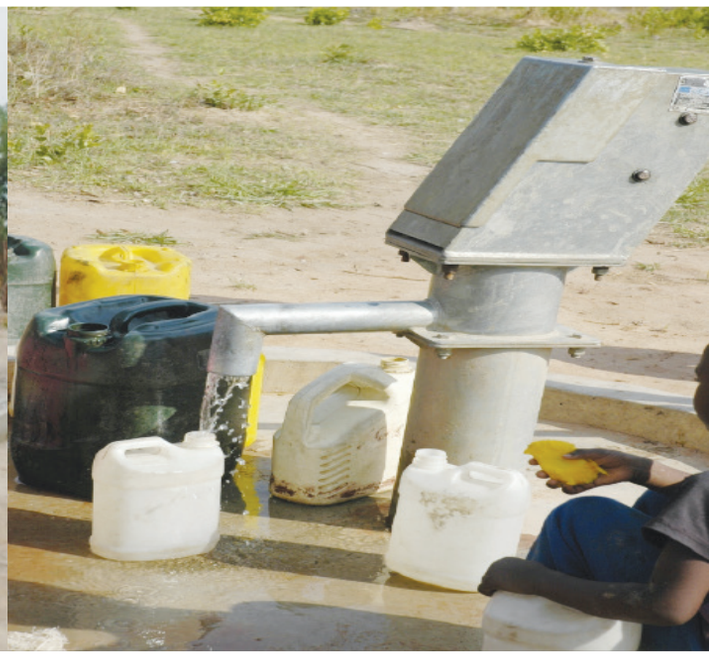
Republic of Zambia

REPORT OF THE AUDITOR GENERAL



on the Water and Sanitation Programme Support Phase I Ministry of Local Government and Housing

July 2014

Foreword

I have the honour to submit my performance audit report on the Water and Sanitation Programme Support Phase I, in accordance with the provisions of Article 121 of the Constitution of Zambia and the Public Finance Act No. 15 of 2004.

Government has acknowledged that in order to improve the well-being of all its citizens and to ensure that the country attains the Millennium Development Goals, the provision of safe water to its citizens including the rural communities is important.

In this respect, in 2003 Government introduced the National Rural Water Supply and Sanitation Programme (NRWSSP) which was meant to increase and improve communities' access to water and sanitation. The Programme consists of a coherent set of investment, institutional and sector support activities aimed at providing and sustaining water supply and sanitation services to the rural population.

The performance audit whose results are contained in this report was carried out to assess the compliance of programme implementation to specifications as set out in the project document and to evaluate its effectiveness on the provision of safe water supply in rural areas of Lusaka, Western and Southern Provinces.

I would like to thank the staff at the Ministry of Local Government and Housing, Local Authorities and the communities in project sites for their cooperation during the process of auditing. I would also like to thank the Royal Government of the Kingdom of Denmark for financing the audit.

Dr. Anna O Chifungula
AUDITOR GENERAL

Abbreviations and Acronyms

APMs	Area Pump Menders
BCHOD	Brian Colquhoun, Hugh O'Donnell and Partners Consulting Engineers
CSO	Central Statistics Office
DANIDA	Danish International Development Assistance
GRZ	Government of the Republic of Zambia
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MLGH	Ministry of Local Government and Housing
NRWSSP	National Rural Water and Sanitation Programme
OAG	Office of the Auditor General
O&M	Operation and Maintenance
PST	Provincial Support Team
RWSS	Rural Water Supply and Sanitation
UNZA	University of Zambia
WRC	Water Resources Consultant
WSPS	Water Sector Programme Support
WSPS I	Water Sector Programme Support Phase I

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EXECUTIVE SUMMARY

In order to improve the well-being of all its citizens and to ensure that the country attains the Millennium Development Goals (MDGs), the Government with the support of DANIDA introduced the Water Sector Programme Support (WSPS) in December 2005. The programme was aimed at providing rural communities with access to safe water supply and was to be implemented in phases.

This audit report covers Phase I of the programme which started in 2006.

The objective of the audit was to assess the compliance of WSPS implementation as specified in the agreement and to measure its effectiveness on the provision of safe water supply in rural areas of Lusaka, Western and Southern Provinces.

Although the WSPS had drilled 792 out of the 865 boreholes planned representing 92%, and that the proportion of households with access to safe water had increased from 41% in 2006 to 49% in 2010, there are a number of challenges such as boreholes not drilled but paid for, wasteful expenditure due to overpayment on contract prices, poor borehole siting, faulty equipment and lack of training of communities in the maintenance of facilities that require to be addressed.

Based on the audit findings, the report has suggested the following recommendations:

i. **Drilling of boreholes in ineligible areas**
The Ministry of Local Government and Housing (MLGH) should strictly follow the specifications as contained in the Programme agreement in the siting and drilling of boreholes.

ii. **Overpayment on the Contract Price**
All payments to contractors should be based on actual works certified by the appointed supervisor and not on contractual amounts.

iii. **Implementation and quality of works**
MLGH should enhance the monitoring of construction works and ensure that they are done to specifications to ensure quality work and corrective action taken if the investigations find weaknesses.

iv. **Maintenance and Rehabilitation**
The MLGH should ensure that the communities are trained as APMs and caretakers as specified in the Programme documents.

The necessary accessories including spare parts and manuals must be provided to the districts to minimize the number of non-functioning wells.

1.0 INTRODUCTION

1.1 Background

Committed to the improvement of the well being of all its citizens and to ensure that the country attains the Millennium Development Goals (MDGs), one of the goals of Government is the provision of adequate safe water and sanitation services particularly to the rural population which is characterized by low access to basic social services such as education, health care, safe water supply and sanitation.

In this respect, in 2003 Government introduced the National Rural Water Supply and Sanitation Programme (NRWSSP) which was meant to increase and improve communities' access to water and sanitation. The Programme consists of a coherent set of investment, institutional and sector support activities aimed at providing and sustaining water supply and sanitation services to the rural population.

According to the Central Statistical Office (CSO) census of 2000 and the Living Conditions Monitoring Survey of 2002/2003, Zambia's rural population was estimated at 7.7 million, (about 65% of the total population in Zambia). Out of the rural population, approximately 37% had access to safe water supply as of 2005.

In this respect, in December 2005, the Government signed an agreement with the Government of the Kingdom of Denmark for the implementation of a Water Sector Programme Support (WSPS) Phase I by the provision of a grant of ZMK196 billion (DKK 245 million) covering the period 2006-2010. The grant was to be administered through the Danish International Development Assistance (DANIDA).

The overall objective of the WSPS was to ensure that Zambia's water resources were effectively developed and efficiently managed to contribute to poverty reduction through increased access to safe water and sanitation and increased food security for low income rural and urban people.

The programme was categorised into three main components as follows:

a. Improving living conditions in the participating districts through sustainable community managed water supply and sanitation infrastructure and productive water.
b. Improving living conditions in participating peri-urban and low-cost housing areas through sustainable water supply and sanitation infrastructure.
c. Establishing institutional frameworks and ensuring that they are operating to facilitate sustainable integrated management of water resources at national and local levels and to support economic growth and improved livelihoods.

1.2 Motivation for the Audit

The audit was undertaken following a request from the Ministry of Local Government and Housing who raised concerns on the prevalence of dry and poor quality bore holes constructed in Western, Southern and Lusaka Provinces under the programme.

2.0 AUDIT DESIGN

2.1 Audit Objective

The objective of the audit was to assess the compliance of programme implementation to specifications as set out in the project document and to measure its effectiveness on the provision of safe water supply in rural areas of Lusaka, Western and Southern Provinces.

2.2 Audit Scope

The audit covered activities of the programme in drilling services and installation of equipment and other apparatus of water points by the Ministry of Local Government and Housing during the period January 2006 to June 2012. The audit covered all eligible districts in the three provinces, namely; Lukulu, Mongu, Kalabo, Senanga, Sesheke, Kaoma, Shan'gombo, Itezhi-Tezhi, Kalomo, Namwala, Kafue, Chongwe and Luangwa.

2.3 Audit Questions

The audit was designed to answer the following questions:

a. To what extent has the Ministry planned and implemented the DANIDA water program?

- **i.** Has the Ministry adequately planned the improvement and accessibility of safe water in rural communities in Southern, Lusaka and Western provinces?
- **ii.** Has the Ministry adequately carried out and documented the procurement process in accordance with the Zambia Public Procurement Act No. 12 of 2008?
- **iii.** Where the works implemented in accordance with the NRWSSP guidelines?
- **iv.** Is there a mechanism in place to ensure that the water facilities are maintained on a sustainable basis?

b. To what extent has the programme increased access to safe water supply in rural communities in Southern, Lusaka and Western provinces?

2.4 Audit Criteria

According to National Water Supply and Sanitation Act of 1997, the Ministry of Local Government and Housing has the responsibility of providing services of water supply to rural areas. The Ministry is also responsible to ensure that water resources are effectively developed and managed to contribute to poverty reduction through increased access to safe water and food security for low income rural population.

The target for water supply in Zambia as set out in the National Long Term Vision 2030 (Vision 2030) is that there should be 100 percent access to safe water supply for all users. In order to achieve this vision, the Government in 2003 introduced NRWSSP. The overall objective of the NRWSSP is to provide sustainable and equitable access to safe water supply and proper sanitation to meet basic needs for improved health and poverty alleviation for Zambia's rural population and to contribute to the achievement of the Millennium Development Goal (MDG) for water supply and sanitation.

According to the Sector Programme Support document, NRWSSP is supposed to increase and improve the number of functioning water supply facilities in rural areas through systematic investment in new facilities and rehabilitation of existing ones on the basis of a single comprehensive national RWSS programme. In this regard, the intended outcome is to increase the number of people with access to functioning rural water points[1] through the following:

a. Increased access to safe water

According to the NRWSSP, the goal was to increase the access to safe, reliable and convenient quantities of water supply by 66 per cent of the rural population by 2011. In order to meet this target, the Ministry was to improve access to water points to 250 people per water point.

1 NRWSSP p21

b. Planning and implementation

i. The communities selected for the program

The Guidelines for implementing Community Water Supply and Sanitation Projects in Rural Areas has spelled out the criteria for selection of the communities[2] as follows:

- Need: 50 households per point source.
- Equity: Districts or areas with low coverage.
- Access: Households with more than 1.5km to nearest safe point source.

ii. Areas where clean water can be extracted and utilised

According to NRWSSP, satisfying hydro-geological conditions is one of the principles to ensure the sustainability of rural water and sanitation supply[3] and the Final description of component 1, each drilling contract should specify the level of hydro-geological survey and drilling supervision to be employed[4].

Geophysical survey involves resistivity profiling used to identify local structural features having ground water potential. The resistivity layering of the aquifer was to be determined by interpretation of Vertical Electrical Soundings (VES).

c. Procurement

Procurement for goods and services would follow GRZ rules and guidelines and procurement of services would go through the Zambia Public Procurement Authority.

d. Consultancy and drilling contracts

Siting, borehole drilling, development and casing of boreholes should be done and each drilling contract should specify the level of hydro-geological survey and drilling supervision to be employed.

Construction specifications should be used to determine the total depth of the borehole installed and the amount the driller should be paid.

e. Implementation and quality of the work

For the successful implementation of the programme and ensuring quality works, the following issues were identified as key:

i. Implementation

- The choice of the technology and service levels which were to be commensurate with what the community were willing to pay for
- Participation of beneficiaries and involvement of the community
- The training of the beneficiary communities in the maintenance of the water points.
- Water supply investments in all districts should be delivered as an integrated package with sanitation, consisting of construction of new water points - boreholes and hand dug wells equipped with hand pumps and proper drainage facilities; spring protection, improved traditional water points, piped water supplies at rural centers; and rehabilitations of existing water points.
- The investment should be based on district plans that reflect community priorities and commitments, to ensure continued operation of facilities in all participating provinces[5].

ii. Quality of works

For a borehole or a well to be considered to be protected in accordance with NRWSSP specifications, it must fulfill the following:

- Be sited 30 meters away from latrines, refuse pits or other sources of faecal or other contamination
- lined all the way down

2 Final description of component 1(P32)
3 NRWSSP (p 11)
4 Final description of component 1 (p 32)
5 In the NRWSSP component 1(page xvi and page 21)

- Have a platform of concrete or bricks that avoids direct infiltration of dirty water from the surface
- Be equipped with a hand pump, or some lifting device
- Have a functioning drainage system for waste water

In addition, the World Health Organisation (WHO) and Zambia Bureau Standards (ZABS) specify some of the key parameters of quality water are as follows:

- The pH (which measures the levels of acidity or alkalinity) of the water should vary from 6.18 to 8.48.
- The Electrical Conductivity (EC) of the formation water ranges from 188 to 1484µmS/cm indicating fresh water. The EC of water estimates the total amount of solids dissolved in water and the commonly used units for measuring electrical conductivity of water is µmS/cm (microSiemens/cm).

iii Maintenance and Rehabilitations

According to the inception report, sustained operation of the WSS facilities is necessary to establish a well resourced maintenance system at community and district levels, including transport, equipment, supply of spare parts as well as trained staff at all levels.

The inception report also explains that to ensure sustainability, Sustainable Operation and Maintenance Project (SOMAP) principles should be applied where the community is supposed to participate in cost sharing, sustainable supply chains, operation and maintenance mechanisms, choice of appropriate technology and capacity building. The inception report further explains that the operation and maintenance of water facilities will include a roll out to all districts of the operation and maintenance systems that has been developed and tested.

3.0 AUDIT METHODOLOGY

In conducting this audit, an exploratory approach was employed including the following;

3.1 Population

The audit involved the boreholes done in Western, Southern and Lusaka Provinces under the WSPS Phase I programme. Officers under MLGH and the community representatives for areas where the boreholes were done were also interviewed.

3.2 Sampling

A random sampling technique was used to select the interviewees and the project sites visited.

3.3 Research instruments

3.3.1 Document Review

The audit was conducted through a review of relevant documents such as NRWSSP Project Document, project inception report, annual work plans, project progress and completion reports under WSPS Phase I.

3.3.2 Interviews

Interviews of officials at the Ministry headquarters, local authorities and selected beneficiaries in communities were also carried out. The purpose of the interviews was to gain an understanding of the project and implementation and effect or impact. Interviews were also used to confirm the results from the document review. Questionnaires were also administered to the interviewees and responses considered.

3.3.3 Physical Inspections

Physical inspections of project sites were conducted including collecting photographic evidence of installed equipment and constructions at water points.

4.0 THE PROJECT

The Ministry of Energy and Water Development has the mandate to develop water sources', while, service provision of water supply and sanitation is vested in the Ministry of Local Government and Housing whlch has delegated the responsibility to local authorities.

The water sector in Zambia comprises three sub-sectors namely; rural water supply and sanitation, urban water supply and sanitation, and water resources management which are supported by the WSPS Phase I.
The audit focused on Phase I of the programme whose implementation was done through:

a. Thirteen (13) Local Authorities in the three Provinces namely:
   - **i. Western Province** – Kalabo, Kaoma, Lukulu, Mongu, Senanga, Sesheke and Shang'ombo.
   - **ii. Southern Province** – Itezhi-Tezhi, Kalomo and Namwala.
   - **iii. Lusaka Province** – Kafue, Chongwe and Luangwa.

b.Two Provincial Support Teams (PST) located in Mongu and Lusaka that are employed specifically for DANIDA Water Project.

Phase 1 project was divided into four (4) Lots and Luangwa. Lot 1 comprised Lukulu West, Kalabo, Shangombo and Sesheke; Lot 2 comprised Mongu, Kaoma, Lukulu East and Senanga; Lot 3 comprised Sesheke, Namwala and Kalomo; Lot 4 comprised Chongwe, Kafue and Itezhi-Tezhi; and Luangwa District.
Phase I had a total budget provision of **K196 billion (DKK 245 million)** out of which **K47.74 billion** was contracted out for the drilling and supervision of the boreholes in four (4) Lots and Luangwa as shown in the table below.

Table 1: Awarded Contracts

Lot	No of Boreholes	Consultant	Contract Amount (K)	Contractor	Contract Amount (K)
1	190	BCHOD	2,845,500,000	China Ghansu	7,360,607,846
2	235	WRC	4,105,665,749	Zambezi Drilling	10,010,470,572
3	145	WRC	2,859,144,393	China Jiangxi	5,981,858,960
4	215	BCHOD	3,295,500,000	African Brothers	8,130,284,112
Luangwa	80	WRC	638,800,000	Zambezi Drilling	2,509,900,000
Total	**865**		**13,744,610,142**		**33,993,121,490**

Source: MLGH Completion Report

5.0 AUDIT FINDINGS

a. Planning to Improve Access to Safe Water in Rural Communities

i. Drilling of boreholes in ineligible areas

Contrary to the objective of Phase I, five (5) out of the thirteen (13) boreholes inspected in Luangwa were drilled within the peri-urban area where there was municipal piped system within the radius of 200 meters. The boreholes constructed at Soweto B in Dzalo ward, Luangwa Bus Station in Mandombe ward, Kamova Community in Mandombe ward, Chidada community in Dzalo ward and Luangwa Civic Center were within 200 meters of the municipal piped system.

ii. Boreholes not drilled but paid for

Although the consultants and the Ministry certified that a total of 75 boreholes costing K2,953,819,442, as shown in the table below were drilled and installed in Lots 1, 2 and 4, and the entire amount was paid to the contractors, a physical verification revealed that the boreholes were not done. The payment of K2,953,819,442 to the contractors was therefore irregular and recoverable.

Table 3: Undrilled Boreholes

Lot	Average Price Per Borehole (K)	No. of of Undrilled Borehores	Amount K
1	38,740,000	38	1,472,120,002
2	41,254,200	24	990,100,800
4	37,815,280	13	491,598,640
		75	**2,953,819,442**

b. Failure to Provide Procurement Documents

Although the Ministry awarded 10 contracts to consultants and contractors costing K47.74 billion, no tender documents were availed for audit. In this regard, it was not possible to ascertain whether the provisions of the Public Procurement Act were adhered to.

c. Overpayment on the Contract Price

Although the Ministry engaged China Ghansu at a contract sum of K7,360,607,846 for the drilling of 190 boreholes, the contractor was paid amounts totalling K7,430,605,732 resulting in an overpayment of K69,997,886. As of March 2014, the overpayment has not been recovered from the contractor.

d. Implementation and Quality of the Works

i. Siting and quality of the Boreholes

The process and methodology that was used in the siting of boreholes and the eventual resultant location of the water points were not done according to the contracts.

According to the contracts, the contractors were required to use geophysics to site the boreholes and a total sum of K5,092,497,200 (865 boreholes @ K5,887,280) was included for that purpose. However, no siting reports were availed for audit making it difficult to ascertain whether geophysics was used. In addition, the following were observed:

- Out of the 975 boreholes drilled, 183 boreholes representing 18.8% as shown in the table below were dry.

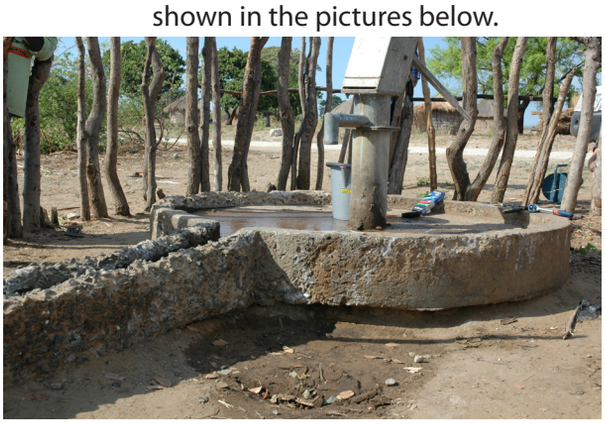
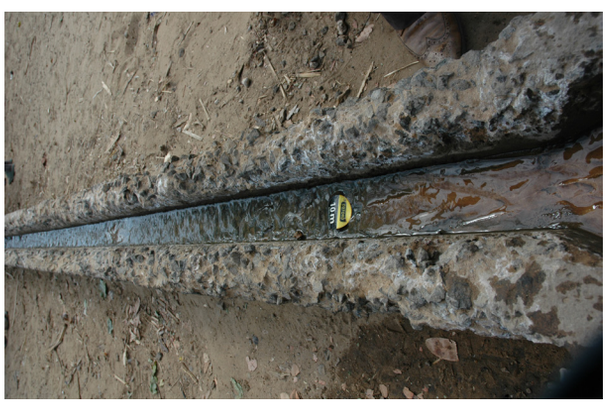
Table 2: Dry Boreholes

Lot	Districts	Contracted No. of Boreholes	No. of Wet Boreholes	No. Dry Boreholes	Total
1	Lukulu west, Kalabo, Shan'gombo, Sesheke	190	155	47	202
2	Kaoma, Lukulu East, Mongu, Senanga	235	235	12	247
3	Sesheke, Namwala, Kalomo	145	121	49	170
4	Chongwe, Kafue, Itezhi Tezhi	215	201	55	256
Luangwa	Luangwa	80	80	20	100
Total		**865**	**792**	**183**	**975**
	Percentage (%)of Dry Boreholes			18.77	

- In Shangombo District two (2) out of three (3) boreholes visited had saline water which could have been detected before the boreholes were drilled had the contractor used scientific methods including geophysics. Consequently, the continued use of this water poses a health risk to the community.

  In one borehole, the water quality was measured at 5600mg/l with the water table just 4m below the surface, which could easily be detected using geophysics.

  In addition as a result of the salinity, the walls of the concrete works were being eroded as shown in the pictures below.

Mashika community well in Shangombo District

ii. Physical inspection

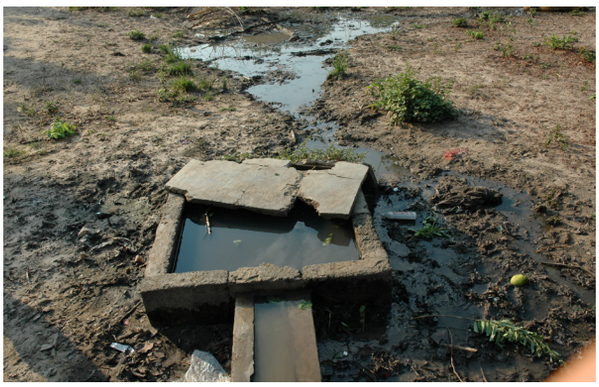
A physical inspection of boreholes under Lot 1, 2, 3 and Luangwa revealed the following:

- **Lack of unique identification marks**

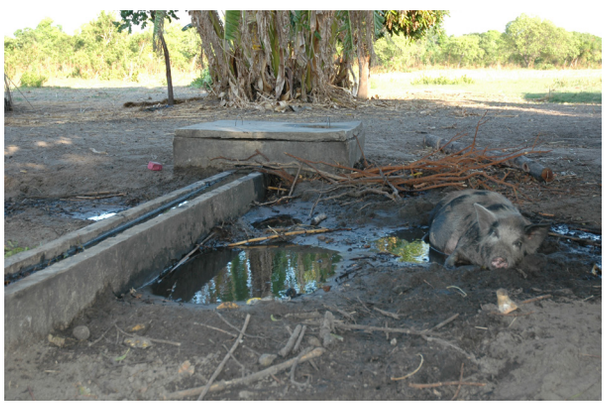
  Although contractors were paid amounts totalling K130,000,000 (650 boreholes @ K200,000 each) for placing of the identification plate, no plates were placed on all the boreholes. As of March 2014, the amount had not been recovered from the contractors.

- **Poor Quality Civil Works**

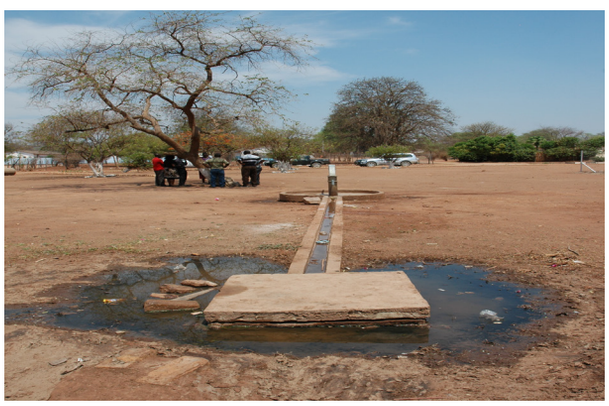
  According to the bill of quantities in the contracts for Lot 1, 2, 3 and Luangwa, the soakways had an estimated cost of K1.2 million. However, the soak ways done were not working properly and caused ponds of water (potential health hazard). See pictures below:



Blocked soakway in Kamilende ward in Kongombe

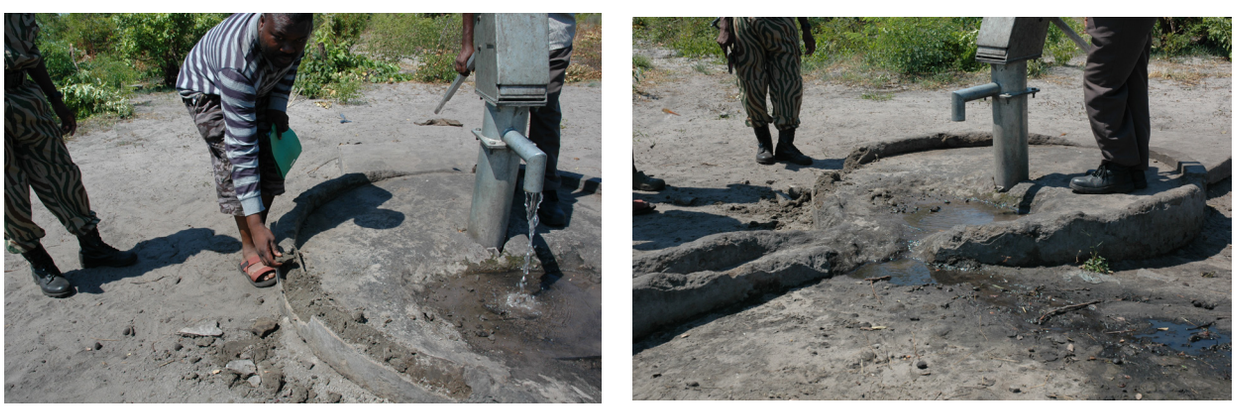


Mutondo community in Mongu



Luangwa High School in Lunya ward

- In Kalabo on the Liuwa plains, the quality of the civil works was found to be very poor in that the concrete could be crumbled by hand as shown in the picture below.

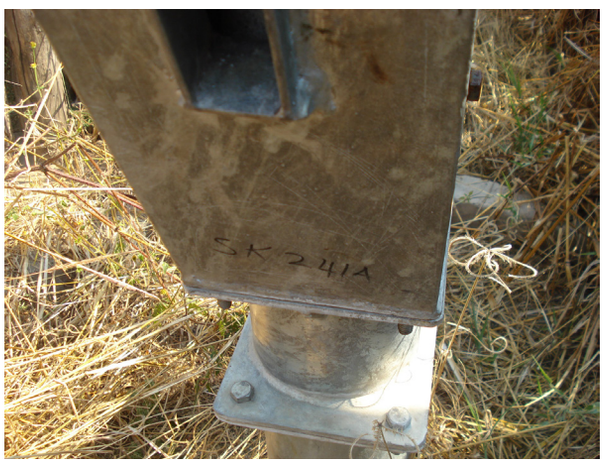


Mutaa Rural Health Centre in Kalabo

From the picture above it is evident that the concrete mix was not correct and just contained fines, no aggregates and very little cement was used.

- **Non-Functioning and Faulty Hand Pumps**

  Out of 66 hand pumps inspected in November 2012, 17 had developed faults and were not functional. See pictures below.



Mulai Lilonga and Nongwa in Sesheke

- **Poor Quality of Water**

Although the contractors were paid a total amount of K323,400,000 to carry out laboratory tests on 831 boreholes, the contractors only carried out tests on 54 boreholes were tested at a cost of K21,600,000. An analysis of the results of the sample tests revealed that water from thirty nine (39) boreholes did not meet the minimum water quality standards a set by the WHO.

In addition, a test check of water samples by a consultant from eighteen (18) boreholes carried out in Chongwe (13 boreholes) and Luangwa (5 boreholes) revealed that water from three (3) boreholes were coloured, and had some black particles, which was an indication that the water was contaminated.

e. Maintenance and Rehabilitation

i. Operations and Maintenance

As per the programme, the operations and maintenance of the water points and their long term sustainability should have been addressed by training the Area Pump Menders (APMs) and caretakers, including the provision of tools. However, in all the sixty-six (66) districts visited, APMs and caretakers were not trained by the contractor and tools for maintenance were not provided to the communities. Consequently, attempts by the community to carry out repair and maintenance works resulted in rope threads failing or PVC pipes being cracked resulting in leakages and pump failure.

ii. Incompatible Tools

The tools and manuals worth K100,800,000 which were left with the council could not be used for repairs because there were not compatible with the type of boreholes installed in Luangwa. The tools could only be used to hold stainless steel type of material and not PVC installed. As such, it was difficult for the area pump menders to repair the broken down wells.

A discussion with the Engineer revealed that the tools supplied for the Luangwa district were inappropriate.

6.0 CONCLUSION AND RECOMMENDATIONS

The audit on the WSPS Phase I has revealed that although the WSPS had drilled 792 boreholes out of the 865 boreholes planned representing 92%, and that the proportion of households with access to safe water has increased from 41% in 2006 to 49% in 2010, there are a number of challenges such as boreholes not drilled but paid for, wasteful expenditure due to overpayment on contract prices, poor borehole siting, faulty equipment and lack of training of communities in the maintenance of facilities.

It is important that these challenges are addressed in the first phase and other phases of this project so that the Government can realise its goal of improving the wellbeing of its citizens at meet its MDGs.

Specifically the following is being recommended:

i. **Drilling of boreholes in ineligible areas**
The MLGH should strictly follow the specifications as contained in the programme agreement in the siting and drilling of boreholes.

ii. **Overpayment on the Contract Price**
All payments to contractors should be based on actual works certified by the appointed supervisor.

iii. **Implementation and quality of works**
MLGH should enhance the monitoring of construction works and ensure that they are done to specifications to ensure quality work and corrective action is taken if the investigations find weaknesses.

iv. **Maintenance and Rehabilitation**
The MLGH should ensure that the communities are trained as APMs and caretakers as specified in the Programme documents. In addition, the necessary accessories including spare parts and manuals must be provided to the districts to minimize the number of non-functioning boreholes.

NOTES