outreach is necessary to protect the sustainability of national water resources. The implementation of an awareness campaign and the coordination of water resources

education efforts have been identified as strategic issues. Wise decision making by all water users is necessary as the era in which expanding water supplies is ending and managing water resources through conservation, recycling, and reuse will be necessary. Ensuring the sustainable use of national water resources in both domestic and productive sectors requires a focus on the strategic need for both water quantity and quality education as well as outreach. Future decision making capability regarding water resources will impact the national economy, environment and quality of life.

Table 5 summarizes all interventions.

Table 5

Area	Intervention Package
Water Assessment	Strengthening of water resources monitoring network for quality, quantity and pollution control (infrastructure and institutions) Water quantity and water quality maps Network operation and maintainance Dissemination of data and information
Water Quality Management	Strengthening of water laboratories Microbiology analysis Capacity for environmental impact assessments on national level Enforcement of guidelines and legislation for pollution control and compliance with abstraction rights
Conservation (Quantity)	Mechanisms for leakage control Water pricing Installation of bulk meters on all individual and communal customer connections Catchment restoration, protection and management - including providing community level support to planting water friendly trees for watershed protection Incentive package for attracting communities to protect the catchments against encroachment
Alternative Resource Development	Inter-basin transfers Promotion of rainwater harvesting and storage Surface water harvesting and storage Defluoridation Wastewater reuse
Integrated Water Resources Management (Demand Management, Water Utilization and Allocation)	Stakeholder coordination and collaboration Strengthening national coordination Institution of abstraction permits and revenue collection Integrated water resource management plans that consider environmental sustainability Development of integrated water resources management plans Water use efficiency plans Development of water use efficiency plans Monitoring of water utilization for all uses Support and regulation of water for domestic use, the Increase in number of irrigation schemes, charcos dams and other economic production activities Minimization of mosquito and snail breeding sites Support the development and the promotion of hydram and hydro options
Transboundary Water Resources	Coordination and collaboration
Disaster Management	Flood and drought forecasting including early warning systems Mapping of vulnerable areas

Area	Intervention Package
	Institute contingency plans for minimising the impact of disasters Administer safety of dams Emergency relief services
Cross-Cutting Issues	HIV/AIDS awareness Promotion of voluntary testing Gender awareness Gender budgeting Gender disaggregated data
Organizational Development and Capacity Building at Headquarter and Basin Level (Catchment Level Included)	Adequate incentive package for retaining and attracting the professional capacity Tailored trainings for enhancing governance and accountability ethics Transboundary water resources management: training in negotiation and conflict resolution Incentive package for technicians Incentive package for other staff Tailored training for disaster and emergency preparedness at national and basin level Strengthening of water basins offices Strengthening of headquarter Strengthening the Water Resources Institute Development of policies, programmes, plans and monitoring
Awareness Creation	Disaster mass preparedness Awareness creation for efficient water use in both domestic and productive sectors

Even though these interventions clearly and significantly contribute to the achievement of the MKUKUTA and MDG targets identified above, based on identified information, it is not clear how much of each intervention is needed. Therefore, the goals included in the NWSDS have been considered as well:

- A nation-wide inventory and status of available and potential surface and groundwater resources and their utilisation is available.
- Increased environmental protection and conservation measures contribute to the sustainability of all aspects of water development, management and use.
- Water resources of acceptable quality are maintained to meet agreed objectives and standards on the basis of a river classification system supported by measures to ensure sustainability.
- Water and misuse of water is minimised and water supply infrastructure is protected from abuse.
- Alternative technologies for the development of water resource availability are developed for use in appropriate situations.
- An institutional framework is established for integrated water resource management providing for effective and efficient integrated water resources management, and which clearly identifies the roles and responsibilities of the relevant organizations and stakeholder.
- Effective and equitable planning for the use of water resources is carried out on an integrated multi-sectoral basis.

- Water needs of all socio-economic sectors are met on a sustainable basis through efficient use of water conservation measures, and management of demand through awareness creation and the setting of water charges on an economic basis.
- Implementation of a responsive, effective and sustainable water resource utilisation and allocation system based on social and economic priorities whilst maintaining reserves for the protection of eco-systems.
- Effective and sustainable water resources management is carried out at all levels through integrated and participative management approaches.
- Sufficient staff possessing the required knowledge, skills, and the resources to implement water resources management functions effectively, are available in the institutions at national, basin, catchment and local levels.
- A strategy, framework and need requirements for utilization of transboundary water resources for all relevant basins for socio-economic development in collaboration and coordination with riparian states is in place.
- Mechanisms to provide advance warning of possible disasters and have contingency plans and resources available to minimise the impact of natural and other disasters are in place.
- The spread of HIV/AIDS among water sector stakeholders is reduced and impacts are mitigated.

5.2.3 Scaling-up

5.2.3.1 Constraints

There are several specific constraints which may inhibit the achievement of the targets. Most of them are addressed and ultimately removed by the interventions identified above. Among them are the following:

- Inadequate, inefficient and ineffective network of water resources monitoring stations required to provide water resources information (inadequate data and information)
- High levels of unaccounted for water due to insufficient water demand management
- Inadequate working facilities and incentives to experienced personnel
- Pollution of water resources from point and non-point sources
- The absence of cooperative management of the shared water resources (transboundary water resources)
- Poor water allocation and land management

However, some constraints are unaffected by the interventions and may represent serious obstacles for the scaling-up to achieve the targets. In particular, there are the following:

- An uneven distribution of water resources both in time and space causes constraints and limitations to development

- Water resources depletion and rising demand due to population growth and urbanization on limited water sources
- Competing demands and interests that effect water use for the major sectors

Finally, the success of the implementation of the interventions depends on other conditions, for example, the labour market must allow additional recruitments, and a basic level of functioning infrastructure must be in place. If these are not fulfilled, they can likewise be constraints for the water resources sub-sector.

5.2.3.2 Quick Wins

Some quick wins have been identified amongst interventions in the water resources sub-sector. They include:

- Strengthening of water resources monitoring network for basic water resource assessment (quality, quantity and pollution control)
- Strengthening of water basins offices by providing efficient equipment and personnel to ensure proper evaluation of water resources.
- Adequate incentive package for retaining and attracting the professional capacity
- Catchment restoration, protection and management - including providing community level support to planting water friendly trees for watershed protection.
- Training in and support for activities to minimize mosquito breeding sites

5.3 Water Supply and Sanitation and Sewerage

5.3.1 MDGs and MKUKUTA Cluster Goals, Targets and Indicators

Not only is access to safe water and basic sanitation essential for the reduction of poverty, it is also an end in itself. Therefore, MKUKUTA and the MDGs set specific targets for water supply, sanitation and sewerage that must be achieved. The attainment of these targets is also a fundamental condition for progress in other sectors.

Table 6 provides an overview of the indicators and quantified targets to be achieved. They refer to MKUKUTA goal 3 ('Increased access to clean, affordable and safe water, sanitation, decent shelter and a safe and sustainable environment and thereby, reduced vulnerability from environmental risk') in cluster 2 and to target 10 (Halve, by 2015, the proportion of people without sustainable access to safe drinking water and sanitation) under MDG 7.

Table 6

Sub-sector	Indicator	2003 Value	MKUKUTA operational target 2010	MDGs 2015
Water Supply	% rural population with access to clean and safe water within 30 minutes of time spent on collection of water	53%	65%	76.5%
	% urban population with access to clean and safe water	74%	90%	90%

Sanitation	% of people with access to basic sanitation by 2010	87%	95%	95%
	Adequate sanitary facilities in schools	80%	100%	100%
	Access to improved sewerage facilities in respective urban areas	17%	30%	30%
	Reduction of number of cholera outbreaks by 50%			
	Reduce households living in slums without adequate basic utilities			

Basic Sanitation can be defined as the lowest-cost option for securing sustainable access to safe, hygienic, and convenient facilities and services for excreta and sullage disposal that provide privacy and dignity while ensuring a clean and healthful living environment both at home and in the neighbourhood of users.

Whereas MKUKUTA is more specific and includes numeric values for the targets, the MDGs are more general. Therefore, to derive specific values for MDG target 10, MKUKUTA was used for interpretation. As the base year, which is not specifically set in the MDGs, 2003 was chosen. Likewise, the base year value was adopted from MKUKUTA. Using MKUKUTA to interpret target 10, it becomes obvious that MKUKUTA is more comprehensive and in some fields more ambitious than the MDGs, especially with regard to urban water supply, access to basic sanitation, adequate sanitary facilities in schools and the reduction of cholera outbreaks. To fill gaps and to avoid contradictions, the MKUKUTA values were used for the 2015 targets where appropriate.

5.3.2 Cross-Sectoral and Cross-Cutting Issues for Water Supply, Sanitation and Sewerage

The water supply as well as the sanitation and sewerage sub-sectors directly and indirectly contribute towards poverty reduction and a number of other objectives. In the context of costing both sub-sectors, it is important to understand these linkages in order to determine whether actions taken to attain the water and sanitation targets suffice, or whether additional interventions are needed with regard to other goals.

Therefore, improved access to safe water and to basic sanitation is essential for the achievement of many MKUKUTA targets and virtually all MDGs. These cross-sectoral linkages can be grouped by sectors and include the following:

Poverty

Provision of clean and safe water supply is an important input in ensuring improved health of household members; adults who are ill themselves or who must care for sick children are less productive. Illnesses caused by unsafe drinking water and inadequate sanitation generate health costs that can claim a large share of poor households' income. Also, time spent in collecting water cannot be used for other livelihood activities. It is imperative that achieving the water supply targets will contribute to reduction of poverty of households. However, in order to reduce poverty, water supply and sanitation services must be affordable so that poor households can benefit.

Primary Education

Improved water supply and sanitation services relieve girls from water-fetching duties, allowing them to attend school. Reducing illness related to water and sanitation, including injuries from water-carrying, improves school attendance, especially for girls. Also, having separate and bigger number of sanitation facilities for girls in schools will increase their school attendance, especially after menarche. These linkages are already partially reflected in the water supply and sanitation targets mentioned in the previous chapter.

Gender and HIV/AIDS

Reduced time and health burdens from improved water services give women more time for productive endeavours, adult education, empowerment activities and leisure. Water supply and sanitation facilities closer to home put women and girls at less risk for sexual harassments and assaults encountered while gathering water and searching for privacy. This can also reduce new infections of HIV/AIDS. Additionally, gender issues and HIV/AIDS require awareness of stakeholders.

Water Related Diseases

Safe drinking water in sufficient quantities and basic sanitation help prevent water-related diseases, especially diarrheal diseases including cholera. Water must therefore be protected at the source, during distribution and in the household before consumption implying that hygiene education is critical. If people do not observe hygienic practices, for example in terms of transporting water to their homes and storing it safely, increased coverage with access to safe water is meaningless from a health perspective.

Maternal Mortality

Sanitation and safe water in health-care facilities help ensure clean delivery and reduce neonatal deaths as well as to ensure basic hygiene practices following delivery. Therefore, improved access to safe water and sanitation at home does not suffice.

Water Resources and Environmental sustainability

Improved sanitation services have positive impacts on water resources. Adequate treatment and disposal of excreta and wastewater contributes to better ecosystem management and less pressure on freshwater resources. Also, improved sanitation reduces flows of human excreta into waterways, thereby polluting water sources and endangering environmental health. However, achieving the sanitation targets therefore automatically improves water resources.

5.3.3 Water Supply Interventions

The water supply related interventions to attain the targets and to satisfy cross-sectoral requirements identified above that will be costed were listed from the MKUKUTA document, Water Sector Development Strategy and policy dialogue meetings held with departmental Directors within the Ministry of Water and Livestock Development. They can be subdivided into five groups: Rural water supply infrastructure, urban water supply infrastructure, capacity building and institutional strengthening, awareness creation and cross-cutting issues including HIV/AIDS and gender.

Rural Water Supply Infrastructure

Additional water supply schemes must be constructed in order to increase the percentage of the population with access to safe water. The construction of water supply schemes includes expansion

and extension which will not be considered separately since a clear distinction is not feasible. Access to safe water can only be achieved through protected sources.

Technology options for rural areas are in line with the NRWSSP and include:

- Shallow well with handpump
- Borehole with handpump
- Protected spring
- Windmills
- Single community gravity fed system
- Multiple community gravity fed system
- Single pumped and piped system
- Multiple pumped and piped system

The service level in rural areas generally corresponds to public taps. However, until 2015, a certain percentage of households will be provided with upgraded service levels. Therefore, as an additional intervention, the upgrading of access to safe water to household connections will be considered.

Additionally, a certain percentage of the currently existing schemes is malfunctioning so that rehabilitation is required.

All water supply schemes must be properly operated and maintained in order to ensure their continued functioning. Costs for operation include for instance electricity or fuel for the pumps; maintenance includes for example minor repairs and surveillance of schemes.

In the context of rainwater harvesting infrastructure, the construction and rehabilitation of small and medium dams as interventions will be considered. Whereas the construction of small dams involves the movement of about 25,000 – 50,000 m³ of earth, the construction of medium dams involves the movement of 100,000 m³ of earth.

As an additional requirement for health, access to safe water should not only be improved for households, but also in health facilities. In rural areas, three types of health facilities can be distinguished: hospitals, health centres and dispensaries. All health facilities in rural areas must have on-site rainwater harvesting facilities. Additionally, depending on the use of the water, they can rely on the community borehole. Drilling boreholes on the compound of the health facilities may lead to overcrowding. Additional equipment like diesel or electrical pumps to distribute the water within hospitals will not be considered in this costing. Table 7 summarizes the interventions for rural water supply.

Table 7

Intervention Package
Construction of new water supply schemes
Upgrading to household connection
Operation and maintenance
Rehabilitation of existing broken schemes
Rainwater harvesting
Construction of water supply infrastructure for health facilities

Urban Water Supply Infrastructure

The urban population growth has been outstripping by far the investment in water supply infrastructure so that current coverage does not correspond to the target values. At the same time, the water supplied is not effectively and efficiently used due to high losses through leakage. In some urban areas, the unaccounted for water is as high as 60 to 70%. Access to safe water must also be secured in urban health facilities.

Additional water supply schemes in urban areas must be constructed. As above, the construction of water supply schemes includes expansion and extension. Three sources and technologies of water supply will be differentiated:

- Piped and pumped water from surface sources
- Piped and pumped water from boreholes
- Gravity-fed systems from springs

The service level of new water supply schemes that are constructed is assumed to correspond to household connections.

Additionally, a certain percentage of the currently existing schemes are malfunctioning so that rehabilitation is required. From a health perspective, it is also essential that the distribution system is in good shape. The pipes must not have leakages to avoid contamination with wastewater.

As in rural areas, all water supply schemes must be properly operated and maintained causing recurrent costs. Operation may include electricity for the pumps and chemical treatment of water, and maintenance is needed to prevent a break down of the schemes.

The installation of meters is vital to prevent wastage and to control water usage. Whereas bulk meters are considered within the water resources sub-sector, the installation of meters on consumer level is an important intervention under urban water supply.

All urban health facilities must be granted access to water. Hospitals require an on-site connection to a piped system. A borehole equipped with a hand pump should be used for water that is not related to the treatment of patients. Water from the borehole can also prevent water shortages in case the piped system breaks down. Health centres likewise require an on-site connection; as a second source, rainwater harvesting suffices. Additional critical equipment like tanks and pumps to distribute the water within the hospitals will not be considered.

Table 8 summarizes all interventions considered for urban water supply.

Table 8

Intervention Package
Construction of new water supply schemes
Rehabilitation of existing broken schemes
Operation and maintenance
Installation of meters
Water supply infrastructure for health facilities

Capacity Building and Institutional Strengthening

Sufficient capacities and strong institutions are necessary to underpin the investments in infrastructure in order to ensure that water supply is sustainable. The interventions can be grouped along two dimensions.

On the one hand, different institutional levels can be distinguished (national, regional, district and community level as well as non-state actors including consultants, contractors and NGOs). The corresponding institutions are the Ministry of Water and Livestock Development (MoWLD), the Drilling and Dam Construction (DDCA), the Energy and Water Utilities Regulation Authority (EWURA), Urban Water Supply and Sewerage Authorities (UWSSA), the regional secretariats and the district councils. On community level, capacity building refers to COWSOs and community artisans.

On the other hand, interventions packages can be classified by field which include recruitment and training, working gear and restructuring of institutions. It is important to note that not all fields of interventions are relevant for every institutional level. Table 9 provides an overview of all interventions related to capacity building and institutional strengthening considered:

Table 9

Level	Intervention Package
National level	Recruitment and retention of appropriate and qualified staff on permanent basis or contract (including staff for BWO dealing with water supply)
	Working gear (transport, equipment, working tools, etc.)
	Carry out training needs assessments for personnel according to their job skills requirements
	Capacity building and training in programme concepts
	Training in public health
	Evaluation of the performance of water supply organisations
	Monitoring and Annual Audit
	Strengthening planning and coordination mechanisms
DDCA	Institutional strengthening for rain harvesting activities
	Assist districts to drill medium deep/deep boreholes
EWURA	Regulation of service provision by EWURA
Regional level	Recruitment and retention of appropriate qualified staff on permanent basis or contract (including staff for BWO dealing with water supply)
	Working gear (transport, equipment, working tools, etc.)
	Carry out training needs assessments for personnel according to their job skills requirements
	Capacity building and training in programme concepts
	Evaluation of the performance of water supply organisations
	Monitoring and Annual Audit
	Strengthening planning and coordination mechanisms
District level	Recruitment and retention of appropriate qualified staff on permanent basis or contract
	Determination of construction and rehabilitation needs
	Training needs assessments for personnel in all WSS organisations.

Level	Intervention Package
	stakeholder consultations and beneficiary participation in investment decisions
	Working gear (transport, equipment, working tools, etc.)
	Tailored capacity building for management and maintenance of water supply schemes
WSSA	Institute customer reporting mechanisms for wastage, misuse and leakage
	Recruitment and retention of appropriate qualified staff on permanent basis or contract
	Working gear (transport, equipment, working tools, etc.)
	Monitoring and Annual Audit
	Carry out training needs assessments for personnel according to their job skills requirements
	Conduct studies on affordability to pay for water and sanitation services based on age, disability and gender
Community Level	Training of community artisans / attendants for basic maintenance of water supply schemes and sanitation facilities
	Tailored training to COWSOs in management of water supply schemes
Contractors, NGOs and Consultants	Training in programme concepts

Awareness Creation

For awareness creation and cross-cutting issues, only interventions which are directly related to water supply were considered. Hygiene education is considered within the sanitation and sewerage sub-sector. The following intervention packages have been identified:

Table 10

Intervention Package
Advocacy on private sector participation
Awareness in programme concepts
Awareness creation for rainwater harvesting
Advocacy and awareness on water supply and sanitation (NAWAPO 2002 & improved sanitation and hygiene)
Raise awareness of the communities and other stakeholders regarding performance monitoring and the procedures involved.
Design and implement a public awareness campaign to promote the minimum service levels to which consumers will be entitled.

Cross-Cutting issues

In order to halt the spread of HIV/AIDS, various interventions must also be carried out in the sub-sector of water supply. Typically, women are more adversely by a lack of access to safe water and sanitation as explained above. Therefore, it is critical that especially women are empowered to participate in the planning and design of water supply schemes. In order to facilitate the situational analysis, gender-disaggregated data must be available.

Table 11

Intervention Package
Raise awareness, train and empower women to actively participate at all levels in planning, designing and managing water programmes.
Advocacy and awareness at all levels through Water Week and World Water day
Develop and implement public awareness campaigns on the opportunities and advantages of stakeholder participation in the provision of WSS services.
Mobilize both human and financial resources to facilitate implementation of situational analysis and operational plan on HIV/AIDS.
Carry out HIV/AIDS situational and impact analysis
Facilitate collection and analysis of gender-disaggregated data to facilitate inclusion in the planning and budgeting processes.

5.3.4 Scaling-Up of Interventions for Water Supply

5.3.4.1 Constraints

Several factors may prevent the attainment of the targets. Access to safe water depends on sufficient water resources which can be abstracted at affordable costs. Additionally, the attainment of the water supply targets depends heavily on conditions in other sectors, e.g. there must be roads so that drilling equipment can be transported to remote areas. Capacity constraints are significant and mainly result from the redefinition of the roles of the various institutions in the supply of water. A complete assessment of capacity needs is strongly desirable as some of the capacity gaps are not yet visible. However, even a quick appraisal of the existing capacities at district level clearly highlights the capacity deficits related to the roles and responsibilities newly transferred in the process of decentralisation. Whereas most district administrations have relevant experiences with the implementation and operation of small water supply schemes using simple technologies, the construction of more complex schemes, management aspects related to the tendering and financing as well as the supervision and coordination of the activities of other stakeholders intervening in rural water supply represent significant challenges that currently only few district administrations are in a position to cope with. The interventions related to water supply capacity building are designed to remove these capacity constraints in the medium term. In the short term, they inhibit a fast scaling-up of the water supply infrastructure. For the costing, it is assumed that capacity constraints can be overcome if the interventions are scaled-up simultaneously and gradually. Additionally, the number of people to be served additionally is assumed to increase implying that it is relatively small in the first year and much higher in 2010 to take into account the time needed for capacity building. Moreover, as explained in the next section, schemes relying on simple technologies and capacity building on district level are given priority in the first years.

5.3.4.2 Identification of Tanzanian 'Quick Wins'

Within the water supply sub-sector, several quick wins have been identified which are given priority in the scaling-up. They include:

- The provision of water supply through simple water projects based on shallow wells and springs is a clear quick win because little technical expertise is needed for implementation and these works are inexpensive.
- Capacity building and training in programme concepts (at all levels)

- Recruitment of appropriate qualified staff on permanent basis or contract on district level because there is acute shortage of engineers and technicians at this level requiring the recruitment of 63 engineers and 260 technicians.

5.3.5 Sanitation and Sewerage Interventions

The interventions have been synthesized from the broad intervention packages listed in the National Water Sector Development Strategy (NWSDS), the National Strategy for Growth and Reduction of Poverty, the MP Quick Wins and the Draft National Environmental Health, Hygiene and Sanitation Strategy (NEHHSAS).

Sanitation and sewerage interventions are divided into four groups, which include sewerage interventions, sanitation interventions, hygiene education, capacity building interventions and cross cutting issues.

Sewerage

There are five intervention packages for sewerage which are necessary to increase the percentage of people with access to sewerage. New sewerage systems must be constructed to cover more households in urban areas with access to sewerage facility networks. No sewerage constructions will take place in rural areas. Since a large share of existing sewerage systems are cloaked, rehabilitation is likewise necessary to reach the sewerage target. However, compared to the construction of new systems, rehabilitation is relatively unimportant because only a small part of the population currently has access to sewerage facilities. To prevent environmental pollution and possibly a contamination of drinking water sources, wastewater must be treated using treatment plants and oxidation ponds.

Table 12

Intervention Package
Construction of sewerage systems
Construction of treatment plants
Construction of oxidation ponds
Rehabilitation of existing sewerage systems

On-site Sanitation

Under on-site sanitation, four intervention packages were considered. In order to increase access to basic sanitation, the construction of on-site sanitation facilities is indispensable in both rural and urban areas. Ventilated improved latrines represent the lowest-cost option that satisfies the definition of basic sanitation and is therefore the preferred technology option. However, due to higher population densities in urban settlements, flush toilets with septic tanks are needed in some instances and therefore must be considered as a more advanced technology option.

Taking into account the other sanitation targets, additional interventions are necessary. First, all health facilities must be equipped with proper sanitation facilities. This is critical because cholera epidemics often spread from hospitals; additionally, the credibility of hygiene education can only be ensured if access to sanitation is also exemplary in basic health facilities. Second, sanitation facilities must be constructed in all primary schools to increase school attendance. As an additional requirement, sanitation facilities in public institutions must always be separate for both genders.

Table 13

Intervention Package
Construction of sanitation facilities in rural areas
Construction of sanitation facilities in urban areas
Construction of sanitation facilities in health facilities in rural and urban areas
Construction of sanitation facilities in primary schools

Hygiene Education and Advocacy

Hygiene education and advocacy includes several intervention packages to create awareness. As explained above, the promotion of hygiene is a critical complement of water supply infrastructure. All interventions packages considered are summarized below.

Table 14

Intervention Packages
Promotion of consumer participation and compliance with sewerage services
Awareness creation on sanitation and hygiene through IEC materials, media and other options
Promotion of efficient and environmentally friendly technologies in liquid waste management
Promotion of standard sanitation facilities
Rehabilitation of sanitation facilities
Preparation and annual updates of household environmental health profile and of participatory sanitation and hygiene practices situation/status
Education and awareness on cleaner production technologies
Environmental management and enforcement, education and awareness programmes
Promotion of improved latrine facilities in rural areas

Capacity Building and Institutional Strengthening

Interventions are carried out on different levels including the community level, the district level, the national level and across all levels. Since institutions for water supply and sanitation partially overlap, some of the interventions for institutions strengthening and capacity building have already been considered in water supply. Additional interventions that must be implemented for sanitation are listed in Table 15:

Table 15

Level	Intervention Packages
Community Level	Facilitation of communities to effectively execute their plans Train local community artisans on improved latrine construction Support water, sanitation and health (WASH) committees at community level Public and environmental health campaigns Integrate sanitation and hygiene education in the COWSOs Strengthen the private sector's ability to construct sanitation facilities. Promotion of safe excreta disposal
District Level	Train sanitation inspection officers on friendly inspection techniques Public and environmental health campaigns
National Level	Strengthening of the sanitation data base Public and environmental health campaigns

Cross-Cutting Issues

The list of interventions for cross-cutting issues complements the interventions for cross-cutting issues considered in the water supply sub-sector. Only one intervention has been considered in addition:

- Support workers living with HIV AIDs, orphans and fight HIV AIDS stigma

5.3.6 Scaling-Up of Interventions for Sanitation

5.3.6.1 Constraints

There are several constraints in the sewerage and sanitation sub-sector which prevent a fast scale-up of the interventions. Poverty at household level is a major constraint for reaching the sanitation targets implying that poverty reduction is a critical prerequisite. Additionally, there are capacity related constraints:

- Weak collaboration and coordination mechanism between main government actors on sanitation
- Poor awareness at community level
- Poor capacity of sanitation actors at district level to use environmentally friendly techniques in both inspection and education

These capacity constraints are addressed by the interventions and can be fully removed in the medium term if all interventions are simultaneously and gradually scaled-up. Additionally, annual investments in sewerage systems increase implying that investments in 2006 are much lower than in 2010 in order to allow for time needed for capacity building.

5.3.6.2 Identification of Tanzanian 'Quick Wins'

Among the interventions identified, there are several quick wins:

- Train local community artisans on improved latrine construction
- Support water, sanitation and health (WASH) committees at community level
- Promotion of improved latrine facilities in rural areas

- Awareness creation on sanitation and hygiene through IEC materials, media and other options.

These are considered quick wins because they can be easily and immediately implemented in a one-year programme, and can quickly bring positive impacts in communities.

6 Costing of the Interventions

6.1 Basic Assumptions and Methodology for costing

The costing is divided into three parts in line with the sub-sectors which correspond to water resources, water supply as well as sanitation and sewerage. The overall methodological approach as well as several fundamental assumptions can be generalized for all sub-sectors and are outlined below:

- The costing is financially unconstrained. It is not based on current or past financial resource availability or spending, but purely on the need for attainment of the targets. Other, non-financial constraints (e.g. regarding capacity) are taken into account.
- This costing reflects the full resource requirements to reach the MKUKUTA targets and the MDGs. It reflects the resources needed to maintain current coverage and service levels in addition to increments required for scaling-up, and it includes all costs disregarding the financing source. In other words, the costs do not reflect public spending requirements. For instance, investments in sanitation facilities are costed, but they must be financed by the households themselves.
- All costs are in 2005 USD. Inflation is not taken into account, so that actual required spending in nominal terms may be higher. For figures in TSH that had to be converted into USD, the exchange rate was assumed to be 1000TSH/USD.
- The calculated costs will match required expenditure if funds are spent as efficiently as possible. It is assumed that there will be neither mismanagement nor leakages of funds.
- For the sake of simplicity, it is assumed that water will be available in sufficient quantity and quality for domestic use with adequate and affordable technology. Likewise, available water resources will satisfy other needs.
- The costing is fully based on the analytical framework, e.g. every intervention previously listed is costed with reference to the targets.
- The interventions can follow different scaling-up paths. Technically, the scaling-up refers to the way in which the overall costs are distributed over the entire period. For some interventions like operations and maintenance which are carried out recurrently, the annual costs are predetermined, whereas for others, like the construction of infrastructure, several options exist (e.g. infrastructure can be built up gradually every year). Scaling-up choices are made based on non-financial constraints (especially regarding capacity) and based on priorities (the cost for the full implementation of quick wins are considered within the first two years to the extent possible). Generally speaking, it is assumed that through a gradual and simultaneous scale-up of all interventions capacity constraints can be removed.
- Projections for the post-2015 period are made based on the needs to maintain the MDG level.
- An Excel-based model was used to compute the results. It consists of four interlinked Excel books each containing several spreadsheets. The current version is not user-friendly.

6.2 Demographic Parameters

The size of the current population, the share of the rural and urban population and the population growth rates strongly influence the results of the costing. The MKUKUTA based MDG relies on data of the population census of 2002. Projections for the future including the population figures for 2006 were made based on actual growth rates between 1988 and 2002 for rural and urban areas.

Table 16

Population	Value	Growth Rates	Value	Percentage	Value
census 2002 mainland	33,461,849	Total	2.93%	2002 rural share	77.4%
census 2002 rural	25,907,011	Rural	1.9%	2002 urban share	22.6%
census 2002 urban	7,554,838	Urban	6.0%	2010 rural share	71.4%
2006 mainland	37,559,171			2010 urban share	28.6%
2006 rural	27,932,773			2015 rural share	67.2%
2006 urban	9,537,809			2015 urban share	32.8%
2010 mainland	42,158,200				
2010 rural	30,116,936				
2010 urban	12,041,264				
2015 mainland	49,202,780				
2015 rural	33,088,852				
2015 urban	16,113,927				
Household size	5				

6.3 Water Resources

6.3.1 Methodology

In costing the interventions for the water resources sub-sector, the methodology involved the following main steps:

- Intervention packages were broken down into activities that are costed
- Activity categories that must be carried out were identified for each intervention. The groups roughly correspond to the following: technical equipment and tools, capacity building in terms of staff recruitment and retention, infrastructure development (office buildings and other infrastructures).
- For each activity of all interventions, the measurement unit and the unit cost were established.
- For each activity, it was estimated how many units are necessary.
- The cost of one activity was derived by multiplying the quantity with the unit cost.
- The cost for each intervention was computed by summing up the costs of all corresponding activities.

Double costing was avoided to the extent possible. Some interventions were omitted because they do not add additional costs. Costs for support departments and cross-cutting departments within the MoWLD have only been partially included to circumvent an overlap with capacity building interventions for water supply.

6.3.2 Assumptions, Values and Data

The costing of the water resources sub-sector rests on the following assumptions:

- (a) Each basin must have at least 3 field offices each of which will be equipped by a set of standard field equipment.
- (b) Each field office will compose at least 2 field survey teams one each for surface and groundwater.
- (c) The field survey teams will be composed of 3-4 operating staff.

For the Water Resources Monitoring stations, for water basins and for water laboratories, detailed data was provided by the MoWLD (costs for the equipment of water resources monitoring stations in Table 37, cost of technical equipment and tools sets for water basins which all have 3 field offices in Table 38, unit costs and number of laboratories are derived from Table 39, costs for equipment for microbiological analysis for each laboratory are based on Table 40).

In areas where data was not available estimations were made through discussions within the drafting team. Other estimates were derived from consultations and interviewing experts from the Ministry. Regarding values for training, workshops and meetings as well as incentives, estimations were made after consultations within the drafting team. Table 17 provides details about the calculations.

Table 17

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/ Years	Total Quantity
Water Resource Assessment	Strengthening of water resources monitoring network for quality, quantity and pollution control (infrastructure and institutions)	infrastructure	hydrometric stations	8,000	600	1	600
		infrastructure	groundwater stations	20,000	340	1	340
		infrastructure	meterological stations (automatic)	14,000	130	1	130
		infrastructure	water quality stations	14,000	150	1	150
		technical supplies	supplies per basin	30,000	9	9	81
		training and consultancies	staff trained per year	1,000	30	9	270
	Water quantity and water quality maps	<i>no additional cost</i>					0
	Network operation and maintainance	field surveys (field data collection, measurements and special field surveys)	survey teams (surface & groundwater)	27,000	54	9	486
	Dissemination of data and Information	superstructure for data storage, primary processing and analysis	storage facilities and equipped computerised data banks	60,000	10	2	20
publication of water resources data and dissemination (monthly bulletins, yearbooks and summaries)		publications issued at regular intervals	15,000	1	108	108	
Water Quality Management	Strengthening water laboratories	equipment	set	139,832	15	1	15
	Microbiological analysis	equipment	set	30,358	15	1	15
	Capacity for environmental impact assessments on national level	training	staff trained per year	1,000	30	2	60
	Enforcement of guidelines and legislation for pollution control and compliance with abstraction rights	training (in env. Auditing and legislation)	staff trained per year	1,000	30	2	60
Conservation (Quantity)	Mechanisms for leakage control	consultancies (studies)	man day	800	270	9	2430
	Water pricing	consultancies	man day	800	270	9	2430

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/ Years	Total Quantity
	Installation of bulk meters on all individual and communal customer connections	equipment&tools	meter	3,000	270	1	270
	Catchment restoration, protection and management - including providing community level support to planting water friendly trees for watershed protection	training and consultancies	staff trained per year	1,000	30	12	360
	Incentive package for attracting communities to protect the catchments against encroachment	incentive package for community level (allowances)	number of communities	50	10000	1	10000
		Training	number of communities trained	500	100	1	100
Alternative Resource Development	Inter-basin transfers	consultancy (studies)	study	2,000,000	1	1	1
	Promotion of rainwater harvesting and storage	training and awareness creation	stakeholders trained per year	1,000	60	9	540
		construction of demonstration tanks for promotional purposes	number of tanks constructed per year	1,000	30	108	3240
	Surface water harvesting and storage	<i>no additional cost</i>					0
	Defloridation	training and awareness creation	stakeholders trained per year	1,000	50	9	450
Wastewater reuse	training basin office staff and awareness creation	staff trained per year	1,000	30	9	270	
Integrated Water Resources Management (Demand Management, Water Utilization and Allocation)	Stakeholder coordination and collaboration	meetings and workshops	no. of meetings	5,000	2	108	216
	Strengthening national coordination	meetings and workshops	no. of meetings	5,000	2	108	216
	Institution of abstraction permits and revenue collection	<i>no additional cost</i>					0
	Integrated water resource management plans that consider environmental sustainability	Training	staff trained per year	1,000	30	9	270

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/ Years	Total Quantity
	Development of integrated water resources management Plans	drafting retreats	no. of retreats	30,000	2	2	4
		stakholder workshops	no. of workshops	5,000	4	9	36
	water use efficiency plans	training	staff trained per year	1,000	30	9	270
	Development of water use efficiency plans	stakeholder meetings and workshops	no. of meetings	5,000	9	48	432
		drafting retreats	no. of retreats	30,000	4	9	36
	Monitoring of water utilization for all uses	<i>no additional cost</i>					0
	Support and regulation of water for domestic use, the increase in number of irrigation schemes, charcos dams and other economic production activities	<i>no additional cost</i>					0
	Minimization of mosquito and snail breeding sites	training	staff in ministry of roads trained	250	5	2	10
		training	trainings per basin	5,000	9	9	81
		equipment	set per basin	5,000	9	9	81
supplies		set per basin	5,000	9	9	81	
Support the development and the promotion of hydram and hydro options	training and awareness creation	staff trained per year	1,000	30	9	270	
Transboundary Water Resources	Coordination and collaboration	meetings and workshops	no. of meetings	25,000	12	9	108
Disaster Management	Flood and drought forecasting including early warning systems	satellite (telemetric) data transmission equipment to upgrade hydrometric to HYCOS stations	equipped hydrometric stations	20,000	30	1	30
	Mapping of vulnerable areas	<i>no additional cost</i>					0
	Institute contingency plans for minimising the impact of disasters	<i>no additional cost</i>					0

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/ Years	Total Quantity	
	Administer safety of dams	training in dam operations and safety	staff trained per year	1,000	10	9	90	
	Emergency relief services	drilling of emergency boreholes	borehole	7,700	450	1	450	
Cross-Cutting Issues	HIV / AIDS awareness	meetings and workshops	no. of meetings	2,500	1	108	108	
	Promotion of voluntary testing	meetings and workshops	no. of meetings	2,500	1	108	108	
	Gender awareness	meetings and workshops	no. of meetings	2,500	1	108	108	
	Gender budgeting	training	man day	300	189	9	1701	
	Gender disaggregated data	training	man day	300	189	9	1701	
Organizational Development and Capacity Building at Headquarter and Basin Level (Catchment Level Included)	Adequate incentive package for retaining and attracting the professional capacity	incentive package (salaries,allowances)	professional staff (monthly incentive package)	600	150	108	16200	
	Tailored trainings for enhancing governance and accountability ethics	training	professional staff trained per year	2,500	50	9	450	
	Transboundary water resources management: training in negotiation and conflict resolution	training	professional staff trained per year	5,000	30	9	270	
	Incentive package for technicians	incentive package (salaries,allowances)	technicians (monthly incentive package)	300	450	108	48600	
	Incentive package for other staff	incentive package (salaries,allowances)	other staff (monthly incentive package)	150	400	108	43200	
	Tailored training for disaster and emergency preparedness at national and basin	training	staff trained per year	300	300	9	2700	
	Strengthening of water basins offices	construction of Buildings	building	building	150,000	1	1	1
		rehabilitation	building	building	30,000	27	1	27
		technical equipment	set per basin	set per basin	3,000,000	9	1	9
		office equipment	set per basin	set per basin	24,000	9	2	18
		vehicles	pick-ups	pick-ups	30,000	63	2	126
	vehicles	motorcycles	5,000	135	2	270		

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/ Years	Total Quantity
		vehicles	bicycles	100	900	2	1800
		vehicles - recurrent costs and maintenance	per month per pick-up	1,800	63	108	6804
		vehicles - recurrent costs and maintenance	per month per motorcycle	30	135	108	14580
		office supplies, utilities, communication	per month per office	200	27	108	2916
	Strengthening of headquarter	construction of buildings	building	500,000	1	1	1
		rehabilitation	building	100,000	2	1	2
		rating tank	piece	80,000	1	1	1
		office equipment	set per office	2,500	30	2	60
		repair and maintenance shops	set	500,000	1	2	2
		laboratory equipment	set	600,000	1	1	1
		vehicles	pick-ups	30,000	6	1	6
		vehicles - recurrent costs and maintenance	per month and vehicle	300	10	108	1080
		office supplies, utilities, communication	per month per office	200	30	108	3240
		Strengthening the Water Resource Institute	construction of Buildings	building	500,000	2	1
	rehabilitation		building	300,000	5	1	5
	laboratory equipment		set	500,000	1	2	2
	geological, hydrological and survey equipment		piece	10,000	50	1	50
	maintenance shop equipment		set	500,000	1	1	1
	office/classroom equipment		set per office	2,500	90	3	270
	vehicles		cars	30,000	10	1	10
vehicles	bus		60,000	1	1	1	
vehicles	pick-ups		30,000	3	1	3	
staff	professional staff (monthly incentive package)		600	33	108	3564	

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/ Years	Total Quantity
		staff	technicians (monthly incentive package)	300	25	108	2700
		staff	others monthly salary	150	30	108	3240
		training	staff trained per year	1,000	30	9	270
		vehicles - recurrent costs and maintenance	per month per vehicle	200	14	108	1512
		office supplies, utilities, communication	per month per office	200	90	108	9720
		student tuition, boarding and meals	per student per year	1,500	200	9	1800
	Development of policies, programmes, plans and monitoring	office equipment	set per office	24,000	27	2	54
		vehicles	pick-ups	30,000	3	2	6
		staff	professional staff (monthly incentive package)	600	23	108	2484
		staff	technicians (monthly incentive package)	300	47	108	5076
		staff	others monthly salary	150	30	108	3240
		vehicles - recurrent costs and maintenance	per month per pick-up	1,800	3	108	324
		office supplies, utilities, communication	per month per office	200	27	108	2916
		Awareness Creation	Disaster mass preparedness	mass media campaign	campaign	50,000	1
Awareness creation for efficient water use in both domestic and productive sectors	mass media campaign		campaign	200,000	1	9	9
	workshops and meetings		workshop / meeting	2,500	180	9	1620

6.3.3 Sequenced Actual Costs of Interventions

Once the overall costs are established, the annual costs for the period between 2006 and 2015 as well as the sequencing of the scaling-up of interventions can be determined. The scaling-up of the interventions must be gradual and simultaneous so that all constraints can be removed and do not prevent the attainment of the targets.

Most interventions must be carried out recurrently (i.e. monthly, yearly or every four to five years) so that frequently, the costs per year are predetermined. Generally speaking, all other interventions follow a linear scaling-up path (e.g. the incremental number of new structures built per year remains constant). However, in the water resources sub-sector, several interventions are only carried out few times (i.e. the rehabilitation of a particular office building) so that their cost cannot be spread over the entire period. In these cases, the costs of the interventions is considered in 2007/2008 and the subsequent years if applicable.

To the extent possible, the cost of quick win interventions were considered in the first two years. However, if quick win interventions are carried out recurrently (i.e. training), their scaling-up path cannot not differ from other recurrent interventions if they are all implemented from the first year onwards. However, all quick wins will be prioritized under scarce financial resources as discussed in subsequent chapters.

Table 18 provides a summary of the sequenced costs for water resources related interventions. Since in the fiscal year 2014/2015 most cost are recurrent, the projections for the years after 2015 coincide with the last year of the costing.

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Table 18

Area	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	Total	Projections
Water Resource Assessment	3,746,000	3,746,000	3,746,000	3,746,000	3,746,000	3,746,000	3,746,000	3,746,000	4,194,000	34,162,000	3,746,000
Water Quality Management	522,570	522,570	522,570	522,570	522,570	12,000	12,000	12,000	24,000	2,672,849	24,000
Conservation (Quantity)	943,050	583,050	583,050	583,050	583,050	583,050	583,050	583,050	583,600	5,608,000	583,600
Alternative Resource Development	500,000	2,500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	6,500,000	500,000
IWRM (Demand Management, Water Utilization and Allocation)	966,250	965,000	965,000	965,000	966,250	965,000	965,000	965,000	5,000	7,727,500	5,000
Transboundary Water Resources	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	2,700,000	300,000
Disaster Management	455,000	455,000	455,000	455,000	455,000	455,000	455,000	455,000	515,000	4,155,000	515,000
Cross Cutting Issues	203,400	203,400	203,400	203,400	203,400	203,400	203,400	203,400	203,400	1,830,600	203,400
Org. Dev. and Cap. Building at Nat., Basin and Catchment level	11,288,000	10,813,200	10,838,400	10,863,600	10,888,800	10,914,000	10,939,200	10,964,400	17,624,600	105,134,200	17,624,600
Awareness Creation	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	6,300,000	700,000
Total	19,624,270	20,788,220	18,813,420	18,838,620	18,865,070	18,378,450	18,403,650	18,428,850	24,649,600	176,790,149	24,201,600

6.4 Water Supply

6.4.1 Methodology

The five groups of interventions including rural and urban water supply infrastructure, capacity building, awareness creation and cross-cutting issues that were identified above were costed separately. Whereas the methodological approach for the costing of the last three fields is comparable to the water resources sub-sector costing, the costing of infrastructure is different and based on the demographic variables presented above.

6.4.2 Costing Rural Water Supply Infrastructure

The cost for the **construction of new water supply** schemes in rural areas is influenced by four groups of parameters:

- Current size of the rural population and projected growth of the rural population
- Current coverage and coverage targets for rural areas
- The current technology mix and the envisaged technology mix
- Per capita unit costs for each technology

The costing of the construction of new water supply schemes is based on the **number of people that must be provided additionally with access to clean and safe water until 2010 and 2015**, respectively. This figure equals the difference between the total number of people that *will be* served (the product of the target coverage and the projected population) and the total number of people *currently* served (the product of the size of the current population and current coverage). Due to two sets of targets for two different years, the number of people to be served additionally is calculated for the period 2006-2010 and 2010-2015 separately. The per capita unit cost is calculated by dividing the total cost of the water supply scheme by the number of beneficiaries. The total cost and the per capita unit cost are both based on average values which take into account possibly higher costs for targeting disadvantaged regions or social groups, including the poorest. Due to different unit costs, it is necessary to calculate the number of people to be served additionally by technology type using the technology mix which is then multiplied by the per capita unit costs of the respective technology.

The costs of **upgrading** people's access to household connections depend also on four factors:

- Current size of the rural population, projected growth of the rural population and household size
- Current coverage and coverage targets for rural areas
- Current and target shares of people with access to household connections in percent of all people covered
- Per capita unit cost of upgrading a public tap connection

The cost of upgrading equals the number of people to be equipped with a household connection times the per capita unit cost. It is important to note that the per capita unit cost solely refers to upgrading the distribution system when a protected source is already developed. It is calculated by dividing the cost per household connection by the household size.

The costs for **operations and maintenance** are calculated by multiplying the respective per capita unit costs with the number of people that have access in a given year (number of people that are currently served in addition to increments). The per capita unit cost for operations and maintenance differs for each technology.

The cost of **rehabilitation** of existing schemes is based on the share of people with access to broken schemes as percentage of the total number of people currently covered and the per capita unit cost for rehabilitation by technology. The number of people covered by each technology is multiplied with the respective per capita unit cost.

The **construction and rehabilitation of rainwater harvesting infrastructure** is simply determined by multiplying the number of earth dams to be constructed or rehabilitated by the unit cost. The provision of **water supply to health facilities** follows the same principles.

Table 19 displays the values and sources that have been used to calculate the cost (coverage values and population figures have been mentioned in previous sections). Most of the data is based on the MoWLD costing and the NRWSSP costing. Unit costs were split up in a hardware component and a share for overhead costs.

Table 19

Variable	Category								Data Source
Construction of New Water Schemes									
technology type	Shallow well with hand pump	Borehole with hand pump	Protected springs	Windmills	Single community GFS	Multiple community GFS	Single pumped & piped system	Multiple pumped & piped system	
hardware per capita unit cost	5.6	16.4	2.4	21.3	33.9	22.6	28.5	19.0	NRWSSP
design, planning, supervision and facilitation	2.8	8.2	1.2	10.7	17.0	11.3	14.2	9.5	NRWSSP
total unit costs per capita	8.4	24.6	3.6	32	50.9	33.9	42.7	28.5	NRWSSP
current technology share	30.4%	19.3%	1.1%	1.3%	11.4%	11.2%	12.7%	12.7%	NRWSSP
2010 and 2015 target share	30.4%	19.3%	1.1%	1.3%	11.4%	11.2%	12.7%	12.7%	NRWSSP
Operation and Maintenance (including repairs)									
total per capita unit costs	0.11	0.11	0.02	0.12	0.06	0.06	0.98	0.98	NRWSSP
Rehabilitation of Existing Broken Schemes									
total unit costs (in % of costs for construction)	20%	20%	20%	20%	20%	20%	20%	20%	Drafting team estimation
people with access to broken infrastructure	25%	25%	25%	25%	25%	25%	25%	25%	Drafting team estimation
Upgrading to Household Connection									
technology type	for all technologies								Drafting team estimation
hardware per capita unit cost	67%								Drafting team estimation
design, planning, supervision and facilitation	33%								Drafting team estimation

Variable	Category				Data Source
total unit costs per capita	100%				Drafting team estimation
current share	5%				Drafting team estimation
2010 and 2015 target share	20%				Drafting team estimation
Rainwater Harvesting					
type	construction of small earth dam	construction medium earth dam	rehabilitation of small earth dam	rehabilitation of medium earth dam	
total unit cost	77800	899667	34533	0	MoWLD
Number of dams	509	9	546	0	MoWLD
Construction of Water Supply Infrastructure for Health Facilities (rural and urban)					
type	ferro-cement tank for rainwater harvesting for hospitals	ferro-cement tank for rainwater harvesting for health centres	ferro-cement tank for rainwater harvesting for dispensary		
total unit cost	10000	10000	10000		MoWLD
% cost for rehabilitation	50%	50%	50%		Drafting team estimation
number of health facilities	280	400	500		MoH
current Coverage	80%	30%	40%		MoH
target coverage	100%	100%	100%		MoH
% of facilities to be covered	80%	30%	40%		MoH
% of facilities covered requiring rehabilitation	40%	15%	50%		MoH

6.4.3 Costing Urban Water Supply Infrastructure

Methodology

The costs for the interventions related to urban water supply were determined separately for every urban water supply authority. This approach is necessary to allow for differences in the technology mix and for different unit costs of some of the interventions.

The cost for the construction of urban water supply infrastructure rests on four parameters for every urban area:

- The size of the current population and projected population size
- Current and target coverage
- Technology mix of the schemes to be constructed

➤ Unit costs of every technology

By computing the difference in the number of people with access to water between 2010 and 2015 as well as between 2010 and 2006, respectively the number of people to be served additionally for both periods is determined. Both figures are multiplied with the percentage share of each technology and the per capita unit cost of each technology to derive the overall cost. The per capita unit cost is calculated by dividing the total cost of the water supply scheme by the number of beneficiaries. It is based on average values which take into account possibly higher costs for targeting disadvantaged regions or social groups.

The calculation of the cost for **rehabilitation** of existing schemes that are broken is based on the per capita unit cost for rehabilitation and the share of people with access to broken schemes.

The **operations and maintenance** cost are computed by multiplying the relevant per capita unit cost with the number of people that have access to safe water in a given year. Increments as well as the number of people already covered are considered.

The **installation of meters** was costed by considering the number of meters already installed, the desired meter coverage (percentage of connections covered) and the total number of connections in 2015 which is assumed to equal the number of people covered divided by the household size. The number of meters to be installed was multiplied by the unit cost of a meter. The number of people was estimated at 5 per household. The cost of meter includes the cost of installing a ¾ inch meter.

Water supply infrastructure for urban health facilities was costed by multiplying the number of health facilities with the unit cost of the scheme to be constructed or rehabilitated.

Values

The per capita unit cost for the construction of new water supply schemes was obtained from figures of the NRWSSP as shown below. Every source will serve a minimum of 2500 people. A per capita cost of 70 USD was added to reflect household connection as the service level.

Table 20

Technology	Unit	Quantity	Unit Cost	Total	Borehole	Spring	Surface
Borehole drilling	meter	100	120	12,000	12,000	0	0
Pump complete	Pc.	1	4,000	4,000	4,000	4,000	4,000
Power source			9,000	9,000	9,000	9,000	9,000
Pump house	No.	1	2,500	2,500	2,500	9,000	2,500
Rising main	Km	2	10,000	20,000	20,000	20,000	20,000
Storage tank	m ³	90	200	18,000	18,000	18,000	18,000
Distribution system	DWP	10	2,000	20,000			0
Total				85,500	65,500	53,500	53,500

The technology mix was estimated by the drafting team using the following table:

Table 21

UWSA	WATER SOURCE	CATEGORIZATION
Moshi	Springs	Spring
Arusha	Springs; Boreholes	Spring, borehole
Tabora	Surface reservoir	Surface
Mwanza	Lake Victoria	Surface
Musoma	Lake Victoria	Surface
Bukoba	Lake Victoria; Springs	Surface
Tanga	Surface reservoir	Surface
Morogoro	Surface reservoir ,stream	Surface
Singida	Boreholes	Borehole
Dodoma	Boreholes	Borehole
Shinyanga	Surface reservoir, Boreholes	Surface, borehole
Kigoma	Lake Tanganyika	Surface
Songea	Springs and boreholes	Surface, borehole
Lindi	Springs	Surface
Mtwara	Boreholes and a spring	Surface borehole
Iringa	River intake and springs	Surface
Sumbawanga	Streams, shallow wells	Surface, borehole
Mbeya	Stream intake and springs	Surface
Babati	Borehole	Borehole
Dar es Salaam	Surface	Surface

The per capita costs of operations were derived by dividing the annual amount of the electricity bills and the annual values of chemicals used for water treatment in each urban area by the number of people served. Costs for staff are considered within the capacity building section. Maintenance per capita cost was calculated in percent of the operations per capita cost.

The meter target coverage was set in accordance with overall policy objectives.

For some of the urban areas, data gaps had to be filled (e.g. for Dar es Salaam, the amount of the annual electricity bills was not available). In these cases, mean values derived from the other UWSSAs were used.

Table 22 displays all parameters used for the calculations. Figures for water supply infrastructure at health facilities are not repeated and can be derived from Table 19.

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Table 22

Urban water Authority	Arusha	Moshi	Musoma	Mwanza	Tanga	Bukoba	Kigoma	Mbeya	Sumbawanga	Dodoma	Shinyanga	Babati	Singida	Tabora	Mtwara	Lindi	Dares Salaam	Morogoro	Songea	Iringa	National
Construction of New Water Schemes																					
pumped and piped system per capita unit cost	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4
pumped borehole per capita cost	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2
GFS (spring) per capita unit cost	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4
current coverage	95%	85%	73%	83%	98%	71%	86%	71%	70%	64%	60%	60%	55%	84%	83%	60%	70%	75%	75%	87%	
coverage by 2010	100%	100%	95%	93%	100%	79%	90%	95%	80%	90%	80%	90%	80%	90%	95%	80%	80%	100%	100%	94%	
coverage by 2015	100%	100%	95%	93%	100%	79%	90%	95%	80%	90%	80%	90%	80%	90%	95%	80%	80%	100%	100%	94%	
share of pumped and piped system	40%	0%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	0%	100%	0%	100%	100%	80%	70%	100%	0%
share of pumped borehole	60%	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	0%	0%	20%	30%	0%	0%
share of GFS (spring)	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Rehabilitation of Existing Broken Schemes																					
per capita unit cost of pumped surface (in % of construction)	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
per capita unit cost of pumped borehole (in % of construction)	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
per capita cost of GFS (in % of construction)	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
% of population with access to broken schemes	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Operations and Maintenance																					
TanESCO bills	330,249	52,995	189,073	559,668	142,449	110,891	112,302	92,442	N/A	1,471,608	113,454	-	67,561	248,086	123,402	47,915	N/A	234,865	1,736	323,257	

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Urban water Authority	Arusha	Moshi	Musoma	Mwanza	Tanga	Bukoba	Kigoma	Mbeya	Sumbawanga	Dodoma	Shinyanga	Babati	Singida	Tabora	Mtwara	Lindi	Dares Salaam	Morogoro	Songea	Iringa	National
chemical consumption value	12,335	12,404	7,168	24,322	146,640	6,172	10,460	27,010	1,184	2,088	45,544	N/A	1,500	115,964	8,641	218	N/A	237,136	15,998	64,284	
maintenance cost per capita (in % of operations cost)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Meters																					
cost per meter	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	
meters installed	17,130	12,027	1,262	14,203	13,328	1,661	2,061	3,288	5	11,158	3,997	544	1,033	4,718	2,806	195	173,000	8,939	448	3,922	
meters per connections	21%	26%	5%	11%	11%	0%	5%	5%	0%	19%	0%	0%	5%	12%	10%	2%	33%	14%	1%	11%	11%
meter coverage 2015	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Table 23 provides an overview on all data sources that have been used:

Table 23

<u>Parameters</u>	<u>Data Source</u>
Construction of New Water Schemes	
pumped and piped system per capita unit cost	Based on NRWSSP data and calculations of the drafting team
pumped borehole per capita unit cost	
GFS (spring) per capita unit cost	
current coverage	Based on MoWLD figures
coverage by 2010	
coverage by 2015	
share of pumped and piped system	Estimations of the drafting team
share of pumped borehole	
share of GFS (spring)	
Rehabilitation of Existing Broken Schemes	
per capita unit cost of pumped surface (in % of construction)	Estimations of the drafting team
per capita unit cost of pumped borehole (in % of construction)	
per capita cost of GFS (in % of construction)	
% of population with access to broken schemes	Estimations of the drafting team
Operations and Maintenance	
Tanesco Bills	Data from the UWSSAs
chemical consumption value	
maintenance cost per capita (in % of operations cost)	Estimations of the drafting team
Meters	
cost per meter	Estimations of the drafting team
meters installed	Data from the UWSSAs
meter coverage 2015	Estimations of the drafting team

6.4.4 Costing Capacity Building, Awareness Raising and Cross-cutting Issues

Methodology

The methodological approach to cost capacity building, awareness creation and cross-cutting issues closely resembles the costing of water resources. The following methodological steps have been taken:

- Intervention packages for capacity building were first categorized by level and institutions.
- Intervention packages were broken down into activities that are costed.
- Activity categories that must be carried out were identified for each intervention. The groups roughly correspond to the following: technical equipment and tools, capacity building in terms of staff recruitment and retention, construction and rehabilitation of office buildings.
- For each activity of all interventions, the measurement unit and the unit cost were established.
- For each activity, it was estimated how many units are necessary.
- The cost of one activity was derived by multiplying the quantity times the unit cost.
- The cost for each intervention was computed by summing up the costs of all corresponding activities.

Some interventions do not cause additional costs. Costs for support departments and cross-cutting departments within the MoWLD have been only been partially included to circumvent an overlap with the water resource sub-sector costing.

Values and Assumptions

The calculation of the costs is based on the following assumptions and data for unit costs and quantities:

➤ Staff:

Data on professional and technical staff at all levels was obtained from recent data available in MoWLD. The unit cost for salaries and allowances per month of 600 and 300 USD respectively is the desired remuneration to retain the staff in the sector.

➤ Consultants

Current rates for foreign consultants are 800 USD per day while local consultants are paid 200 USD per day. Unit cost for foreign consultancy is made up of one consultant for 10 working days. However consultancies for annual reviews consist of 3 consultants for 7 working days. Unit cost for local consultancies consists of one consultant for 10 working days and annual reviews consists 3 consultants for 10 working days.

➤ Office Equipment

Office sets consist of equipment such as fax, photo copier, desk top, printer, etc. are all valued at 2,500 USD. The number of office sets required corresponds to existing and probable future number of offices. It is assumed that the set typically needs to be renewed once every 4-5 years.

➤ Operations and Maintenance of Vehicles

Vehicle kilometrage per month is much more at national level than at the district. It is estimated at 2000 km, 2000 km and 1500 km monthly at national, regional and district respectively. Rate per kilometre of 0.6 USD is inclusive of fuel, maintenance and allowance for the driver. The vehicles are replaced after 4-5 years in the project.

➤ Office supplies, Utilities, Communications, etc.

These are expenses to run and maintain the offices of which the corresponding expenses are paid monthly. At national level the current expenditures were sought and estimation made for the scaled up situation. At regional and district level, estimations were made.

➤ Training

Trainings of staff at national, regional and district level considered costs for fees, per-diem and transporting the trainee to the training place. However tailored trainings for artisans and communities to manage and operate the water schemes considered a group of 30 people assembled in one centre.

➤ Building and Rehabilitation of Offices

Current prices for building new offices were investigated and 20% was considered for rehabilitation work.

➤ Regions and Districts

At regional level there are 21 Regional Secretariats. At district level there are 98 rural districts and each time this number was used to determine the number of meetings and workshops required at these levels.

➤ Maji Week

The anniversary commemorations of Maji Week encompass a number of activities for awareness creation including publications, workshops, broadcasting, meetings, etc at all levels. Current costs stand at 200,000 USD per occasion.

➤ Meetings and Workshops

Current prices have been used to estimate a meeting of 30-35 people. The unit cost unit include lunch, hall expenses, meeting materials, transport and per-diem for 3-5 people who would have been invited from outer stations.

All remaining data gaps have been filled with assumptions of the drafting team.

Table 24 provides an overview on the values used for the calculations of the costs for water supply capacity building.

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Table 24

Level	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years per Level	Total Quantity	Rationale
national level	Recruitment and retention of appropriate qualified staff on permanent basis or contract (including staff for BWO dealing with water supply)	salaries and allowances	staff (professional)	600	139	108	15012	
			staff (technician)	300	222	108	23976	
		training workshops and trainings	staff to be trained/year	1,000	50	9	450	
	Working gear (transport, equipment, working tools, etc.)	construction of offices	offices	1,500,000	1	1	1	
		rehabilitation of offices	offices	100,000	2	1	2	
		office equipment	sets	2,500	54	2	108	
		vehicles	vehicles	30,000	21	2	42	
		office supplies, utilities, communication	expenses per month	45,000	1	108	108	
		operations and maintenance of Vehicles	Km per month	0.60	42,000	108	4536000	
		Carry out training needs assessments for personnel according to their job skills requirements	training needs	consultant	8,000	1	3	3
	Capacity building and training in programme concepts	training	seminars	1,000	2	9	18	
		Training in public health	participation in MPH at Muhimbili	staff per year trained	5,000	1	2	2
	Evaluation of the performance of water supply organisations	evaluation	Evaluation Team	2,720	98	9	882	
	Monitoring and Annual Audit	monitor	No additional cost					
		annual review	Consultancy	16,800	1	3	3	
Strengthening Planning and Coordination Mechanisms	meeting and workshops	Meeting	2,000	4	9	36		
DDCA	Carry out rain harvesting activities by building small and medium earthdams.	equipment and tools	Bulldozer D7R	280,000	5	1	5	
		equipment and tools	Excavator CAT 322	160,000	3	1	3	
		equipment and tools	Compactor Vibra	90,000	5	1	5	
		equipment and tools	Wheel loader 950	155,000	5	1	5	
		equipment and tools	Tipper 18 tonner	100,000	10	1	10	
		equipment and tools	Low loader	250,000	2	1	2	
		equipment and tools	water bowser	80,000	5	1	5	
		equipment and tools	water pump	5,000	5	1	5	
		equipment and tools	Pick up double cabin	30,000	5	2	10	
	Assist districts to drill medium deep/deep boreholes	equipment and tools	Drill Rig	600,000	12	1	12	
		equipment and tools	Pump Test	70,000	12	1	12	
		equipment and tools	Compressor	130,000	12	1	12	
		equipment and tools	Truck (drill pipes etc)	80,000	12	1	12	

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Level	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years per Level	Total Quantity	Rationale
		equipment and tools	Tipper 7 tonner	50,000	12	1	12	
		equipment and tools	Fuel Truck	70,000	12	1	12	
		equipment and tools	water bowser	70,000	12	1	12	
		equipment and tools	Mobile workshop	200,000	6	1	6	
		equipment and tools	Pick up double cabin	30,000	12	2	24	
EWURA	Regulation of service provision by EWURA	office accomodation	space in square metres	18	336	108	36288	
		office equipment	sets	2,500	9	2	18	
		vehicles	vehicles	30,000	9	2	18	
		office supplies, utilities, communication	expenses per month	13,000	1	108	108	
		operations and maintenance of vehicles	km per month	0.6	18,000	108	1944000	32 new engineer recruits for Basin Offices
		subcontraction	service contracts	30000	42	9	378	
		stakeholder meetings	meeting	3,000	21	4	84	
		training	courses	2,000	3	9	27	
regional level	Recruitment and Retention of appropriate qualified staff on permanent basis or contract (including staff for BWO dealing with water supply)	salaries and allowances	staff (professional)	600	63	108	6804	
			staff (technician)	300	120	108	12960	
		training workshops and trainings	staff trained/year	1,000	30	9	270	
	Working gear (transport, equipment, working tools, etc.)	office equipment	sets	2,500	21	2	42	
		vehicles	vehicles	30,000	21	2	42	
		office supplies, utilities, communication	expenses per office per month	1,000	21	108	2268	
		operations and maintenance of vehicles	km per month	0.60	42,000	108	4536000	
	Carry out training needs assessments for personnel according to their job skills requirements	training needs	man days	200	7	3	21	
	Capacity building and training in programme concepts	training	seminars	1,000	1	9	9	63 new recruitments of engineers
	Evaluation of the performance of water supply organisations	evaluation	evaluation team			covered at national level		260 new recruits of technicians
	Monitoring and Annual Audit	monitoring	no additional cost					
		annual review	covered at national level					
	Strengthening planning and coordination mechanisms	meeting and workshops	Meeting	2,000	2	9	18	

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Level	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years per Level	Total Quantity	Rationale
district level WSSA	Recruitment and retention of appropriate qualified staff on permanent basis or contract	salaries and allowances	staff (professional)	600	98	108	10584	63 New recruitments of engineers
			staff (technician)	300	400	108	43200	
	Determination of construction and rehabilitation needs	scheme assessment	training	1,000	100	9	900	
			no additional cost					
	Training needs assessments for personnel in all WSS organisations.	training needs	local consultants	2,000	21	3	63	
	stakeholder consultations and beneficiary participation in investment decisions	expenses for meetings	meetings	1,000	196	9	1764	
	Working gear (transport, equipment, working tools, etc.)	rehabilitation of offices	offices	20,000	98	1	98	
		office equipment	sets	2,500	98	2	196	
		vehicles	vehicles	30,000	98	2	196	
		office supplies, utilities, communication	expenses per month	1,500	98	108	10584	
		operations and maintenance of vehicles	km per month	0.60	196,000	108	21168000	
	Tailored capacity building for management and maintainance of water supply schemes	training workshops and trainings	workshops / trainings	3,000	98	9	882	
	Institute customer reporting mechanisms for wastage, misuse and leakage.	sensitization campaigns	no additional cost					
	Recruitment and retention of appropriate qualified staff on permanent basis or contract	salaries and allowances	staff (professional)	600	84	108	9072	
			staff (technician)	300	360	108	38880	
			training workshops and trainings	staff trained/year	1,000	70	9	630
	Working gear (transport, equipment, working tools, etc.)	construction of office in Manyara region	offices	500,000	1	1	1	
		rehabilitation of offices	offices	100,000	20	1	20	
		office equipment	sets	2,500	21	2	42	
		vehicles	vehicles	30,000	42	2	84	
		office supplies, utilities, communication	expenses per month	10,000	21	108	2268	
		operations and maintenance of vehicles	km per month	0.60	63,000	108	6804000	
	Monitoring and Annual Audit	monitoring	no additional cost					
annual review for UWSAs		local consultancies	6,000	21	3	63		
Carry out training needs assessments for personnel according to their job skills requirements	training needs	local consultants	2,000	7	3	21		

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Level	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years per Level	Total Quantity	Rationale
	Conduct studies on affordability to pay for water and sanitation services based on age, disability and gender	studies carried out	local consultants	2,000	7	2	14	
Community Level	Training of community artisans / attendants for basic maintenance of water supply schemes and sanitation facilities	trainings and workshops	workshops/trainings	3,000	196	9	1764	
	Tailored Training to COWSOs in management of water supply schemes	training and workshops	workshops/trainings	3,000	98	9	882	
Contractors, NGOs and Consultants	training in programme concepts	training	workshops/trainings	1,000	98	3	294	

Calculations for water supply awareness creation and cross-cutting issues are shown in Table 25:

Table 25

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years per Level	Total Quantity	Sum
Awareness Creation	Advocacy on private sector participation	advertisements in news papers	number of advertisements	700	3	9	27	18,900
		production of brochures and fliers	number of brochures/fliers	0.55	5000	4	20000	11,000
		radio and TV broadcast	10-15 minutes broadcast airtime	3000	3	9	27	81,000
	Awareness in programme concepts	workshops and meetings	number of workshops	2000	25	3	75	150,000
	Awareness creation for rainwater harvesting	Training	districts	1000	98	9	882	882,000
		meetings and workshops	number of meetings in districts	500	98	9	882	441,000
	Advocacy and awareness on water supply and sanitation (NAWAPO 2002 & improved sanitation and hygiene)	meetings and workshops	number of workshops at national level	5000	1	9	9	45,000
			number of meetings at district level	3000	98	9	882	2,646,000
	Raise awareness of the communities and other stakeholders regarding performance monitoring and the procedures involved.	meetings and workshops	number of meetings	500	98	9	882	441,000
	Design and implement a public awareness campaign to promote the minimum service levels to which consumers will be entitled.	mass media campaign	10-15 minute broadcast airtime	3000	3	9	27	81,000
number of advertisements			700	3	9	27	18,900	
Cross-Cutting	Raise awareness, train and empower women to actively participate at all levels in planning, designing and managing water programmes.	meetings and workshops	number of meetings in districts	500	98	9	882	441,000
	Advocacy and awareness at all levels through Water week and World Water day	mass media campaign, meetings and workshops, exhibition	annivesary Water Week	200000	1	9	9	1,800,000
	Develop and implement public awareness campaigns on the opportunities and advantages of stakeholder participation in the provision of WSS services.	mass media campaign	10-15 minutes broadcast airtime	3000	3	9	27	81,000
			Number of advertisements	700	3	9	27	18,900
	Mobilize both human and financial resources to facilitate implementation of situational analysis and operational plan on HIV/AIDS.	mobilization	meetings	2000	2	9	18	36,000
	Carry out HIV/AIDS situational and impact analysis	assessments	no additional costs					
Facilitate collection and analysis of gender-disaggregated data to facilitate inclusion in the planning and budgeting processes.	data collection	no additional costs						

6.4.5 Sequenced Actual Costs of Water Supply Interventions

The calculation of the costs per year based on the overall costs for the water supply sub-sector strongly differs between infrastructure related interventions on the one hand and capacity building, awareness creation as well as interventions for cross-cutting issues on the other hand.

➤ Water Supply Infrastructure

For simplicity, the calculation of the annual costs is based on the average; the costs for the construction of new water supply schemes in rural and urban areas of the years 2006-2010 and the 2010 - 2015 periods were divided by 4 and 5, respectively. For the 2006-2010, based on the average annual investments, a progressive scale-up was used (resource requirements are 60% of the average costs in the first year, and then increase at an annual rate of 20% to 40% in the subsequent years). The upgrading of public taps to household connections in rural areas follows the same scaling-up path as the construction of new water supply infrastructure. Costs for operations and maintenance per year are automatically determined by the scaling-up of the construction of new schemes.

Rehabilitation of defective infrastructure is assumed to follow a linear scaling-up path until 2010 when all presently broken schemes will have been repaired.

The cost for rainwater harvesting infrastructure, water supply infrastructure for health facilities as well as the installation of meters was spread evenly over the full period (2006-2015).

All quick win interventions related to infrastructure are fully scaled up within the first two years.

➤ Capacity Building, Awareness Creation and Cross-Cutting Issues

Most interventions must be carried out recurrently (e.g. monthly, yearly or every four to five years) so that frequently, the costs per year are predetermined. Generally speaking, all other interventions follow a linear scaling-up path (e.g. the incremental number of new structures built per year remains constant). However, in the water resources sub-sector, several interventions are only carried out few times (e.g. the rehabilitation of a particular office building) so that their cost cannot be spread over the entire period. In these cases, the costs of the interventions is considered in 2007/2008 and the subsequent years if applicable.

Most activities are carried out recurrently on an annual or monthly basis or they are repeated after 4 -5 years. Therefore, to a large extent, the annual costs are predetermined. One-time purchase of equipment for the DDCA is assumed to be done in 2007/2008. Since capacity building at district level is a quick win intervention, all additional recruitments are assumed to be made within the first two years. Both assumptions ensure that capacity constraints are removed so that the scaling-up of infrastructure is not inhibited.

The annual costs for the water supply sub-sector were calculated as shown in Table 26:

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Table 26

Area	Intervention Package	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	Total	Projections
Rural Infrastructure	Construction of new water schemes	29,794,732	35,311,940	33,103,247	38,620,455	27,333,500	27,333,500	27,333,500	27,333,500	27,333,500	273,497,872	12,685,757
	Upgrading to household connection	47,520,000	63,359,999	95,039,999	110,879,999	22,947,855	22,947,855	22,947,855	22,947,855	22,947,855	431,539,271	9,618,929
	Operation and maintenance (including repairs)	3,191,968	3,514,587	3,738,384	3,999,480	4,184,270	4,369,060	4,553,850	4,738,639	4,923,429	37,213,666	8,229,813
	Rehabilitation of existing broken schemes	4,250,513	4,250,513	4,250,513	4,250,513	-	-	-	-	-	17,002,051	-
	Rainwater harvesting	7,394,667	7,394,667	7,394,667	7,394,667	7,394,667	7,394,667	7,394,667	7,394,667	7,394,667	66,552,000	-
	Constr. of WS Infrastructure for health facilities	4,105,444	4,105,444	4,105,444	4,105,444	4,105,444	4,105,444	4,105,444	4,105,444	4,105,444	36,949,000	-
Sub-Total		96,257,324	117,937,151	147,632,254	169,250,557	65,965,735	66,150,525	66,335,315	66,520,105	66,704,895	862,753,860	30,534,500
Urban Infrastructure	Construction of new Water Schemes	47,735,742	63,647,656	95,471,484	111,383,398	67,126,336	67,126,336	67,126,336	67,126,336	67,126,336	653,869,961	66,398,128
	Rehabilitation of existing broken schemes	8,426,157	8,426,157	8,426,157	8,426,157	-	-	-	-	-	33,704,630	-
	Operation and maintenance	3,801,237	5,068,315	7,602,473	8,869,552	6,782,549	6,782,549	6,782,549	6,782,549	6,782,549	59,254,324	6,782,549
	Meters	22,445,049	22,445,049	22,445,049	22,445,049	22,445,049	22,445,049	22,445,049	22,445,049	22,445,049	202,005,442	22,445,049
	Water supply infrastructure for health facilities	216,556	216,556	216,556	216,556	216,556	216,556	216,556	216,556	216,556	1,949,000	-
Sub - Total		82,624,741	99,803,733	134,161,719	151,340,712	96,570,491	96,570,491	96,570,491	96,570,491	96,570,491	950,783,357	95,625,726
Capacity Building and Institutional Strengthening	National level	3,143,760	5,003,960	3,118,960	3,143,760	3,118,960	3,118,960	3,148,760	3,118,960	3,118,960	30,025,040	3,118,960
	DDCA	-	19,580,000	-	-	-	-	510,000	-	-	20,090,000	-
	EWURA	1,725,176	1,716,176	1,716,176	1,716,176	1,716,176	1,716,176	1,716,176	1,716,176	1,716,176	15,454,584	1,716,176
	regional level	1,800,400	1,606,000	1,605,400	1,605,400	1,605,400	1,605,400	1,605,400	1,605,400	1,605,400	14,644,200	1,605,400
	district level	6,580,500	7,194,800	6,807,300	6,807,300	6,807,300	6,807,300	6,807,300	6,807,300	6,807,300	61,426,400	6,807,300

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	Total	Projections
	WSSA	5,472,400	6,293,400	5,472,400	5,472,400	5,472,400	5,472,400	5,472,400	5,472,400	5,472,400	50,072,600	5,472,400
	Community Level	882,000	882,000	882,000	882,000	882,000	882,000	882,000	882,000	882,000	7,938,000	882,000
	Contractors, NGOs and consultants	32,000	38,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	294,000	32,000
Sub-Total		19,636,236	42,314,336	19,634,236	19,659,036	19,634,236	19,634,236	20,174,036	19,634,236	19,634,236	199,944,824	19,634,236
Awareness Raising		540,423	534,422	534,422	534,422	534,422	534,422	534,422	534,422	534,422	4,815,800	534,422
Cross-cutting Issues		264,100	264,100	264,100	264,100	264,100	264,100	264,100	264,100	264,100	2,376,900	264,100
Total		199,322,823	260,853,742	302,226,731	341,048,827	182,968,984	183,153,774	183,878,364	183,523,354	183,708,143	2,020,674,742	146,592,984

6.5 Sanitation and Sewerage

6.5.1 Methodology

Interventions related to sewerage, on-site sanitation, capacity building, awareness creation including hygiene education and cross-cutting issues were costed separately. Sanitation and sewerage infrastructure was costed similarly to water supply infrastructure, whereas the methodological approach for the costing of the last three fields is comparable to the water resources and water supply capacity building costings.

6.5.2 Costing Sewerage and Sanitation Facilities

Methodology

As in the case of urban water supply, sewerage was costed on a town by town basis to the extent possible. The calculations are based on the following parameters:

- Current sewerage coverage per town
- Target coverage for the national level
- Per capita unit cost

Current coverage for the entire urban population was calculated using the weighted average of the per town values (with the town sizes as weights). Based on the population projections for 2010 and 2015, the population to be served additionally was computed for the 2006-2010 and 2010-2015 periods and multiplied with the per capita unit costs.

Rehabilitation costs were computed by multiplying the rehabilitation per capita unit cost with the number of people with access to broken sewerage systems. The latter is derived by multiplying the percentage of broken schemes with the number of people covered.

The cost for constructing treatment plants and oxidation ponds was derived by multiplying the number of units to be constructed with the unit cost of one treatment plant and oxidation plant, respectively. The construction of sanitation facilities in rural areas was costed by multiplying the number of people to be served additionally and the per capita unit cost. The costing of sanitation facilities in urban areas took a similar approach except that the technology mix due to two available sanitation technologies with differing per capita unit costs was considered.

The construction of sanitation facilities at primary schools and health facilities was computed by multiplying the number of institutions, the requirement per institutions in terms of sanitation facilities and the unit cost of the respective sanitation facility.

Values and Data Sources

In addition to target coverage and population projections which are mentioned above, the following parameters were used for the calculation of the costs for the sanitation and sewerage sub-sector. Sanitation data was made available to the MoWLD through regions, districts, wards, villages level and the authorities responsible for sanitation issues. In cities and peri-urban areas, surveys on sanitation and sewerage were conducted from house to house, ward to ward, district to district.

Table 27

Variable	Value	Source
Construction of Sewerage System		
per capita unit cost of sewerage system	90	Estimation of drafting team

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

current coverage (in %)	30%	Estimation of drafting team
Construction of Treatment Plants		
unit cost	4,000,000	MoWLD data
quantity required	8	MoWLD data
Construction of Oxidation Ponds		
unit cost	3,620,000	MoWLD data
quantity required	8	MoWLD data
Rehabilitation of Existing Sewerage Systems		
per capita unit cost of rehabilitation	30%	Estimation of drafting team
% require rehabilitation	50%	Estimation of drafting team
Construction of on-site Sanitation Facilities		
hardware unit cost of ventilated improved latrine	225	RWSSP
hardware unit cost of flush toilet with septic tank	575	RWSSP
current urban and rural coverage	87%	Estimation of drafting team
share of ventilated improved latrines in urban areas	80%	Estimation of drafting team
share of flush toilet with septic tank in urban areas	20%	
share of ventilated improved latrines in rural areas	100%	Estimation of drafting team
share of flush toilet with septic tank in rural areas	0%	
On-site Sanitation Facilities in Hospitals		
number of hospitals	280	
current coverage	60%	
2010 target coverage	100%	MoH
flush toilets required per hospital	16	
ventilated improved latrine required per hospital	6	
On-site Sanitation in Health Centers		
number of hospitals	400	
current coverage	60%	
2010 target coverage	100%	MoH
flush toilets required per hospital	2	
ventilated improved latrine required per health center	4	
On-site Sanitation in Dispensaries		
number of hospitals	5000	
current coverage	40%	
2010 target coverage	100%	MoH
ventilated improved latrine required per dispensary	2	
Construction of on-site Sanitation Facilities in Primary Schools		
number of primary schools	14257	
current coverage	80%	
2010 target coverage	100%	Estimation of drafting team
ventilated improved latrines required per primary school	12	

6.5.3 Costing Hygiene Education, Capacity Building and Cross-Cutting Issues

Methodology

The methodological approach to cost capacity building, awareness creation and cross-cutting issues closely resembles the costing of water resources. The following methodological steps have been taken:

- Intervention packages for capacity building were first categorized by level and institutions.

- Intervention packages were broken down into activities that are costed.
- Activity categories that must be carried out were identified for each intervention. They include campaigns, workshops and meetings, consultancies and training.
- For each activity of all interventions, the measurement unit and the unit cost were established.
- For each activity, it was estimated how many units are necessary.
- The cost of one activity was derived by multiplying the quantity and the unit cost.
- The cost for each intervention was computed by summing up the costs of all corresponding activities.

Values and Assumptions

Due to a lack of data, all values were estimated by the drafting team. Table 28 summarizes all parameters used for the calculation of the costs.

Table 28

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years	total quantity	Rationale
Hygiene Education and Advocacy	Promotion of consumer participation and compliance with sewerage services	mass media	campaign	20,000	1	108	108	National campaign monthly
		meeting and workshop	workshop/meeting	3,000	1	108	108	National campaign monthly
	Awareness creation on sanitation and hygiene through IEC materials, media and other options.	meeting and workshop	workshop/meeting	3,000	1	108	108	National campaign monthly
		printed media	pieces	5	20000	9	180,000	Once in every year
	Promotion of efficient and environmentally friendly technologies in liquid waste management	Consultancy	man days	200	125	81	10,125	Once in every year
	Promotion of standard sanitation facilities	mass media	campaign	20,000	1	108	108	National campaign monthly
		meeting and workshop	workshop/meeting	3,000	1	108	108	National campaign monthly
	Rehabilitation of sanitation facilities	infrastructure (government assistance)	districts	100,000	125	1	125	Once in nine years
	Preparation and annual updates of household environmental health profile and of participatory sanitation and hygiene practices situation/status	participation in health profile surveys	man days	10	661500	3	1,984,500	Two for every ward for every three years
	Education and awareness on cleaner production technologies	mass media	campaign	20,000	1	108	108	National campaign monthly
		meeting and workshop		3000	1	108	108	National campaign monthly

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years	total quantity	Rationale
	Environmental management and enforcement, education and awareness programmes	training and awareness creation	Workshop/meeting	3000	1	108	108	National campaign monthly
	Promotion of improved latrine facilities in rural areas	mass media campaign	Campaign	20,000	1	108	108	National campaign monthly
Capacity Building	On Community Level							
	- Facilitation of communities to effectively execute their plans	training of TOTs	Person	500	250	9	2,250	Two for every district per year
	- Train local community artisan on improved latrine construction	training of local artisans	Person	250	1250	9	11,250	Ten for every district per year
	- Support water, sanitation and health (WASH) committees at community level	train water committees	man day	10	2700	9	24,300	Two for every ward per year
	Public and environmental health campaigns	mass media campaign	Campaign	25,000	1	108	108	National campaign monthly
	Integrate sanitation and hygiene education in the COWSOs	engagement of health officers in water supply schemes	man day	2	2700	9	24,300	Two for every ward per year
	Strengthen the private sector's ability to construct sanitation facilities.	training private companies	Company	1200	1250	9	11,250	Ten companies for every district per year
	Promotion of safe excreta disposal	mass media campaign	Campaign	25,000	1	108	108	National campaign monthly

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Area	Intervention Package	Activities	Unit	Unit Cost	Number of Units	Number of Months/Years	total quantity	Rationale
		training and awareness creation	man day	250000	1	108	108	National campaign monthly
	On District Level							
	- Train sanitation inspection officers on friendly inspection techniques	train inspection Officers	Persons	1,200	2700	9	24,300	Two for every ward per year
	Public and environmental health campaigns	mass media campaign	Campaign	25,000	1	108	108	National campaign monthly
		training and awareness creation	man day	25,000	1	108	108	National campaign monthly
	On National Level							
	Strengthening of the sanitation data base	equipment and tools	Set	200,000	1	1	1	Database at headquarter
	Public and environmental health campaigns	mass media campaign	Campaign	25,000	1	108	108	National campaign monthly
Cross-Cutting Issues	Support workers living with HIV/AIDS, orphans and fight HIV/AIDS stigma	free/strongly subsidized water supply to PLWHA	persons	0.8	36,0000	9	3,240,000	0.8 per person
		support HIV/AIDS orphans	Package	500	50	9	450	50 orphans per year
		advocacy meetings and workshops	Meeting/Workshop	10,000	10	9	90	10 times per year

6.5.4 Sequenced Actual Costs of Sanitation and Sewerage Interventions

Once the overall costs are established, the annual costs for the period between 2006 and 2015 as well as the sequencing of the scaling-up of interventions can be determined. The scaling-up of the interventions must be gradual and simultaneous; in particular, interventions related to capacity building and hygiene education must accompany the scaling-up of sewerage systems and of on-site sanitation facilities so that capacity constraints can be overcome.

As for the water supply sub-sector, the calculation of the costs per year based on the overall costs for the sanitation and sewerage sub-sector differs between interventions related to sewerage and on-site sanitation on the one hand and hygiene education, capacity building, as well as interventions for cross-cutting issues on the other hand.

➤ Sewerage and on-site Sanitation

For the sake of simplification, the calculation of the annual costs is based on the average; the costs for the construction of sanitation facilities and sewerage systems of the 2006-2010 and the 2010-2015 periods were divided by 4 and 5, respectively.

The annual costs of sewerage for the 2006-2010 period increase progressively; they start at 60% of the average value and they increase up to 140% of the average annual cost. For the 2010-2015 period, the annual costs are constant and correspond to the average value.

The construction of on-site sanitation facilities is assumed to follow a fully linear scale-up path; the annual costs between 2006 and 2010 as well as between 2010 and 2015 correspond to the average values. All health facilities as well as all primary schools will be equipped with on-site sanitation facilities until 2010. The annual costs correspond to average values.

It is assumed that one treatment plant and one oxidation pond is constructed every year between 2006 and 2014 (the total number is eight in each case).

All sewerage systems are rehabilitated until 2010; the annual costs in the 2006-2010 period are constant.

➤ Hygiene Education and Advocacy, Capacity Building and Interventions for Cross-cutting Issues

Almost all interventions must be carried out recurrently so that in most cases, the annual costs are predetermined. Interventions that only involve a one-time activity are considered in 2007/08. The cost of interventions which consist of support for every district once in the 2006-2015 period were spread evenly; in other words, it is assumed that every year a constant number of districts is supported.

All quick win interventions are carried out recurrently (i.e. training), so that their scaling-up path cannot not differ from other recurrent interventions if they are all implemented from the first year onwards. However, all quick wins will be prioritized under scarce financial resources as discussed in subsequent chapters.

The annual costs for the sanitation and sewerage sub-sector were calculated as shown in Table 29:

MKUKUTA Based MDG Costing for the Water and Sanitation Sector

Table 29

Area	Intervention Package	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	Total	Projections
Sewerage	Construction of sewerage systems	30,670,917	40,894,556	61,341,833	71,565,472	21,750,648	21,750,648	21,750,648	21,750,648	21,750,648	313,226,016	25,817,627
	Construction of treatment plant	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	-	32,000,000	-
	Construction of oxidation ponds	3,620,000	3,620,000	3,620,000	3,620,000	3,620,000	3,620,000	3,620,000	3,620,000	-	28,960,000	-
	Rehabilitation of existing sewerage systems	3,477,324	3,477,324	3,477,324	3,477,324	-	-	-	-	-	13,909,296	-
Sub-Total		41,768,241	51,991,880	72,439,157	82,662,796	29,370,648	29,370,648	29,370,648	29,370,648	21,750,648	388,095,312	25,817,627
on-site Sanitation	Construction of on-site sanitation facilities in rural areas	68,309,880	68,309,880	68,309,880	68,309,880	25,409,886	25,409,886	25,409,886	25,409,886	25,409,886	400,288,948	26,876,420
	Construction of on-site sanitation facilities in urban areas	46,334,279	46,334,279	46,334,279	46,334,279	45,654,558	45,654,558	45,654,558	45,654,558	45,654,558	413,609,903	54,191,138
	On-site sanitation facilities in hospitals	714,900	714,900	714,900	714,900	-	-	-	-	-	2,859,600	-
	Construction of on-site sanitation facilities in primary schools	1,924,695	1,924,695	1,924,695	1,924,695	-	-	-	-	-	7,698,780	-
Sub - Total		117,283,754	117,283,754	117,283,754	117,283,754	71,064,443	71,064,443	71,064,443	71,064,443	71,064,443	824,457,231	81,067,558
Hygiene Education and Advocacy		5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	45,530,000	5,058,889
Capacity building interventions		9,709,900	9,909,900	9,709,900	9,709,900	9,709,900	9,709,900	9,709,900	9,709,900	9,709,900	87,589,100	9,709,900
Cross-Cutting		413,000	413,000	413,000	413,000	413,000	413,000	413,000	413,000	413,000	3,717,000	413,000
Total		174,233,784	184,657,422	204,904,700	215,128,339	115,616,880	115,616,880	115,616,880	115,616,880	107,996,880	1,349,388,644	122,066,974

6.6 Analysis and Evaluation of Results

The overall cost for the water and sanitation sector in Tanzania can be computed by adding up the costs of each sub-sector. It must be emphasized that the overall cost must not be fully covered through public funds. Table 30 displays a summary of total costs of all three sub-sectors.

A graphical analysis of the overall costs is necessary to facilitate the evaluation of the results. The following aspects are especially important:

- The evolution of the costs over time can be visualized so that the implications of the scaling-up assumptions are clearer. Additionally, the forecast of the post-2015 cost based on the projections is insightful (Figure 5). The cost curve depends on the MKUKUTA targets as well as on the MDGs and the scaling-up paths of the interventions as explained in previous sections.
- The determination of the share of every sub-sector in the total costs reflects the relative costs and facilitates the identification of the parameters with the greatest impact on the results (Figure 6). Figure 7 visualizes the annual cost by sub-sector.
- The share of each field of interventions within the sub-sectors reflects the relative cost in greater detail which is useful for policy and planning if all interventions have the same priorities (Figure 8 and Figure 9).
- Figure 10 gives a rough estimation of the percentage of capital and recurrent costs.

Table 30

Sub-sector	Area	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	Total	Projections	MKUKUTA (total)
Water Resources	Sub-total	19,624,270	20,788,220	18,813,420	18,838,620	18,865,070	18,378,450	18,403,650	18,428,850	24,649,600	176,790,149	24,201,600	78,064,529
Water Supply	Rural Infrastructure	96,257,324	117,937,151	147,632,254	169,250,557	65,965,735	66,150,525	66,335,315	66,520,105	66,704,895	862,753,860	30,534,500	531,077,285
	Urban Infrastructure	82,624,741	99,803,733	134,161,719	151,340,712	96,570,491	96,570,491	96,570,491	96,570,491	96,570,491	950,783,357	95,625,726	467,930,905
	Cap. Building and Inst. Strengthening	19,636,236	42,314,336	19,634,236	19,659,036	19,634,236	19,634,236	20,174,036	19,634,236	19,634,236	199,944,824	19,634,236	101,243,844
	Awareness Raising	540,423	534,422	534,422	534,422	534,422	534,422	534,422	534,422	534,422	4,815,800	534,422	2,143,690
	Cross Cutting Issues	264,100	264,100	264,100	264,100	264,100	264,100	264,100	264,100	264,100	2,376,900	264,100	1,056,400
	Sub-total	199,322,823	260,853,742	302,226,731	341,048,827	182,968,984	183,153,774	183,878,364	183,523,354	183,708,143	2,020,674,742	146,592,984	1,103,452,124
Sanitation and Sewerage	Sewerage	41,768,241	51,991,880	72,439,157	82,662,796	29,370,648	29,370,648	29,370,648	29,370,648	21,750,648	388,095,312	25,817,627	248,862,074
	on-site Sanitation	117,283,754	117,283,754	117,283,754	117,283,754	71,064,443	71,064,443	71,064,443	71,064,443	71,064,443	824,457,231	81,067,558	469,135,016
	Hygiene Education and Advocacy	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	5,058,889	45,530,000	5,058,889	20,235,556
	Cap. building interventions	9,709,900	9,909,900	9,709,900	9,709,900	9,709,900	9,709,900	9,709,900	9,709,900	9,709,900	87,589,100	9,709,900	39,039,600
	Cross Cutting	413,000	413,000	413,000	413,000	413,000	413,000	413,000	413,000	413,000	3,717,000	413,000	1,652,000
	Sub-total	174,233,784	184,657,422	204,904,700	215,128,339	115,616,880	115,616,880	115,616,880	115,616,880	115,616,880	107,996,880	1,349,388,644	122,066,974
Total		393,180,877	466,299,384	525,944,851	575,015,786	317,450,933	317,149,103	317,898,893	317,569,083	316,354,623	3,546,853,535	292,861,558	1,960,440,898

Figure 5

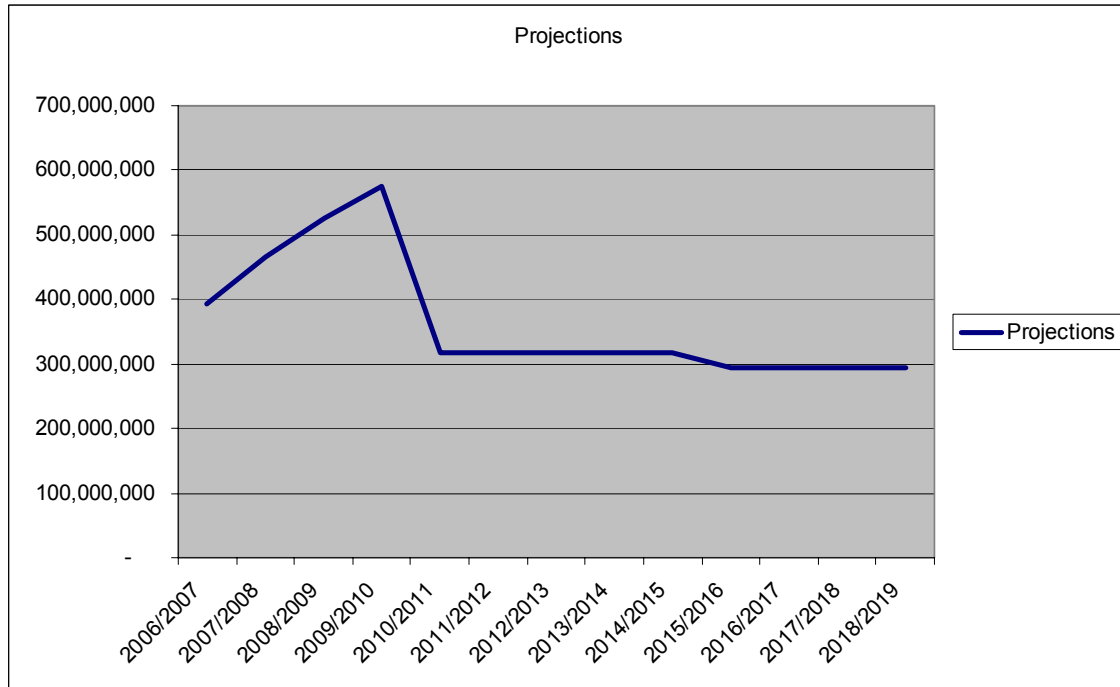


Figure 6

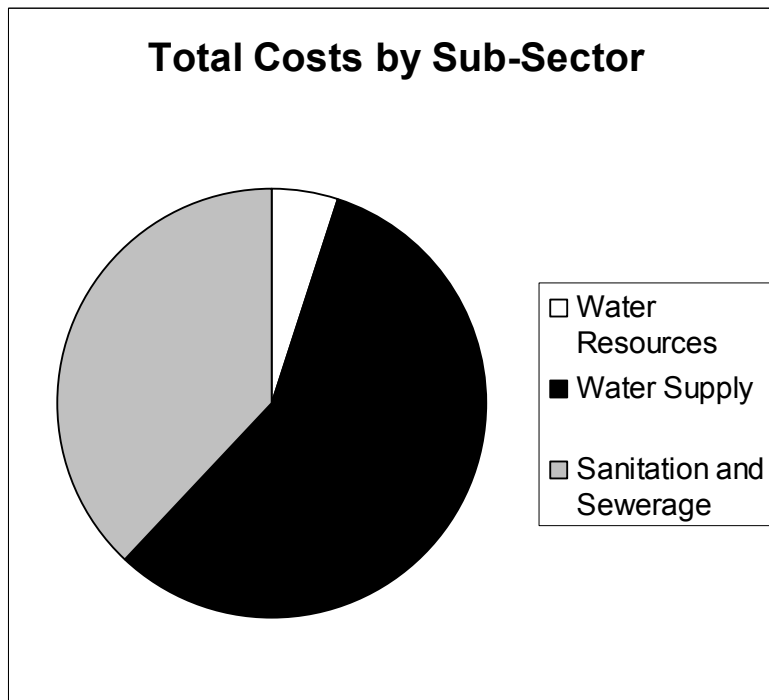


Figure 7

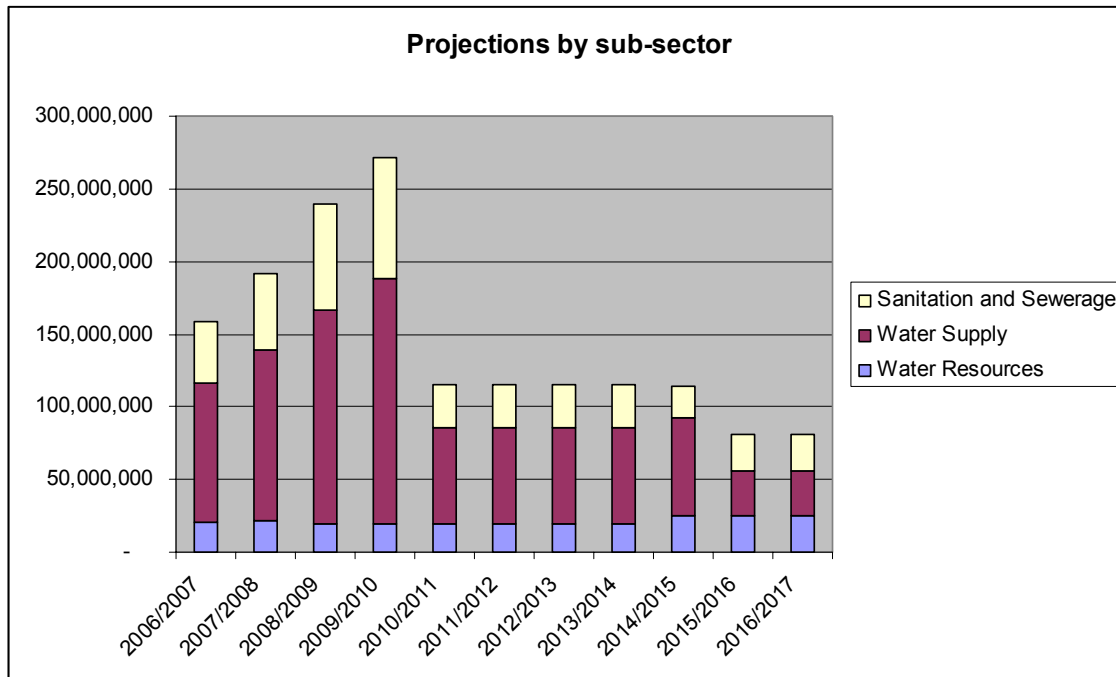


Figure 8

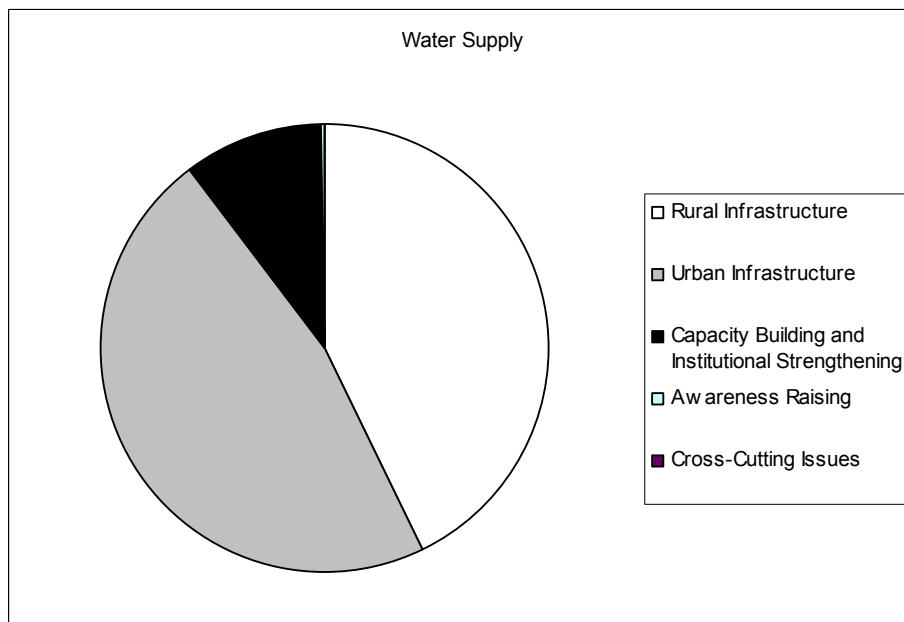


Figure 9

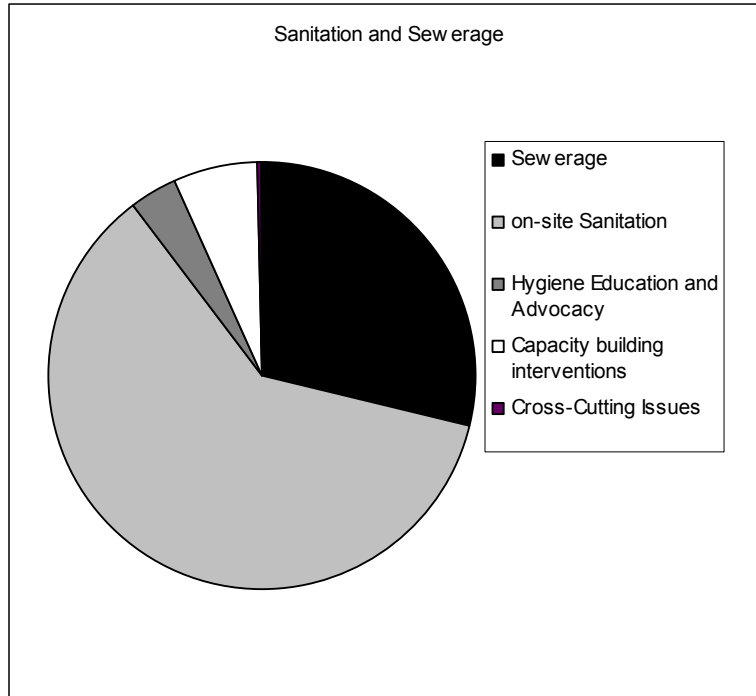
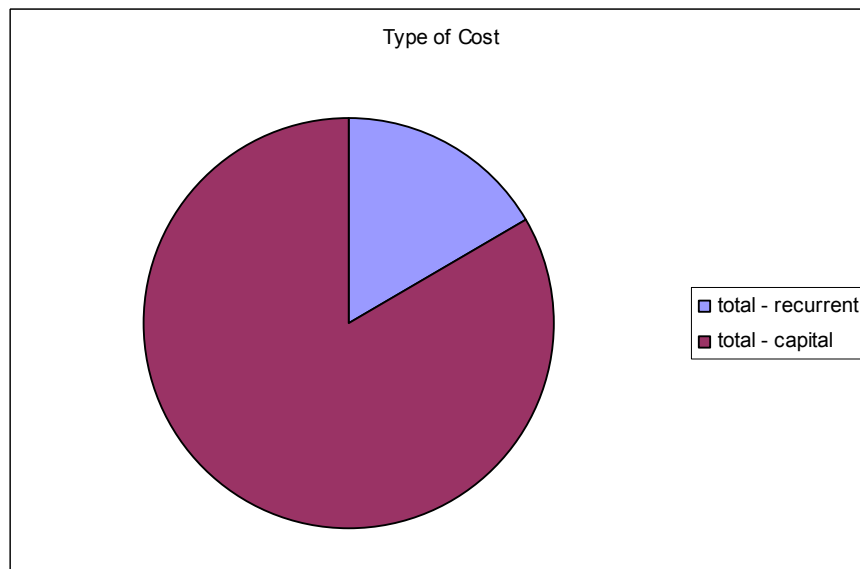


Figure 10



7 Financing Strategy

7.1 Overview

Developing a financing strategy to meet the requirements consists of several steps. First, possible sources of financing must be identified and assessed. Broadly speaking, public and private sources including user fees and community contributions as well as household investments can be distinguished. It is important to not only determine the amount of resources that are currently available, but also to make projections for the future. Secondly, the resource requirements for each financing source based on the costs must be determined and financing gaps for both sources can be computed. Finally, strategies to tackle the gap as well as implications for future budget guidelines and MTEFs will be discussed.

7.2 Analysis of Current Financing

7.2.1 Public Allocation for the Water and Sanitation Sector

Public allocation for the water and sanitation sector includes the development and the recurrent budget. The latter is subdivided between personal emolument and other charges. It is financed by domestic revenue and external resources.

The MoWLD allocations for water and sanitation represent the largest share in domestic revenues. They can be further subdivided between the regular budget and development funds for a special project with a limited duration. Allocations of other institutions are also an important source of financing for water and sanitation. On the national level, allocations from the Ministry of Health and the Ministry of Education must also be partially considered. In particular, allocations for construction of sanitation infrastructure in health facilities and primary schools as well as for hygiene education must be taken into account. Additionally, local government allocates resources for water and sanitation. The sum of the allocations for water and sanitation of these institutions equals the sum of the domestic revenues.

Even though at present, official development assistance earmarked for the water and sanitation sector is not transferred to the Government of Tanzania, it is still recorded in the budget and is therefore integral part of the public allocation. External sources consist of both loans and grants. Assistance from NGOs is excluded in the budget; however, for reasons of simplicity, it is not separated from public allocation since the amounts are relatively insignificant.

Current public allocation is summarized in Table 31. Several data gaps could not be filled.

Table 31

Public Allocation	Current Revenue Amount(s) - 2005/2006 in TSH			
	Recurrent		Development	Total
	Personnel Emolument	Other Charges		
Ministry of Water and Livestock Development (local)	3,018,671,500	12,208,600,000	5,683,000,000	20,910,271,500
Ministry of Water and Livestock Development (special project local)	0	0	63,000,000,000	63,000,000,000
Foreign (Loan and Grants)	0	0	53,010,000,000	53,010,000,000
Ministry of Health (Sanitation and hygiene education)	?	?	?	?
Ministry of Education (Construction of School Toilets)	?	?	?	?
Local Government	9,317,819,000	3,375,233,000	0	12,693,052,000
NGOs (WaterAid, World Vision, etc)	?	?	?	?
Total	12,336,490,000	15,583,833,000	121,693,000,000	149,613,323,000

Annual projections for the 2006-2015 period are based on amounts currently available. In order to ensure comparability with the costing, projections are made in current USD and exclude increases due to inflation. Additionally, yearly public allocation was not further subdivided. Two possible scenarios are incorporated in the model.

The first one assumes an annual increase of 10% of public allocation over the entire period. The increase does not cover the special project; its funding is assumed to gradually decrease and expire after 2007/2008 and thereby reducing public revenue for water and sanitation. For the first years, the figures of this scenario roughly correspond to the MTEF which are summarized in Table 32.

Table 32

Public Allocation	Revenue Projections (in TSH)			
	2006/07	2007/08	2008/09	2009/10
Ministry of Water and Livestock Development (local)	23,001,298,000	25,301,428,000	27,831,571,000	30,614,728,000
Ministry of Water and Livestock Development (Special project local)	69,300,000,000	30,000,000,000	-	-
Foreign (Loans and Grants)	58,311,000,000	64,142,100,000	70,556,310,000	77,611,941,000
Ministry of Health (Sanitation and hygiene education)	?	?	?	?
Ministry of Education (Construction of School Toilets)	?	?	?	?
Local Government	13,962,357,000	15,358,593,000	16,894,452,000	18,583,898,000
NGOs (WaterAid, etc.)	?	?	?	?
Total	164,574,656,000	134,802,121,000	115,282,334,000	126,810,567,000

The second scenario assumes no change of public allocations in real terms; in other words, under this scenario, the amount of public allocation for the water and sanitation sector is expected to remain constant over the entire period of the costing. Table 35 summarizes projections for public allocation under both scenarios in USD.

7.2.2 Private sources

The second financing source for the water and sanitation sector comprises user fees as well as contributions to the village water funds as one sub-category and household investment as a second sub-category. User fees are collected by UWSAs in regional headquarters, by UWSAs in district headquarters and small towns, by WUEs (Companies, Groups, Trustees, Associations, etc.) and water basin boards. The amounts currently available are summarized in Table 33. For the contributions to the village water funds, the bank balance is used to indicate current levels. As indicated, some data gaps cannot be filled.

Household investments are one-time expenditures in on-site sanitation facilities and household connections. Currently, there is no data for them available.

Table 33

Private Sources	Current Revenue Amount(s) - 2005/2006 in TSH			
	Recurrent		Development	Total
	Personnel Emolument	Other Charges		
User fees				
➤ UWSAs (Regional HQ)	3,550,000,000	12,145,000,000	2,100,000,000	17,795,000,000
➤ UWSAs (District HQs & Small Towns)	?	?	?	?
➤ WUEs (Companies, Groups, Trustees, Associations, etc)	?	?	?	?
➤ Basin Water Boards	-	440,500,000	-	440,500,000
Village Water Funds (Bank Balance)	-	1,270,000,000	-	1,270,000,000
Investments by households	-	-	?	?
Total	3,550,000,000	13,855,500,000	2,100,000,000	19,505,500,000

Projections for user fees and contributions to village water funds are made under two scenarios. The first and optimistic one assumes an annual increase of 10%, whereas the other one assumes that the collected user fees and the community contributions remain unchanged.

Household investments cannot be projected because current amounts are not available, and because decisive factors such as willingness to pay for investments and future household income are difficult to predict.

Projections for private sources excluding household investments under both scenarios for the entire period are summarized in Table 36 (in USD).

7.3 Resource Requirements, Financing Scenarios and Financing Gaps

There can be insufficient public and private sources to cover the costs which results in public and private financing gaps. In order to compute the financing gaps, the resource requirements by financing source must be known. In other words, in line with current Tanzanian policies, it must be determined what share of the costs is expected to be covered by each of the financing sources if sufficient funds were available. Hence, for every intervention costed, the shares of public allocation, user fees and contributions to the water fund as well as of household connections were established (Table 34 and Figure 11).

It is of most interest to determine the public financing gap. Based on the previous analysis, projected public resource availability must be compared with the requirements for public allocation. As displayed and visualized in Table 35, Figure 12 and Figure 13, under the assumptions of an annual 10% increase of public allocations and based on the results of the costing, the public financing gap widens dramatically in relative and absolute terms until 2010. In the years after 2010, it narrows down and eventually even turns into a surplus. However, in absolute terms of the entire period, the public financing gap totals 539 million USD implying that requirements exceed by far projected resource availability. Under scenario 2, the financing gap also widens during the first years, but then persists until 2015 even though it narrows down. It totals 580 million USD. Several key parameters strongly influence the extent of the public financing gap. Among them are the unit costs and the population to be served additionally with access to safe water and access to sewerage as well as the percentage share of the investments to be covered by public sources. Under different projections and assumptions, the public financing gap therefore changes.

An annual increase of 10% of user fees and community contributions will not be sufficient to meet the requirements. The financing gap for private sources excluding household investments (which cannot be projected) is displayed in Table 36, Figure 14 and Figure 15. In relative terms, the private financing gap is much larger than the public financing gap. It also widens until 2010, but remains large in the subsequent years until 2015 even though it slightly narrows down. For the full period, it amounts to 408 million USD. Under scenario 2, the evolution of the financing gap is similar, but in absolute terms it is much larger and amounts to 525 million USD.

It must be noted that the actual private and public financing gaps may be smaller due to data gaps.

Table 34

Intervention Package	covered by public funds	covered by user fees and contributions	covered by household investments
Water Supply – Rural Infrastructure			
Construction of new Water Schemes	95%	5%	0%
Upgrading to household connection	75%	0%	25%
Operation and Maintenance (including repairs)	10%	90%	0%
Rehabilitation of existing broken schemes	80%	20%	0%
Rainwater Harvesting	80%	20%	0%
Construction of WS Infrastructure for Health Facilities	95%	5%	0%
Water Supply - Urban Infrastructure			
Construction of new Water Schemes	70%	30%	0%
Rehabilitation of existing broken schemes	65%	35%	0%
Operations & Maintenance (including repairs)	10%	90%	0%
Meters	30%	70%	0%
Water Supply Infrastructure for Health Facilities	100%	0%	0%
Water Supply – Capacity Building and Inst. Strengthening			
National level	60%	40%	0%
DDCA	50%	50%	0%
EWURA	100%	0%	0%
Regional level	90%	10%	0%
District level	90%	10%	0%
WSSA	70%	30%	0%
Community Level	10%	90%	0%
Contractors, NGOs and Consultants	100%	0%	0%
Water Supply - Awareness Raising	20%	80%	0%
Water Supply - Cross-cutting Issues	30%	70%	0%

Intervention Package	covered by public funds	covered by user fees and contributions	covered by household investments
Sanitation and Sewerage			
Construction of Sewerage System	80%	20%	0%
Construction of Treatment Plant	90%	10%	0%
Construction of oxidation ponds	90%	10%	0%
Rehabilitation of existing Sewerage Systems	90%	10%	0%
Construction of on-site sanitation facilities in urban areas	0%	0%	100%
Construction of on-site sanitation facilities in rural areas	0%	0%	100%
Construction of on-site sanitation facilities in hospitals	100%	0%	0%
Construction of on-site sanitation facilities in schools	100%	0%	0%
Hygiene Education and Advocacy	20%	80%	0%
Capacity building interventions	30%	70%	0%
Cross-cutting	0%	100%	0%
Water Resources Management			
Water Resource Assessment	100%	0%	0%
Conservation and Environmental Protection	95%	5%	0%
Alternative Resource Development	95%	5%	0%
Integrated Water Resources Management (Demand Management, Water Utilization and Allocation)	100%	0%	0%
Transboundary Water Resources	100%	0%	0%
Disaster Management	100%	0%	0%
Cross-cutting Issues	90%	10%	0%
Organizational Development and Capacity Building at headquarter and basin level (catchment level included)	100%	0%	0%
Awareness Creation	80%	20%	0%

Figure 11

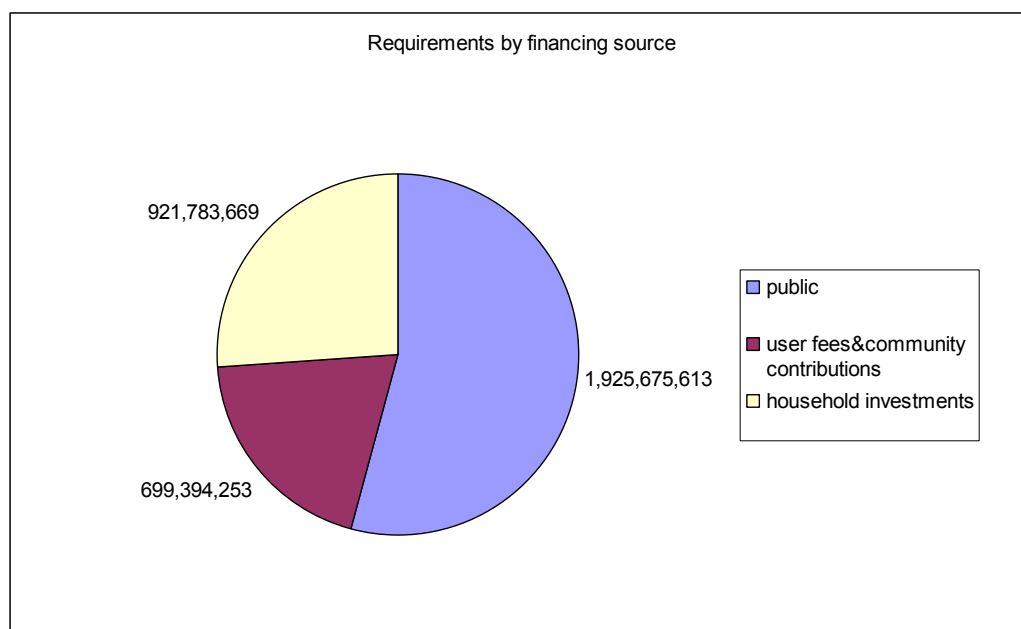


Table 35

	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	total
Availability										
Scenario 1	164,574,656	134,802,122	115,282,334	126,810,568	139,491,624	153,440,787	168,784,865	185,663,352	204,229,687	1,393,079,995
Scenario 2	149,613,324	149,613,324	149,613,324	149,613,324	149,613,324	149,613,324	149,613,324	149,613,324	149,613,324	1,346,519,915
Requirements										
	185,264,956	223,195,673	281,639,912	318,256,527	155,942,639	155,985,068	156,208,747	156,072,426	155,453,027	1,932,116,764
Public Financing Gap										
Scenario 1	20,690,299	88,393,551	166,357,578	191,445,960	16,451,015	2,544,281	-12,576,118	-29,590,926	-48,776,660	539,036,769
Scenario 2	35,651,632	73,582,350	132,026,588	168,643,204	6,329,315	6,371,744	6,595,423	6,459,102	5,839,704	585,596,849
Gap (in % of availability)										
	13%	66%	144%	151%	12%	2%	-7%	-16%	-24%	39%
	24%	49%	88%	113%	4%	4%	4%	4%	4%	43%

Table 36

	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	total
Availability (private sources excluding household investments)										
Scenario 1	21,456,050	23,601,655	25,961,821	28,558,003	31,413,803	34,555,183	38,010,701	41,811,772	45,992,949	291,361,936
Scenario 2	19,505,500	19,505,500	19,505,500	19,505,500	19,505,500	19,505,500	19,505,500	19,505,500	19,505,500	175,549,500
Requirements for private sources (excluding household investments)										
	62,933,956	71,859,646	87,444,975	95,914,494	66,251,082	66,417,393	66,763,704	66,750,014	66,154,953	699,400,253
Private Financing Gap (excluding household investments)										
Scenario 1	41,477,906	48,257,991	61,483,154	67,356,492	34,837,279	31,862,210	28,753,002	24,938,243	20,162,004	408,038,317
Scenario 2	43,428,456	52,354,146	67,939,475	76,408,994	46,745,582	46,911,893	47,258,204	47,244,514	46,649,453	523,850,753
Gap (in % of availability)										
	193%	204%	237%	236%	111%	92%	76%	60%	44%	140%
	223%	268%	348%	392%	240%	241%	242%	242%	239%	298%
Requirements for household investments										
	126,524,159	130,484,159	138,404,159	142,364,159	76,801,407	76,801,407	76,801,407	76,801,407	76,801,407	921,783,669

Figure 12

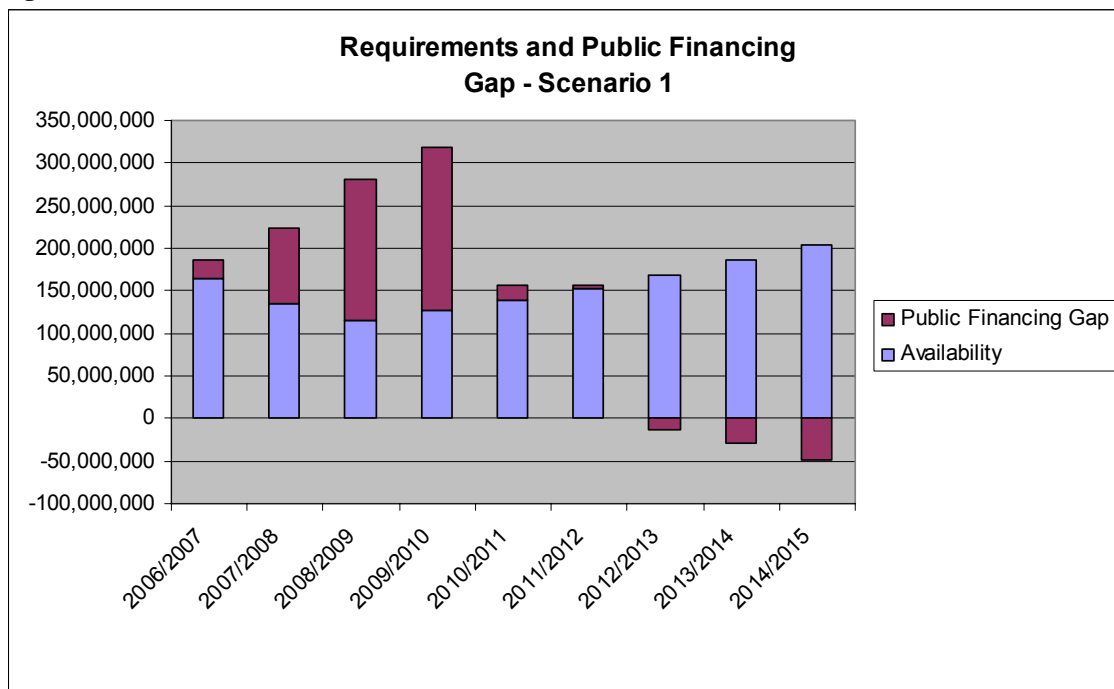


Figure 13

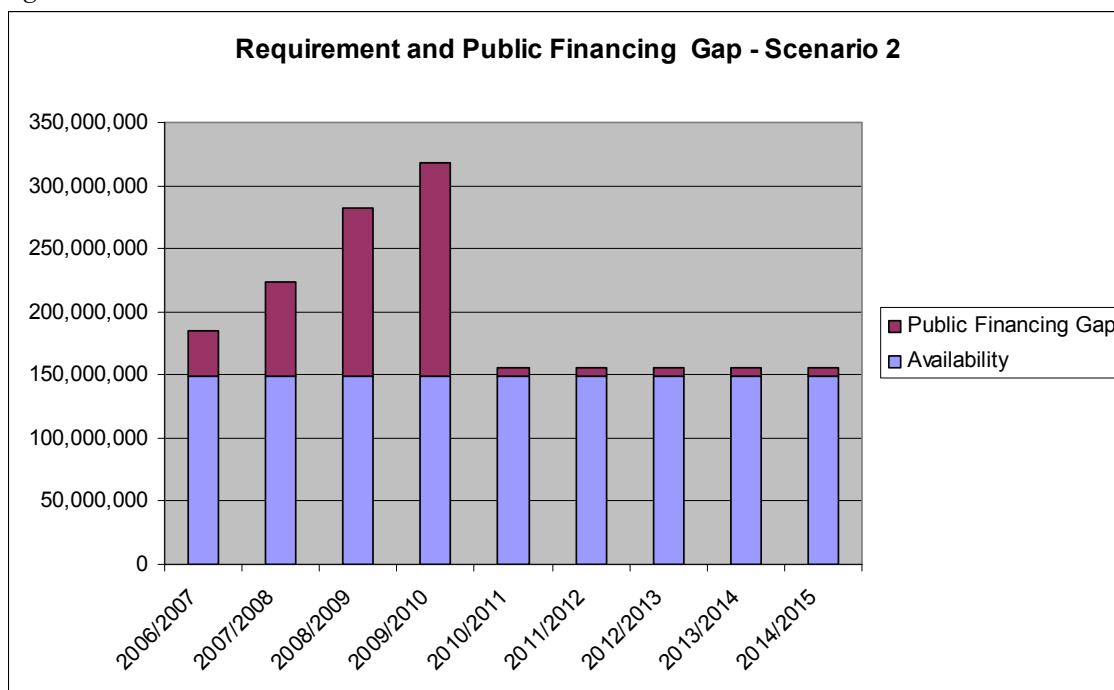


Figure 14

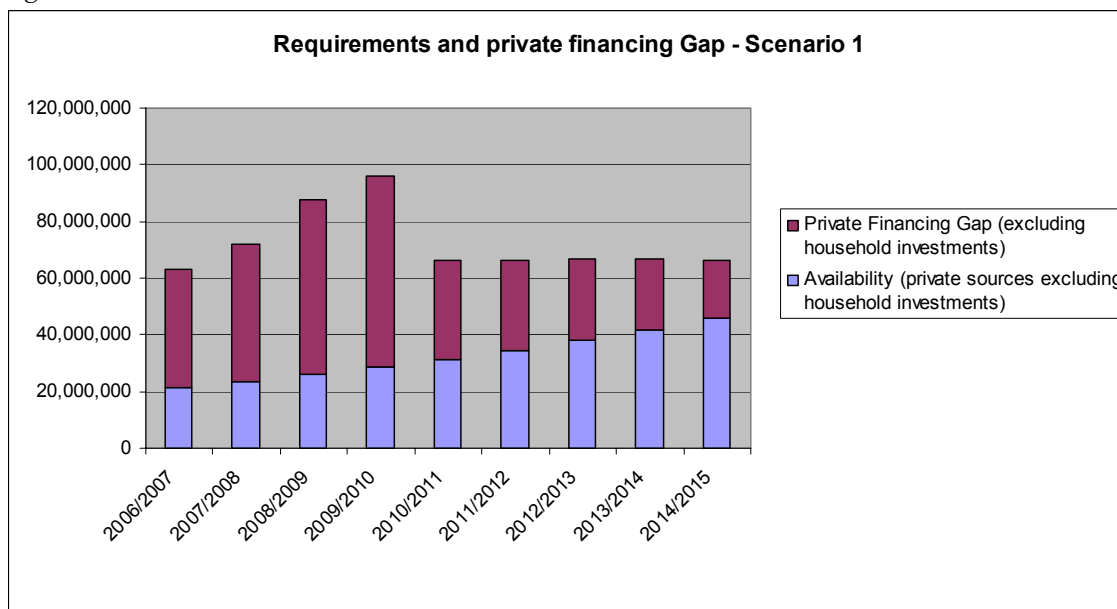
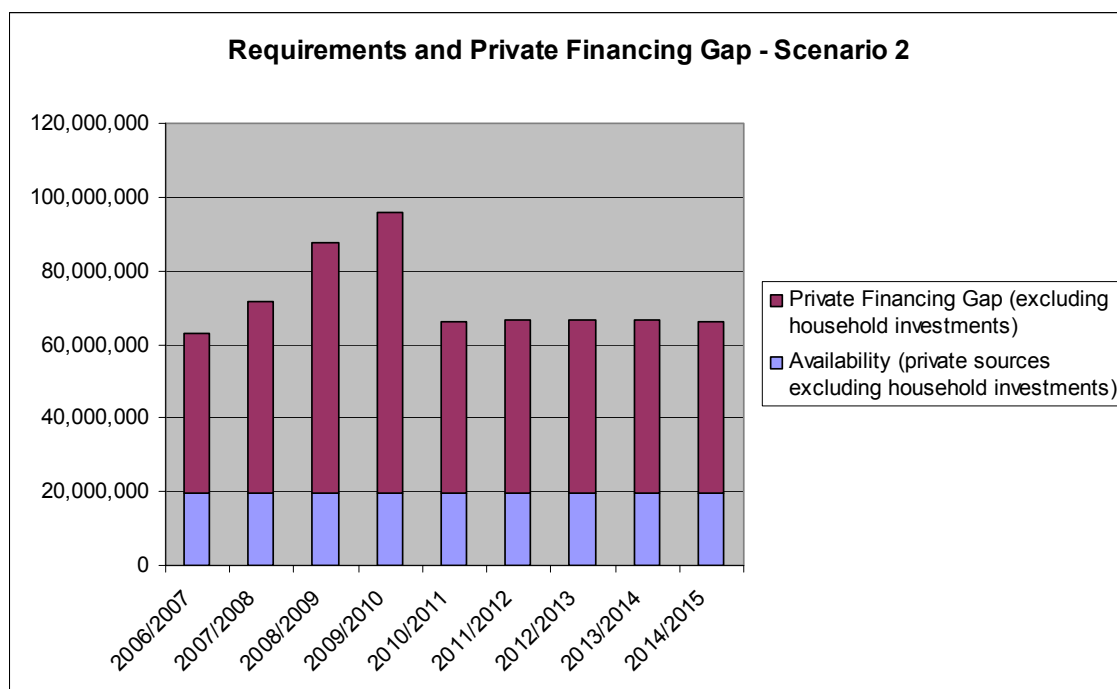


Figure 15



7.4 Options for Additional Resource Mobilization

The public financing gap can be filled by both additional external resources and additional domestic revenue. Provided that the revised results of this costing are widely accepted, Tanzania may be in the position to access additional (but not necessarily sufficient) external funds for several reasons. First, the Government of Tanzania and development partners alike have committed to reach the MDGs as well as the MKUKUTA targets. Secondly, Tanzania has a stronger and better governance than other countries in sub-Saharan Africa so that additional funds can be expected to be efficiently spent. Finally, aid for Africa is currently in the focus of public attention in donor countries and high on the international agenda so that overall increases are possible or even likely.

Domestic revenues for the water and sanitation sector can increase due to two factors. On the one hand, the water and sanitation sector can receive more attention and thereby a higher share of the national budget. On the other hand, the overall domestic revenue can increase so that even though the percentage share of the water and sanitation sector in the budget remains constant, total allocation could still augment. However, major increases are unlikely.

Closing the public financing gap by requiring users and households to carry an even higher burden is impossible under current policy guidelines and seems unrealistic in the context of a large financing gap for private sources under current modalities.

In order to close the financing gap for private sources, the level of user fees and community contributions must be increased. Possibilities to increase the amount of user fees collected include the raising of collection efficiency by the installation of meters and by enhancing payment practice through better enforcement mechanisms. Required household investments were not considered in the calculation of the private financing gap. However, households will especially be required to pay for sanitation facilities if the targets are to be met. Hygiene education can be used to promote higher spending for on-site sanitation by creating awareness for the health benefits that access to basic sanitation entails.

7.5 Implications for Future Budget Guidelines, SBAS and MTEFs

Even in the likely case of a remaining public financing gap, the results of the costing can still be used as a basis for planning and budgeting in the water and sanitation sector so that the optimal outcomes can be reached under financial constraints. Since the costing is disaggregated by interventions whereas the budget is rather disaggregated by economic category and administrative responsibility, the costs must be translated into budget terms. Using the Strategic Budget Allocation System, the budget framework can be linked to MKUKUTA interventions. Therefore, it is now very simple to forecast annual budget requirements. This document will serve as a good reference during preparation of both the inputs of the sector to the budget guidelines and for the budget ceilings for the water and sanitation sector. The ceilings for the sector budget preparations need to put strong consideration of this costing document.

Even in the likely case of a remaining public financing gap, the results of the costing can still be used as a basis for planning and budgeting in the water and sanitation sector so that the optimal outcomes can be reached under financial constraints. Using the Strategic Budget Allocation System, the budget framework can be linked to MKUKUTA interventions. Even though the total level of public allocation does not suffice, reallocations between the sub-sectors, between intervention packages or between activities can improve the status. In other words, the optimal allocation of public funds to the various areas in the water and sanitation sector under financial constraints can be reassessed using the costing. For example, the cost of quick win interventions could be fully met at the expense of other interventions which have only a longer-term impact. Additionally, all intervention packages costed can

be rated on a simple scale by the GoT according to political preferences. In the budget, priority will then be given to the least expensive interventions that were rated most favourably. For example, from a health perspective, it could be argued that hygiene education is as important as the construction of infrastructure that provides physical access to safe water. Supposing that this view is accepted, all resource requirements for hygiene education could be fully funded because hygiene education is comparatively less expensive; allocations for infrastructure investments could be reduced accordingly.

8 Evaluation and Conclusion

- The MKUKUTA based MDG costing is suited and completely adapted to fit the national context. The analytical framework and in particular the list of interventions were developed in line with Tanzanian requirements. The technical model to calculate the costs was developed in its totality by the drafting team to meet sector specific demand.
- The MKUKUTA based MDG costing does not only provide an approximation of the order of magnitude; it rather can and should be used and further developed for sector planning and budgeting. Therefore, it can be used for advocacy, but more importantly, it should be seen as a water and sanitation sector policy tool. More specifically, the MKUKUTA based MDG costing document will serve as a good reference for the budget process.
- The quality of the results certainly varies. It is notoriously harder to cost institutions, capacity building, awareness creation and alike compared to infrastructure. However, since infrastructure related costs represent by far the largest share of the costs and since the costing of infrastructure is based on solid grounds, deviations from the 'true' values for the 'soft part' of the costing are of minor importance since they affect only a small percentage of the overall costs.
- The costs calculated do not refer to reaching the MDGs and MKUKUTA targets alone; they rather refer to reaching the targets using the MKUKUTA and sector strategy interventions under sector policies. Supposing that these interventions are optimal choices and best suited, the results of the costing represent the lowest cost scenario.
- The costs reflect the resource needs for the water and sanitation sector to satisfy all requirements. The requirements take into account not only the targets of the sector itself; rather, strong emphasis was put on the requirements of cross-sectoral linkages. For instance, the costs as calculated reflect what is needed in the water and sanitation sector from a health perspective. Thereby, like MKUKUTA itself, the costing underpins the need for harmonization for exchange of information on requirements between the sectors.

9 Recommendations and the Way Forward

- With the MKUKUTA based MDG costing document, it is now easy for programme forecasting to put in place a phased implementation framework. Each sub-sector can now easily prepare the strategic programs to implement the NAWAPO 2002 in their areas. The proposed programmes that are recommended include:
 - The National Rural Water Supply and Sanitation Programme (under final preparation)
 - The Urban Water Supply and Sewerage Development Programme
 - The Urban Water Supply Component
 - The Urban Sewerage Development Component
 - The Water Resources Development Programme
 - Water Resource Institutional Development and Capacity Building (IWRM)
 - Water Resource Assessment (Quantity)

- Water Resource Protection (Quality) Component
- Transparency of all data and parameters used ensures that all stakeholders can make specific comments regarding the inputs of the calculations if they disagree with the results or with specific assumptions. All criticism should be collected, discussed and reviewed and then adopted in the final draft if appropriate so that the MKUKUTA based MDG costing is generally accepted among all stakeholders. After the final acceptance of the resource requirements by all stakeholders and especially by the development partners, the projections for available public funds should be reassessed and reevaluated to derive a more realistic financing gap. Based on this review, the MKUKUTA based costing should feed into the budget process of subsequent years.
- For proper execution of activities, the programs that will be implemented based on the costing, need to employ SWAP coordination, collaboration and activity execution principles. The example of this approach is proposed by the National Rural Water Supply and Sanitation Program.
- The MKUKUTA based MDG costing becomes an even more powerful policy tool if it covers more sectors, as envisaged by the government, especially those to which the water and sanitation sector makes important contributions through cross-sectoral linkages. Provided that interfaces between the various costings can be created, cross-sectoral linkages are better reflected so that the basis for planning and budgeting would be enhanced, especially under financially constrained scenarios.
- Annual revisions in terms of how much is still needed are recommended. For example, the pace of scaling-up may be slower or faster than assumed in the costing, so that the costs for the remaining year until 2010 and 2015, respectively, change.
- The MKUKUTA based MDG costing should be made more user-friendly so that all parameters can be more easily changed by the user to facilitate annual revisions. Additionally, provided that the financing gap cannot be closed, the costing should be extended to allow the inputting and the consideration of priorities according to political preferences of the government of Tanzania so that guidance for allocation decisions is enhanced under financially constrained scenarios.

10 Annex

10.1 Costs for Water Monitoring Stations

Table 37

Type of Station	Equipment	No	Unit Cost (US\$)	Total Cost(US\$)
Hydrological	Recording	1	8,000	8,000
Meteorological	Ordinary Station			
	Gunn Bellan	1	2,500	2,500
	Automatic Raingauge	1	4,500	4,500
	Sunshine Recorder	1	3,000	3,000
	Standard Raingauge	1	500	500
	Measuring Cylinder	1	100	100
	Stevenson Screen	1	1,500	1,500
	Evaporation pan (standard type)	1	500	500
	Max/Min Thermometer	1	100	100
	Dry/Wet Bulb Therm	1	100	100
	Piche	1	50	50
	Total			12,850
	Automatic Weather Station			14,000
Rainfall	Non-recording			
	Standard Raingauge	1	500	500
	Measuring Cylinder	1	100	100
	Total			600
	Recording			
	Automatic Raingauge	1	4,500	4,500
Total			4,500	
Water Quality	Water Quality Stations	1	14,000	14,000
	Handheld Water Quality Stations	1	14,000	14,000
Groundwater	Recording & non-recording	1	20,000	20,000

Source: MoWLD, 2005

10.2 Technical Equipment and Tools Sets for Water Basins

Table 38

Description of Equipment and Tools	Measurement Unit	Number of units	Unit Cost of Input(US\$)	Total (US\$)	Remarks
Wading rods	Sets	27	1,300	35,100	1 set per gauging team
Gauging wheel - single drum	Sets	27	40,000	1,080,000	1 set per gauging team
Stop Watch	Pcs	54	120	6,480	2 pcs per gauging team
Sinker 75lb	Pcs	27	1,500	40,500	1 pc per gauging team
Single Drum Winch	Pcs	27	6,000	162,000	1 pc per gauging team
Counter Set	Pcs	27	600	16,200	1 pc per gauging team
Hand sampler	Pcs	27	600	16,200	1 pc per gauging team
Cableway sampler	Pcs	27	1,500	40,500	1 pc per gauging team

Description of Equipment and Tools	Measurement Unit	Number of units	Unit Cost of Input(US\$)	Total (US\$)	Remarks
GPS	Pcs	36	2,000	72,000	4 pcs per basin
Automatic water level recorders	Sets	90	15,000	1,350,000	10 sets per basin
Magnetometer	Sets	27	11,000	297,000	1set per field office
Current Meters Universal	Sets	27	7,000	189,000	3 sets per basin
Current Meters Pygmy	Sets	27	4,000	108,000	3 sets per basin
Ultra Sonic flow meter	Sets	27	7,000	189,000	1set per field office
Open Channel Computer	Sets	27	3,000	81,000	1set per field office
Current Meter, Acoustic Doppler Current Profiling-ADCP	Sets	27	34,000	918,000	1set per field office
Surveying Instruments (dumpy level, staff, tripod)	Sets	27	3,500	94,500	3 sets per basin
Surveying Instruments (quick set, staff, tripod)	Sets	27	3,500	94,500	3 sets per basin
Engineers compass	Pcs	27	60	1,620	3 pcs per basin
Boat (inflatable)	Pcs	4	9,000	36,000	4 pcs in 4 basins
Life Jacks	Pcs	16	160	2,560	16 pcs in 4 basins
Waders	Pcs	16	180	2,880	16 pcs in 4 basins
Bridge Crane	Pcs	27	2,000	54,000	1 pc per gauging team
Echo sounder	Pcs	4	100	400	4 pcs in 4 basins
Sounding Weight (Sinkers)	Pcs	27	3,100	83,700	1set per field office
Geological compasses (bruton)	Pcs	27	220	5,940	3 pcs per basin
Flow Tracker	Pcs	27	8,500	229,500	1set per field office
Geological hammer	Pcs	27	30	810	3 pcs per basin
Sediment samplers DH-48 & DH-49	Pcs	27	2,700	72,900	3 pcs per basin
Seismic System	Sets	27	54,000	1,458,000	3 sets per basin
Earth Resisitivity	Sets	27	15,000	405,000	3 sets per basin
Electromagnetic system	Sets	27	47,000	1,269,000	3 sets per basin
Hand augers	Sets	27	6,500	175,500	3 sets per basin
Permeameter	Sets	27	850	22,950	3 sets per basin
Soil moisture meters	Sets	27	1,700	45,900	3 sets per basin
Soil Sample rings(set of 24)	Sets	27	400	10,800	3 sets per basin
Field Computers	Sets	27	3,000	81,000	3 sets per basin
Pumping test equipment	Sets	27	564,000	15,228,000	3 sets per basin
Portable Water Analysis Kit	Sets	27	10,000	270,000	3 sets per basin
Total				24,246,440	

Source: MoWLD, 2005

10.3 Data for Water Laboratories

Table 39

Item or service to be procured	Quantity/ No. of Labs	Unit Price	Total Cost
Analytical Balance top loader 1500gx0.001g	15	4,000	60,000
Conductivity	15	373	5,600
Alytical Balance	15	4,356	65,333

Atomic Absorption Spectrophotometer	15	54,222	813,333
pH metre	15	1,180	17,700
Turbidity metre	15	4,700	70,500
Automatic pipette	15	Lumpsum	13,560
Water bath stainless steel	15	4,244	63,660
Distillation unit	15	1,602	24,033
pH electrodes	15	187	2,800
Reference electrode	15	196	2,933
Combined fluoride electrodes	15	187	2,800
Ion selective metre	15	6,884	103,267
Filtration Unit	15	7,111	106,667
Cooled incubator air max.	15	5,511	82,667
Spectrophotometer DR	15	10,022	150,333
Refrigerators	15	1,100	16,500
Calorimeter	15	8,444	126,667
Vacuum pump for TSS	15	4,978	74,667
Suckers (rubber sucker)	15	Lumpsum	133
Petri dishes	15	Lumpsum	533
Kjeldahl apparatus	15	6,164	92,467
Muffle furnace	15	13,160	197,400
Borosilicate glass-sampling bottles 250 mls clear glass	15	Lumpsum	200
Borosilicate glass-sampling bottles 50 mls clear glass	15	Lumpsum	200
Borosilicate glass-sampling bottles 25 mls clear glass	15	Lumpsum	200
BOD bottles – 250 mls	15	Lumpsum	240
Beakers, 25, 100, 250, 500 1000 mls	15	Lumpsum	400
Measuring cylinders, 10, 25, 500, 1000 mls	15	Lumpsum	400
Volumetric Flasks, 50, 100, 250, 500, 1000, 2000 mls	15	Lumpsum	800
Flat bottomed flask	15	Lumpsum	133
Conical Flasks 250, 500 mls	15	Lumpsum	267
Burrete	15	Lumpsum	760
Pipettes 1.0, 5.0, 10.0, 25.0 mls	15	Lumpsum	267
Sampling bottles – Plastic bottles 1000 mls	15	Lumpsum	7
Plastic bottles 25 mLs	15	Lumpsum	53

Source: MoWLD, 2005

Data for Microbiological Analysis:

Table 40

Item or service to be Procured	Quantity No.	Unit Price USD	Total Cost USD
Domestic gas, cylinder head, burnsen burner	15	Lumpsum	6,667
Water bath capable of maintaining at 45+0.5oC	15	5,156	77,333
Test tubes 15mm x 160mm	15	Lumpsum	33
Test tubes 20mm x 200mm	15	Lumpsum	43
Durham tubes	15	Lumpsum	8

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Loop made of platinum/Iridium or nickel/chromium	15	68	1,027
Total delivery pipettes of 1mm, 10 ml	15	Lumpsum	88
Colony counting equipment consisting of illuminated Air/filter pump, vacuum at least 400mm Hg.	15	4,009	60,133
Comparator	15	4,978	74,667
Comparator	15	196	2,933
Colony counter with magnifier lens & set of adapter	15	4,009	60,133
Burner alcohol	15		93
Sampler	15	1,511	22,660
Forceps, stainless steel 125 mm long	15	Lumpsum	75
6 watt UV lamp	15	968	14,520
UV viewing cabinet	15	7,871	118,067
GPS	15	533	8,000
Chemical and Reagent	15	Lumpsum	8,889
Sub-total			455,369

Source: MoWLD, 2005