



Groundwater Protection and its Link to Sustainable Sanitation and Town Planning

Workshop Report

February 8th – 10th 2011
Fringilla, Zambia



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List of abbreviations

BGR	Federal Institute for Geosciences and Natural Resources
BMZ	Federal Ministry for Economic Cooperation and Development
BORDA	Bremen Overseas Research and Development Association
CBO	Community Based Organization
CBU	Copperbelt University
CU	Commercial Utility
DC	District Commissioner
DDCC	District Development Coordination Committee
DHMT	District Health Management Team
DWA	Department of Water Affairs
ECZ	Environmental Council of Zambia
EIA	Environmental Impact Assessment
GEHC	George Environmental Health Committee
GIZ	Gesellschaft für Internationale Zusammenarbeit
DHMT	Health Development Team
JICA	Japan International Cooperation Agency
LA	Local Authority
LC	Local Community
LCC	Lusaka City Council
LWSC	Lusaka Water and Sewerage Company
MEDW	Ministry of Energy and Water Development
MLGH	Ministry of Local Government and Housing
MLGH-DHID	Ministry of Local Governance and Housing, Department of Housing & Infrastructure Developments
MoH	Ministry of Health
NDCC	National Development Coordination Committee
NECOS	Network for Environmental Concerns and Solutions
NGO	Non-Governmental Organization
NISIR	National Institute for Scientific and Industrial Research
NWASCO	National Water Supply and Sanitation Council
PDCC	Provincial Development Coordination Committee
PSUP	Participatory Slum Upgrading Programme
PUWSS	Peri-Urban Water Supply and Sanitation
PUWSSU	Peri-Urban Water Supply and Sanitation Unit
RDC	Residents Development Committee
RUWSSU	Rural Water Supply and Sanitation Unit
SAG	Sector Advisory Group
UNZA	University of Zambia
URP	Urban and Regional Planning Department (Copperbelt University)
VIP	Ventilated Improved Pit Latrine

WASAZA	Water and Sanitation Association of Zambia
WASHE	Water Sanitation Hygiene & Education
WISEC	Water Irrigation Sanitation Electricity Civil (Engineering)
WDC	Ward Development Committee

Executive Summary

In Lusaka, the capital of Zambia, 60 % of the water for public supply stem from the local groundwater resource. Lacking sanitation provision causes groundwater pollution and puts the resource at high risk. The use of untreated water from shallow wells in unplanned settlements is one factor leading to outbreaks of cholera. These outbreaks occur annually during the rainy season when groundwater levels rise and pit latrines are flooded. From 8th to 10th February 2011 an interactive workshop took place in Fringilla, near Lusaka. This workshop was convened and organized by the GReSP project, BGR Groundwater Section and the BMZ/BGR sector project Policy Advice Groundwater. Co-organizer was the Water and Sanitation Association of Zambia (WASAZA) and the water programme of GIZ Zambia co-financed the event. The workshop addressed senior technical staff from various sectors including hydrogeologists, sanitation experts and town planners. The participants were asked to develop a To-Do-list, naming activities for the joint improvement of the situation in the selected unplanned settlements (George and Chunga). It became obvious that groundwater protection and an improvement of basic sanitation have to go hand in hand. In the Lusaka context, sustainable sanitation options must take high groundwater tables into consideration.

1.0 Introduction

1.1 Background of the workshop

After having conducted a successful international symposium on 'Coupling Groundwater Protection and Sustainable Sanitation' in Hannover in October 2008 (www.bgr.bund.de/EN/symposium2008), the Sector Program on Policy Advice for Groundwater started their new activity to promote further activities related to groundwater protection and sanitation issues: a workshop bringing together decision makers from various sectors including groundwater protection, sanitation and town planning.

This report gives the proceedings of the three day workshop held from February 8th to 10th, 2011 at Fringilla Lodge near Lusaka, Zambia.

1.2 Selection of workshop region and workshop scope

The implementation region for the workshop was Sub-Saharan Africa (SSA) and Lusaka was decided to be a favourable venue for the following reasons:

- (i) the population growth puts an enormous stress on the water resources and the sanitation sector,
- (ii) the karst aquifer in Lusaka is tremendously vulnerable to contamination,
- (iii) local governmental and non-governmental organisations (NGOs) have a great interest to improve the sanitation situation of the capital and
- (iv) ongoing projects of German development cooperation exist in which the workshop could fit in well.

The workshop was meant to focus on very local case study areas. Two case study areas in Lusaka were identified for the workshop participants to deal with namely George and Chunga compounds. Meanwhile the concept of the workshop was thought to have the potential to be a role model for the region. Observers from neighbouring countries were invited to not only share their experiences but to also take home the observations and if convinced from the outcomes organize a similar workshop in their home country.

1.3 Workshop aim and outcomes

The overall goal of the workshop was to establish a strategy for the improvement of the sanitation situation thereby contributing to groundwater protection. One of the expected outcomes was an improved awareness and understanding of the link between sanitation, groundwater and town planning. Another outcome was the list of activities (To-Do-List) for the identified main problems, in which every participant of the round tables committed him- or herself to a number of actions in order to reach the above goal.

1.4 Workshop participants

In total 43 participants attended the workshop. The facilitators were Andrea Nick from the GReSP project, Kerstin Krueger from BGR Groundwater Section, Vanessa Vaessen and Friedrich Hetzel from the groundwater advisory group of BGR, and Kamuka Kang'ombi from WASAZA. The workshop was moderated by Ms. Mpala Nkonkomalimba, an independent consultant. The participants included experts in sanitation, groundwater and city planning from various institutions in Zambia. Additionally observers were invited from abroad, being resource persons from the sanitation and groundwater sector who were asked to evaluate the workshop

format from their perspective. These representatives came from South Africa (University of Kwa-Zulu Natal, Prof. Chris Buckley, and BORDA regional office, Stefan Reuter), Uganda (GIZ partner institution, David Bateganya), Tanzania (BORDA regional office, Andreas Schmidt) and Kenya (GIZ water programme, Patrick Onyango).

From Lusaka, the relevant stakeholders of the groundwater, sanitation and planning sectors were invited. The invitations were aimed at the senior technical level / operational level. The following institutions were invited and attended (in bold):

Groundwater sector

- Ministry of Energy and Water Development (MEWD), Department of Water Affairs (DWA)

Sanitation sector

- Ministry of Local Government and Housing (MLGH-DHID) Department of Housing & Infrastructure Development
- Lusaka Water and Sewerage Company (LWSC)
- Devolution Trust Fund (DTF)

Town Planning sector

- Lusaka City Council (LCC) Public Health Department (PHD) and Department for Housing & Social Services (DHSS) / Peri Urban Unit
- Ward Development Committee (WDC) of Lima ward (including George Compound) and Chunga ward

Regulatory Institutions

- National Water and Sanitation Council (NWASCO)
- Environmental Council of Zambia (ECZ)

Health sector

- Ministry of Health (MoH) Lusaka District Health Management Team (DHMT)

Academia

- Copperbelt University (CBU)
- University of Zambia (UNZA)
- National Institute for Scientific and Industrial Research (NISIR)

Private sector

- WISEC Engineering

NGOs / Community-based Organizations

- George Environmental Health Committee (GEHC)
- Network for Environmental Concerns and Solutions (NECOS)

A description of these institutions follows in chapter 4.1 Stakeholder analysis. For contact details of the participants, please see the participant list in Appendix II.

1.5 Workshop approach and methodology

The workshop was structured into plenary presentations and plenary discussions as well as round table discussions focussing on the two identified case study areas: George and Chunga compounds. Workshop participants were asked to develop a To-Do-List of tasks that need to be tackled in order to reach at an improved land-use planning and management including cross-cutting strategies. This list was based on a preceding asset and needs analysis which formed the first part of the workshop. The participants assessed the strengths (assets) and the weaknesses (needs) of the case study areas. All discussions were visualised and participants input and participation highly encouraged. The workshop also included a transect walk through the respective compounds, involving the communities and stakeholders in those areas.

2.0 Legal framework of groundwater protection

About 68% of the urban population of Lusaka have access to adequate water supply. The sanitation coverage is estimated to be 17% having access to adequate sanitation (NWASCO, 2009). 60% of the water used for public supply stems from groundwater. Lusaka does not have functioning sewerage treatment facilities and more than 75% of its population use onsite sanitation (Nkhuwa 2000) which is a serious threat to the shallow groundwater in the karstic aquifers in Lusaka. The need for joint action of the mandated institutions for more sanitation coverage and thereby more groundwater protection becomes obvious when considering the actual legal framework and the situation on the ground. The following descriptions (including subchapters 2.1 – 2.5) are taken from an unpublished study paper (Mucheleng'anga 2007) of the National Institute for Scientific and Industrial Research (NISIR).

The Ministry of Energy and Water Development has been mandated to oversee the issues related to exploration, development and management of the water resources. The responsibility to supply water and sanitation is vested in the Ministry of Local Government and Housing through the Local Authorities (LA). Formation of the Commercial Utilities by the LAs has taken place and eventual participation of the private sector for purposes of ensuring better management of the water supply is envisaged. The regulator for water supply and sanitation is the National Water and Sanitation Council (NWASCO).

2.1 Water Resources Management Law (existing and new Bill)

The water resources management system set up in Zambia under the existing legislative framework failed to consider groundwater as part of the resources that required to be distributed to groups of users with competing demands. The result of this was that abstraction of groundwater was therefore not regulated and boreholes were sunk without any due consideration. In like manner, settlements as well as the construction of septic tanks were done without much consideration of the possible groundwater resources pollution. The old Water Act of the 1940s and 1950s is therefore antiquated and is being replaced by a new bill: the Water Resources Management Bill. The Bill among others proposes to

- (a). provide for the equitable, reasonable and sustainable utilisation of the water resources;
- (b). provide for the management, development, conservation, protection and preservation of the water resource and its ecosystems

Specifically Part XI Section 92 (1) states:

- (a). encouraging the development of sustainable practices that do not degrade groundwater
- (b). preventing the pollution of aquifers through the regulation of toxic substances that permeate the ground; and
- (c). recommending to the Minister, the declaration of protected areas around groundwater recharge areas and abstraction sources.

In this law-to-be groundwater is for the first time considered as a resource that requires protection and regulation in its use and management. The use of the pit latrines and septic tanks would somehow be in contradiction with this legal instrument as such systems may be regarded

as unsustainable practices that degrade the groundwater resources. The need to prevent pollution of aquifers through regulation of substances as well as declaring certain areas protected zones to prevent pollution is emphasized. Furthermore, settlements in areas which may be considered as important recharge zones may be controlled through this incoming law.

2.2 Environmental Protection and Pollution Control Act 1990

The Zambian law on environmental protection and pollution control was enacted in 1990. The law states as follows:

The Environmental Protection and Pollution Control Act 1990 (EPPCA) and revised in 1999 is an Act to provide for the protection of the environment and the control of pollution; to establish the Environmental Council and to prescribe the functions and powers of the Council; and to provide for matters connected with or incidental to the foregoing.

Definition of discharge according to the Environmental Protection and Pollution Control Act is given as “spilling, leaking, pumping, emitting, emptying or dumping...” (Republic of Zambia, Environmental Protection and Pollution Control Act 1990 Part IV Section 22). The definition of an aquatic environment according to this Act does include groundwater (Part IV Section 22 “...all surface and ground waters.....” (Republic of Zambia EPPCA, 1990)). Furthermore, the Act prohibits discharge of any pollutant into the aquatic environment. This is presented in Part IV Section 24: “...no person may discharge or apply any poisonous, toxic, erotoxic, obnoxious or obstructing matter, radiation or other pollutants or permit any person to dump or discharge such matter or pollutant into the aquatic environment in contravention of Water Pollution Control Standards established by the Council under this part” (Republic of Zambia EPPCA, 1990). This is repeated in Part VI Section 50 where it says “no person shall discharge waste so as to cause pollution in the environment”. The discharge of wastes to groundwater through use of pit latrines as method of sanitation could be said to be against this legal provision.

2.3 Water Supply and Sanitation Act of 1997

The Water Supply and Sanitation Act number 28 of 1997 states:

An Act to establish the National Water and Sanitation Council and define its functions; to provide for the establishment, by local authorities, of water supply and sanitation utilities; to provide for the efficient and sustainable supply of water and sanitation services under the general regulation of the National Water Supply and Sanitation Council; and to provide for matters connected with or incidental to the foregoing.

This Act places the obligation of supply of water and sanitation services on the local authorities when it says in Part III Section 10(1) “a Local Authority shall provide water and sanitation services to the area falling under its jurisdiction....”. Provision of such services to its population is therefore critical. However, with the burgeoning population and reduced financial resources to cope with such increases, there is a constant struggle of the local authorities to meet this obligation. The poor sanitation facilities in George Township area could be attributed to lack of such services from the Lusaka City Council through the Lusaka Water and Sewerage Company (LWSC). The National Water and Sanitation Council (NWASCO) is obligated to establish and enforce standards for design and construction as well as operation and maintenance of water and sanitation facilities as stated in the above Act part II Section 4 (2) (e) (i) and (iii) of this law. Monitoring of the design quality of these water supply and sanitation facilities in George Township could therefore necessarily be looked into by NWASCO.

2.4 Public Health Act CAP 295 of the Laws of Zambia

The Public Health Act Chapter 295 of the Laws of Zambia provides necessary input in the protection of groundwater from pollution. Part IX Section 64 prohibits any individual to generate or cause nuisance that may be injurious or dangerous to health. The Local Authority is mandated to ensure that its areas of jurisdiction are kept clean and without nuisances (Section 65 of part IX). Section 67 (1) (d & e) of Part IX indicates that wells supplying domestic water of poor quality or waste water discharged into public streets constitute nuisances. Prevention of pollution to water supply as well as cleaning of such water supplies in any Local Authority's jurisdiction area is the responsibility of the Local Authority. This is contained in Part XI of the Public Health Act CAP 295 of the Laws of Zambia. In this regard Section 78 states:

78. It shall be the duty of every Local Authority to take all lawful, necessary and reasonably practicable measures for:
- (a). preventing any pollution dangers to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes (whether such supplies derived from sources within or beyond its district) and
 - (b). purifying any such supply which has become so polluted; and to make measures (including if necessary, proceedings of law) against any person so polluting any such supply or polluting any stream so as to be a nuisance or danger to health.

The seepage from the pit latrines into the groundwater is a public health problem and thus requires control by the LA and other agents.

2.5 Local Government Act Cap 281 of the Laws of Zambia

Functions of Councils in Zambia among others include control of developments and use of land in their areas especially in the interest of public health and public safety (Section 61 subsection 29 of the Local Government Act CAP 281 of the Laws of Zambia). Furthermore Councils are required to establish and maintain public health (Section 61 subsection 40 of CAP 281). In Section 61 subsection 61, the Councils have an obligation "to take and require the taking of measures for the conservation and the prevention of the pollution of supplies of water". The Council should hence ensure that water supply areas within its jurisdiction are maintained in a manner fit for use. Subsection 50 of Section 61 indicates that Councils have the responsibility to provide sanitary conveniences and ablution facilities as well as ensure that these are available and well maintained. However, due to various problems resulting from high population pressure and other related issues, the local authorities are unable to perform this function to the full. The result is informal/unplanned settlements wherever open space can be found, without authorisation and without adequate sanitation facilities. Political interference has not spared the situation either.

3.0 Groundwater situation in Lusaka

Lusaka's underground is mainly composed of carbonate rocks being subject to intensive karstification. The main groundwater body is hosted by the marbles of the Lusaka Dolomite Formation. Karstification is an ongoing process in carbonate rocks that dissolves the rock and enlarges the fissures and fractures through which groundwater flows. This feature makes groundwater in Lusaka even more vulnerable to pollution for two reasons: the protective cover can be bypassed and water moving through large fractures is not subjected to a filtering process.

In a comprehensive sampling campaign in April and May 2010, the GReSP project found the following results for the groundwater quality in the City of Lusaka. Microbiological indicators for faecal pollution of groundwater are quite high in most of the sampled boreholes. Only 13 out of 88 water samples show no Total Coliforms, and only one third of the samples stay below the Zambian Drinking Water Standard. Under the prevailing pH (median = 7.0, min = 5.8, max = 8.0) in the calcareous geological environment, potentially toxic heavy metals like lead, cadmium or arsenic as well as iron or manganese tend to form hydroxy- and carbonate complexes which are insoluble and can therefore not be found in the water. Concentrations of lead, cadmium and arsenic are far below a toxic level in all samples analyzed. Nitrate levels were found to be very high in many boreholes and often exceeded the Zambian Drinking Water Standard limit of 44 mg/L. The median for nitrate in the study area is 16.9 mg/L, the maximum value was 260 mg/L. While the large production boreholes of LWSC exhibit nitrate concentrations below the Zambian Drinking Water Standard, boreholes for the local supply of peri-urban areas show considerably higher values, some have concentrations of more than 100 mg/L.

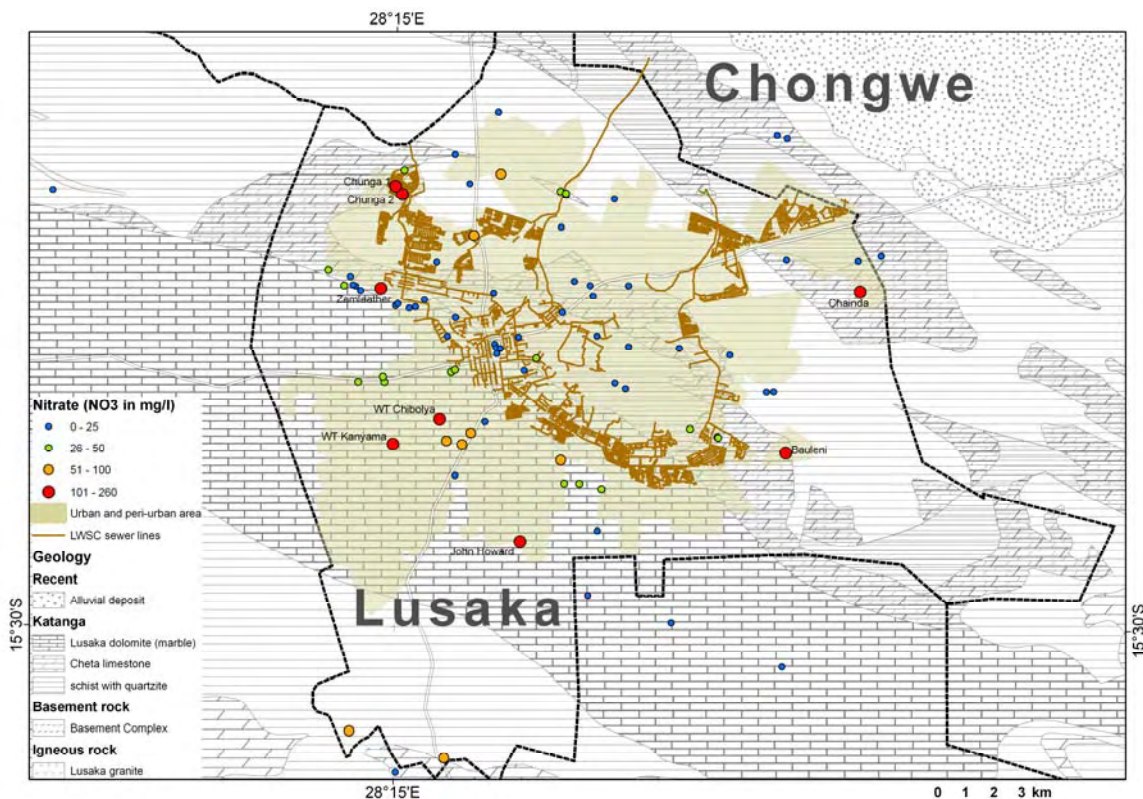


Figure 1: Map of nitrate concentrations in Lusaka district, April/May 2010.

It is estimated that Lusaka produces about 765 tonnes of solid wastes daily. Of this quantity, only 76.5 tonnes is actually collected and properly disposed off while the remainder is disposed off anyhow. For 2005, there were recorded 80,000 tonnes of collected garbage in Lusaka (both by LCC and private franchises, ECZ 2008), aside from the uncounted garbage that was burnt or disposed in the environment. Disposal areas include the limestone sinkholes and crevices (Nkhuwa 2000). Such a situation is made worse in an area whose geology is that of dolomitic marble and limestone. This is the geology which forms the larger base of the city terrain and is highly prone to solution weathering and creation of channels and sinkholes (Nkhuwa, 2000). Though these features provide a good groundwater infiltration and retention capacity, pollution of the groundwater is also made easy.

In terms of town planning, one major document exists that is usually referred to in this context: the Lusaka Master Plan, which was established in a JICA financed project from 2005-2008. The Master Plan was established as a comprehensive urban development plan of Greater Lusaka and is composed of sector plans on spatial development and land use control, urban transportation improvement, sustainable environment preservation, improvement of living environment, upgrading of infrastructure and social services. It also proposes a capacity development plan and priority projects/programs for realization of the sector plans, one of them being water supply and sanitation. The recommendation of the Master Plan in terms of water supply and sanitation improvement are summarized as:

“To deal with the water demand increase caused by the population increase and economic growth in Lusaka, water supply capacity in Kafue water works should be augmented with water leakage improvement. The Water Supply and Sanitation Improvement Project consists of (a) intake facility on Kafue River, (b) raw water main pipeline, (c) new water treatment plant with 50,000 m³/day, (d) booster pumping station and transmission main pipeline with 66 km length, (e) sanitation pilot plant and (f) reduction program of UFW (unaccounted-for water). Project cost of the Water Supply and Sanitation Improvement Project (Phase-1) is estimated at approximately USD 92 million (equivalent to ZMK 330 billion).” (JICA 2009)

Most of these facts were given as input presentations in the knowledge session. Dr. Roland Bäumlé and Levy Museteka of the GReSP project presented the hydrogeological setting of Lusaka, its groundwater pollution status, as well as possible groundwater protection measures. Christopher Kellner from the Water and Sanitation Association of Zambia and Jackson Mulenga from Devolution Trust Fund gave presentations on sustainable sanitation options in general and examples from Zambia. Patrick Onyango from GIZ Kenya presented insights of the Kenyan ecosan experiences. All presentations as well as publications of the GReSP project are available for download from www.bgr.bund.de/zambia.

4.0 Results of the workshop

During the first round table session, participants were asked to describe the different stakeholders in the thematic complex of groundwater, sanitation and town planning. Furthermore they were requested to establish a picture of the planning process with regard to water and sanitation.

4.1 Stakeholder and process analysis

The Chunga group developed a very thorough stakeholder picture with different sorts of fluxes between the different parties (see Figure 2). By conducting the stakeholder analysis participants got an understanding of the interactions between the various stakeholders. The analysis proved to be quite complex which also reflected the complexity of the different stakeholders (see Annex III).

The stakeholders are defined by their mandates and roles:

Ministry of Energy and Water Development (MEWD), Department of Water Affairs (DWA)
DWA within MEWD is responsible for water resource exploration, evaluation and management.

Ministry of Local Government and Housing (MLGH-DHID) Department of Housing & Infrastructure Development

The mandate for water supply and sanitation in Zambia lies with MLGH. MLGH, through its Department of Physical Planning and Housing, is also responsible at the national level for identifying “housing and improvement areas.”

Lusaka Water and Sewerage Company (LWSC)

LWSC is the commercial utility owned and advised by Lusaka City Council, responsible for water supply and sanitation in areas assigned to it by LCC.

Lusaka City Council (LCC)

LCC is the Local Authority in Lusaka and is mandated by the Local Government Act to establish and maintain public health. It has an obligation to prevent the pollution of water supply sources and the responsibility to provide sanitation facilities.

Public Health Department

PHD receives its mandate from the Public Health Act which states that it is the duty of the Local Authority to prevent “any pollution dangers to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes”.

Department for Housing & Social Services, Peri-Urban Unit

DHSS-PUU was established with special attention to the peri-urban areas in Lusaka and their needs.

Ward Development Committee (WDC)

WDCs are the smallest unit of citizen’s representation in Lusaka, but they are not recognized by the current Local Government Act.

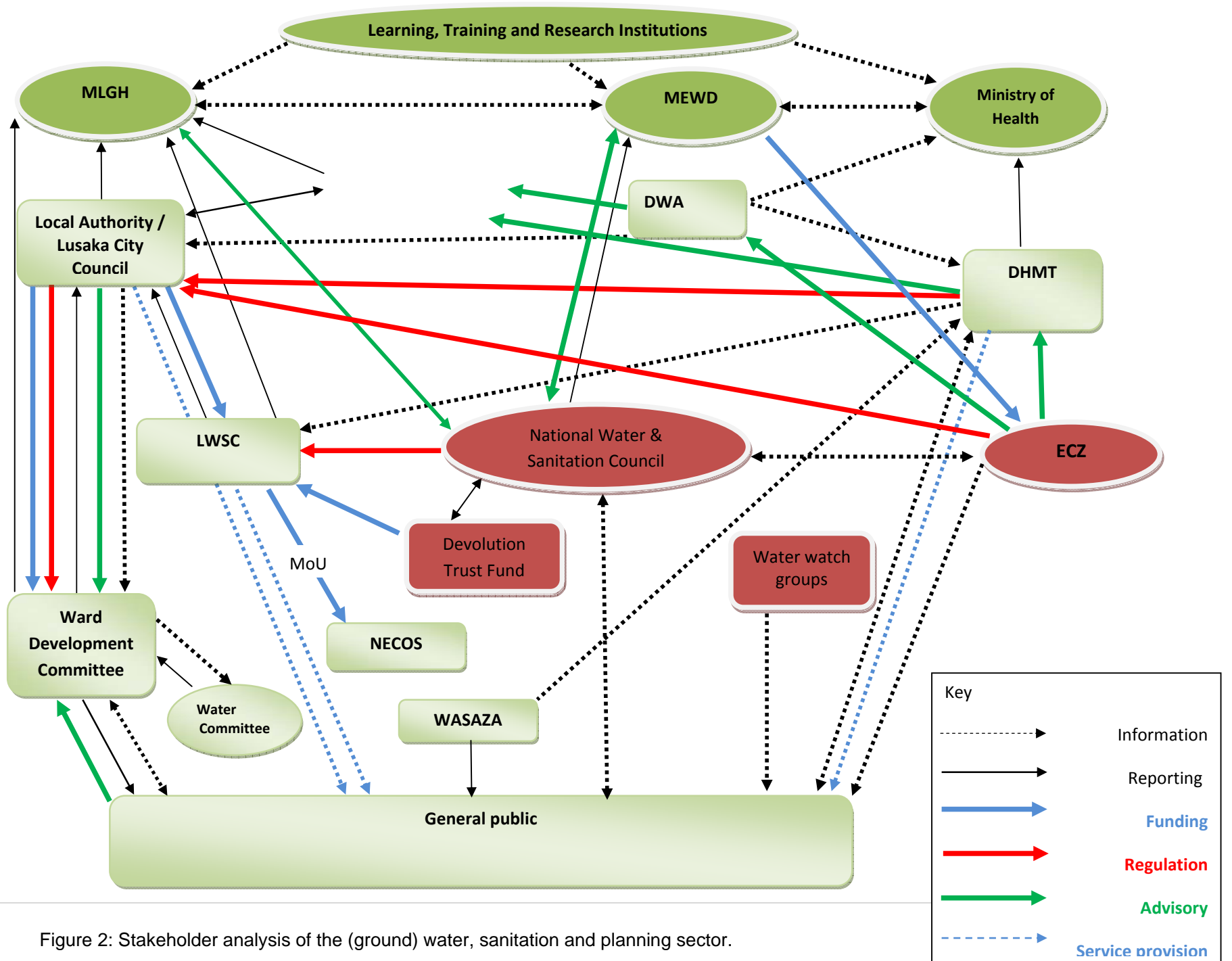


Figure 2: Stakeholder analysis of the (ground) water, sanitation and planning sector.

National Water and Sanitation Council (NWASCO)

NWASCO is the regulator for water and sanitation in Zambia. It controls the tariffs for service provision and conducts surveys on e.g. ability-to-pay.

Environmental Council of Zambia (ECZ)

ECZ was established through the Environmental Protection and Pollution Control Act in 1990 and controls the protection of the environment and has the duty to prevent pollution including the discharge of any pollutant into the aquatic environment.

Ministry of Health (MoH) Lusaka District Health Management Team (DHMT)

DHMT is the unit of MoH responsible for health issues in Lusaka District and is for example involved in cholera prevention and disaster management.

University of Zambia (UNZA)

UNZA is a research and higher education institution with a School of Mines (including groundwater) and an IWRM research centre.

Copperbelt University (CBU)

CBU is the second university in Zambia and includes among others the Environmental Engineering Department and Urban and Regional Planning Department.

Network for Environmental Concerns and Solutions (NECOS)

NECOS is an NGO active in Chunga, Madimba area that has built Urine-Diversion Dry Toilets (UDDT) in the area.

George Environmental Health Committee (GEHC)

GEHC is a community-based organization (CBO) which concentrates on health issues and reports to the DHMT.

WISEC Engineering

WISEC is a private company which is involved in the water and sanitation business among others.

Water Trusts

WT are active in the water supply management in peri-urban areas and in some cases get involved in sanitation services as well. They are formed by stakeholders such as NGOs and directed by a board of directors from different institutions such as LWSC and LCC (Mwandawande 2005).

4.2 Planning process analysis

The George group set its focus on the planning process and identified the hierarchy shown in Figure 2. This planning matrix comes into action when institutions apply for funding at the governmental **Constituency Development Fund (CDF)**. This fund provides 710 Million ZMK for the year 2011 (2010: 600 Million ZMK). The corresponding project proposals, which can be submitted by different institutions will be evaluated and approved by committee members of the **District Development Coordination Committee (DDCC)**. It was however highlighted that it is very difficult to get the CDF funds and the process is fraught with some difficulties:

- There is no interaction at the planning stage. Thus, potential stakeholders are not involved project planning stage. The DDCC will only be involved when the implementation has already taken place.
- Instruments such as an Environmental Impact Assessment (EIA) are only implemented if the project exceeds a certain limit (financial or regulatory).
- There is an information exchange gap between the involved institutions.

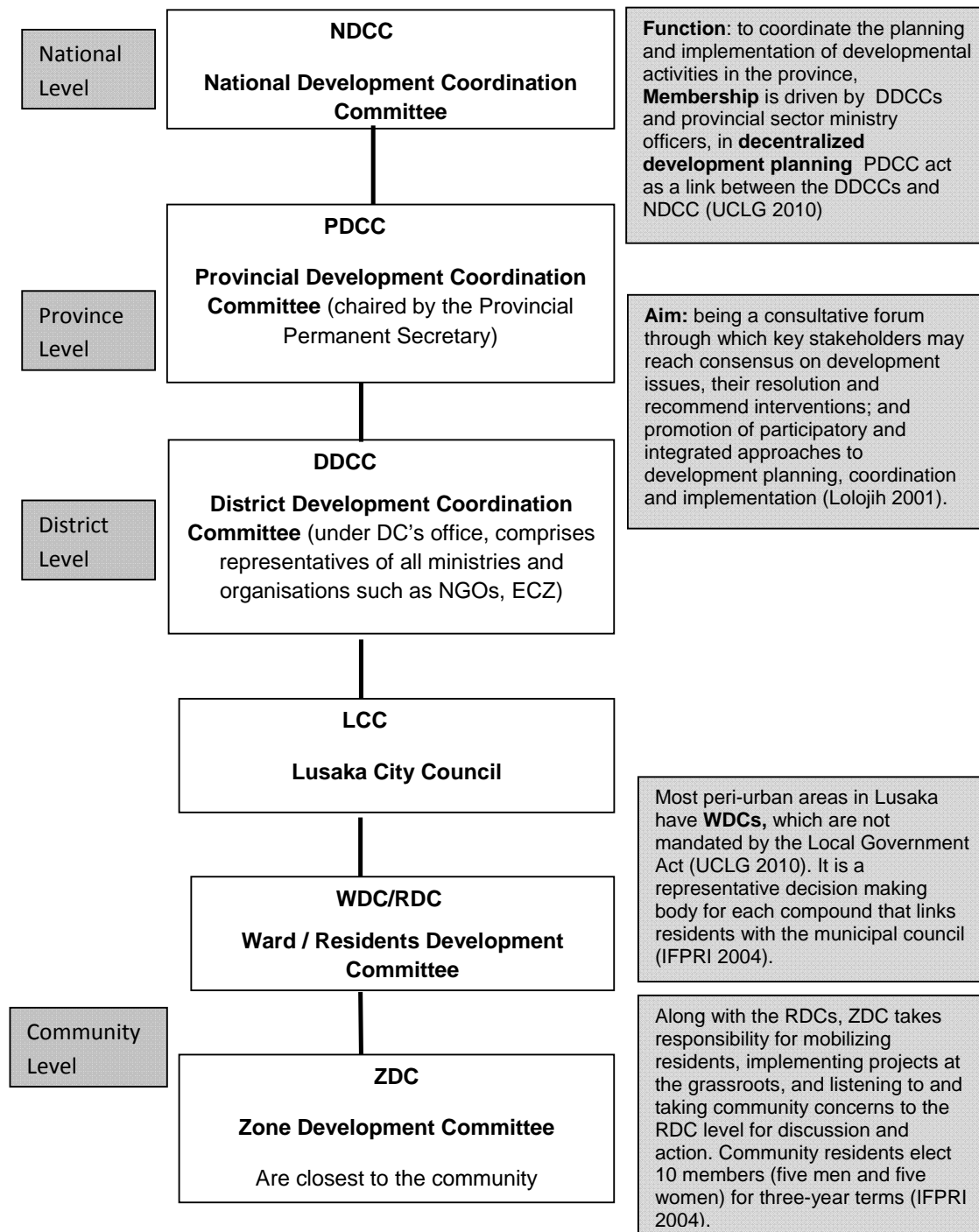


Figure 2: Planning process analysis, elaborated by the George group with additional comments.

Another instrument in the planning process is the **Ward Development Plan (WDP)**. Activities congruent with this plan can be funded by the **Ward Development Fund (WDF)**. For the establishment of the WDP the Ward Development Committee carries out a survey in the area involving inhabitants and elaborates a priority list of activities, which should be carried out in the peri-urban area (e.g. school infrastructure, improvement of water and sanitation situation, etc.). The Ward Development Plan will then be forwarded to LCC, who will forward it to the District Planning Officer. It was mentioned that the Ward Development Plans and their suggestions are not necessarily included in the **City Development Plan**. Nevertheless it was considered important that the City Development Plan includes guidelines and considers the prioritized needs analyzed within the Ward Development Plans.

4.3 Other topics

Water Monitoring

Groundwater monitoring (quantity and quality) is carried out by the following institutions:

- DWA: Groundwater levels (36 boreholes are monitored by DWA)
- ECZ: Groundwater quality (irregularly in different boreholes)
- LWSC: Groundwater levels and quality (in their production boreholes)
- DHMT + LCC: Groundwater quality (for microbiological indicators)

Furthermore, research institutions such as NISIR and UNZA conduct measurements of both groundwater levels and quality on research project basis.

In this context it was underlined by the participants that drilling and monitoring costs are very high as well as costs for sampling and laboratory analysis.

Communication Process between the different institutions

Another discussion topic was the way how results (e.g. monitoring results) or identified needs are communicated to other stakeholders. Few participants mentioned that the information protocol system has to be improved as it is very difficult to get appropriate information in reasonable time. Following communication tools and channels had been identified by the participants and recommendations given:

Communication Tools & Channels:

- DWA → Meteorological Service (under METNR) for Crop Water Bulletin
- DDCC receives health report and input from other member institution of the Committee
- Epidemic control meetings
- ECZ reports to the general public (in form of publications)
- LWSC reports to NWASCO (water and sanitation service supply) and ECZ (wastewater)

Recommendations for improving the information exchange:

- NWASCO should more actively inform interested public (e.g. by creating an internet forum)
- Identification of stakeholders who do not contribute so far, to disseminate their information
- DWA or ECZ should collect monitoring data as a focal point
- Information exchange should take place through bulletins / reports in working groups or SAG
- A task force for water quality needs to be formed
- Field officers of LCC should channel information from and to the community

4.4 George Roundtable & Transect walk

- Dimas Chipalala – LCC, Environmental Health Officer
- John Mafuta Kamanga – LCC, Head of Peri-Urban Unit
- Kennedy Mayumbelo – LWSC, Manager Peri-Urban
- Judith Lungu – WDC Lima Ward, Chair person
- Chole Musonda – GEHC, Chair person
- Pasca Mwila – DWA, Senior Hydrogeologist
- Beauty Shamboko-Mbale – DWA, District Water Officer
- Dr. Clara Mbwili Muleya - Lusaka DHMT- MPD Manager Planning & Development
- Richard Banda – WISEC Engineering, Operations Director
- Ikukumbuta Mwanawande – Copperbelt University, Researcher / Lecturer
- Joseph Sakala – ECZ, Manager Inspectorate
- David Tembo – MLGH, Provincial Housing Development Officer

4.4.1 Key facts of the George compound

The George compound is a legalized, but unplanned settlement. This is due to several factors, starting from Independence in 1964 when people began to move from the rural areas to settle somewhere in and around Lusaka City. In 1978 it became obvious that inhabitants of the new squatter areas would not allow to be relocated and LCC legalized the areas which were then named “peri-urban areas”. Ever since, there has been a struggle for the upgrading of these settlements.

In this context it was also referred to the Lusaka Master Plan, which was established in a JICA financed project in 2007-2008 (JICA 2009). The Master Plan recommends the establishment and use of a cadastre in which all plots should be registered. In part, this cadastre exists in LCC. However, it was also said that the master plan is very well on paper while implementation activities such as the set-up of water and sanitation systems are still a problem.

Although all structures such as houses and toilets belong to the inhabitants of George, the land on which they stay belongs to the government. House owners have to pay ground rates to the government for settling on this land.

It is estimated by participants that about 150.000 people live in George with a growth rate of 3,7 % per year. The compound is characterized by both internal and migration growth, whereas internal growth prevails. Official figures, e.g. by Central Statistics Office (CSO) can be misleading and are usually underestimated according to participants.



Water Supply

The water supply of the George Compound is organized by several water tanks (picture 1) which are supplied by eight boreholes in the immediate neighbourhood of the dense settlement. (The boreholes are between 60 and 80 m deep). Each water tank, operated by LWSC, contains about 300 m³ water, which is chlorinated before supply to the communal taps.

Picture 1: Water tank in George Compound

Inhabitants of George get their water from communal standpipes (piped water supply), which means that 4-5 water taps have to be shared by a number of households (see picture 2). This water has to be paid for and costs 200 Zambian Kwacha (ZMK) per 20 l. On the lowest tariff, one household is allowed to get 200 l per day (about 10 water canisters); money is collected on a monthly basis. The communal water taps are operated by voluntary persons paid by LWSC. However, as the payment is nothing but an allowance, the volunteers also have a regular job, so that the water taps can only be operated for some hours per day (before and after working hours of the volunteer). Therefore water availability is restricted, although water could be supplied 24 hours in terms of resource availability. Participants highlighted that this inadequate water supply situation is a result of management by LSCW. Another problem mentioned is the tariff and the lifeline amount fixed by the regulator NWASCO. If people pay their tariff for 200 l per day and cannot pay more, there is no need for more supply above this amount. During the field trip participants learned that the water consumption per household is not registered by the volunteer at the communal tap, so that persons from one household are able to get more water on one day, whereas another household get no or less water.



Picture 2: Communal water tap



Picture 3: Volunteer filling the water canisters

Additional sources of water are shallow wells (picture 4 & 5), which are used especially by very poor people who cannot afford the water price or in times when the communal tap is not operated. The quality of this water is much worse compared to the communal tap water as it is not chlorinated and not protected against any sort of direct contamination.



Picture 4 & 5: Shallow wells

Sanitation

A sustainable sanitation chain (see Annex V) does not exist in George, while it is regarded as highly important by the participants of the workshop. There is one connection to a sewer line at the public toilet at Lilanda Bus Station (500 ZMK for toilet use, 1500 ZMK for shower). The wastewater is transported to the Chunga settling ponds from where it is discharged into the Chunga river. The prevailing sanitation system is the pit latrine, some have been upgraded to VIPs (ventilated improved pit latrine). Currently, there are 65 VIP latrines in George, funded by JICA. All latrines are manually emptied into the environment once they are full. A suction truck would cost more than 100 Euro, an astronomical amount for most inhabitants. Furthermore, flying toilets are used.



Picture 6: VIP Latrine



Picture 7: Standard. raised pit latrine

A layer of cement blocks usually raises the pit latrines, because the underlying rocks are so shallow that space for digging is limited. Thus faeces and urine are disposed of right onto the rock formation which hosts the groundwater resource.

Health problems

During rainy season George is affected by cholera caused by the consumption of contaminated groundwater and surface water resulting from inadequate sanitation provision. George can partly become water logged, but is not as badly affected as other areas of Lusaka. Groundwater levels are generally very high in the area of George, also in the dry season. This implies that the pit latrines are flooded, especially during the rainy season. The constantly recurring cholera outbreaks are still a major health problem in many of the peri-urban areas of Lusaka and awareness creation activities alone will not be enough to prevent this disease.



Picture 8: Polluted groundwater

Awareness Creation during the Transect Walk

During the transect walk a theatre group from Lusaka (Kaselo Community Dance Theatre) sensitized the residents of George on the importance of groundwater protection. The group uses songs and dance performances in order to transmit messages of higher complexity such as that construction of latrines should take into account the flow of groundwater (i.e. latrines should be located a minimum distance from wells or boreholes to avoid pollution). Also, people were told that pit latrines should never touch the water table to minimize pollution of groundwater and that the connection between water pollution and diseases such as cholera causes many deaths almost every rainy season in Zambia.



Picture 9 & 10: Kaselo Community Dance Theatre Group during their performance

4.4.2 To-Do-List and milestones

The participants taking part at the roundtable identified the following main problems for the George compound (see Table 1). The table also names the lead institutions, which take the responsibility to enable the corresponding identified activities regarding the problem. This should taken place in collaboration with further institutions taken part at the round table. Based on this, the To-Do-List and milestones have been elaborated (see Annex II). The created To-Do-List enables an overview about existing activities and approaches taken place by each institution and additionally identifies suggestions of new approaches and collaboration activities. Most activities include a specific timeframe and expected completion date.

Table 1: Key Issues identified for the George Compound

Problems	Solution	Lead	Collaboration with
Sanitation	to provide adequate, sustainable, sanitation (taking groundwater into account)	LCC	WDC (Ward Development Committee), Local Community, Academic & Research Institutions, LWSC, MoH, ECZ, MLGH, NGOs, CBOs
Solid Waste	to provide adequate solid waste management	LCC	WDC/Local Community, Academic & Research Institutions, NGOs/CBOs, ECZ, Private Sector, MLGH, MOH
Water Supply	to provide water at an economical rate, taking the poor into account	LWSC	MLGH, MOH, DWA, ECZ, LCC
Planning	Planning should be more coordinated and include stakeholders (e.g. PSUP)	MLGH	WDC, LCC, DWA, MOH, ECZ, NGOs/CBOs, Academic & Research Institutions, NWASCO*
Financing	to develop a financing model for sustainable WASH service provision and housing development	MLGH	WDC, Private Sector, Community, LCC, LWSC, DWA, Academic & Research Institutions

* NWASCO did not participate at the roundtable

4.5 Chunga Roundtable & Transect Walk

Participants of the roundtable were

- Chitaku Mucheleng'anga – National Institute for Scientific & Industrial Research, Research coordinator
- Nyonge Phiri - Lusaka Water & Sewerage Company, Groundwater production & distribution
- Kasenga Hara – National Water Supply and Sanitation Council, Technical Inspector
- Levy Musetaka - DWA, Water Quality Officer
- Frank Ngoma – DWA, Provincial Water Officer

- Gershom Kabanda - NECOS, Expert on Dry Toilets
- Justine Aaron Banda - Devolution Trust Fund (DTF), Trainee Engineer
- Towera Kazunga – University of Zambia, Student / MLGH, employee
- Aaron Davies Mulunda - Ward Development committee, Chairman
- Christine Shawa– DHMT, Environmental Health Officer
- Greenford Sikazwe - Lusaka City Council Public Health Department, Assistant Director
- Aaron Kachunga – Office of the District Commissioner / DWA, Assistant Engineer
- Kamuka Kang'ombi - Water and Sanitation Association of Zambia, Membership Officer (rapporteur)

4.5.1 Key facts of the Chunga compound

Needs and asset analysis

In the first roundtable session a needs and asset analysis was conducted in order to have a common understanding of the situation in Chunga. Furthermore, it was also important to have a baseline to build upon when discussing how the stakeholders from the different sectors can interact in a more integrated approach.

Situation in Chunga / Madimba

Chunga / Madimba has roughly 97,000 dwellers with approximately 2,500 households. Chunga is a planned settlement whereas Madimba is not. Madimba is an area within Chunga.

Water supply

There are four boreholes in Chunga and an extra two in Madimba area. In 17 kiosks dwellers can buy chlorinated water. Still, people are lacking water. Therefore 300 shallow wells were dug in the area, where the water quality is generally very low and unsafe. It is also incorrect billing, insufficient supply of water and late response to the customers' queries which make people look for alternative water resources.

Sanitation

There is an inadequate supply of proper sanitation facilities resulting in a lack of clean and safe water. There are pit latrines in Chunga and about 50 Urine Diversion Dry Toilets (UDDT) in Madimba (sponsored by SIDA). The pit latrines in Madimba are situated near shallow wells with a distance of 5 to max. 10 m. This is resulting in the contamination of (ground) water resources causing many water borne diseases (cholera, diarrhoea, etc.) for people living in the area. Regular cholera outbreaks occur in the area.

Unofficial status of Madimba

The unofficial status of Madimba creates problems of general nature due to the fact that the Town and Planning Act had no impact on 'exempted' areas which were not under its legislation. The status of a non-recognised settlement implies that ground rates are not collected to pay for water and sanitation services. NWASCO has the role of regulating the Local Authority to provide services such as water and sanitation. However, NWASCO has no power to regulate at the household level concerning the supply of latrines, wells etc. The water and sanitation act stops at the boundary of the plot as well. As public land in Zambia is owned by the government, it seems to be difficult to change land rights.

LWSC

The service provider (LWSC) experiences challenges in meeting their obligations due to a lack of resources and lack of coordination between the local authorities and themselves. Furthermore, there is a shortage of human resources in LWSC which reduces the utility's efficiency as they are often unable to attend to blockages or unpaid bills by the water users, etc. On the other hand, people do not pay their service providers because they cannot manage as most of the occupants in the area are unemployed.

Health and Hygiene

The Ministry of Health (District Health Management Team) as well as LWSC have been sensitising people in the different areas on health and hygiene issues but the problem has not been solved. People might know about health and hygiene but there is a lack of ownership. Inhabitants do not look at the sustainability of proper toilets but rather invest on building houses.

Way forward

To tackle the problem of water and sanitation as well as groundwater contamination in Chunga, the following suggestions were made by the participants:

1. There should be action taken by the line ministries for a harmonised approach
2. Enforcement of laws
3. Allocation of land and land rights need to be clarified because settlements are still unplanned and therefore unofficial
4. City council should do more sensitization work. People ought to know about disposing of solid waste and pit latrine contents.
5. Financial resources of LA should cope with their mandate.
6. It is the responsibility of the owner to take care of sanitation problems in the household.
7. Have awareness raising activities (i.e. workshops on groundwater quality) closer to the affected people.
8. There should be a clear line of coordination between the LA and the service provider.

Transect walk

To connect the theoretical issues with the reality the group went to Chunga / Madimba area for a transect walk. During the field trip, it was noted that the water tank (financed by Chinese donors) had many leakages and water was dripping from the tank. Quite an amount of clean, treated water was therefore lost. This problem has persisted for the last two years, despite complaints from the WDC to LWSC. Moreover, a water pipe with running water had also been left unattended. At the same time people had to pay the tariff for water as agreed by NWASCO. The running water pipe was used for collection of water for cooking, washing and probably also drinking.



Picture 11+12: Girl fetching drinking water from an unconnected water pipe with running water and shallow well in Chunga.



Picture 13+14: Water kiosk in Madimba and borehole of LWSC



Picture 15+16: Urine-Diversion Dry Toilet of NECOS, exterior and interior

NECOS built 50 dry toilets in Chunga/Madimba area. Each toilet costs about 7 Mio. Zambian Kwacha which is equivalent to 1000 Euro. The Finnish government financed 20 of those toilets; the rest came from LWSC and the beneficiaries (through WDC).



Picture 17: Awareness raising through a theatre group performance at the Springs of Hope School

4.5.2 To-Do-List and milestones

After the transect walk the groups were asked to identify the important problems they realised during the discussions and during the transect walk:

Identified Key Issues in Chunga

1. Limited Supply of treated water & high cost
2. Wastage of treated water
3. Continued use of pit latrines& shallow wells
4. High water table vs. application of eco-san sludge – presence of sink holes
5. No space for public facilities
6. Dependency syndrome
7. Poor waste water treatment infrastructure
8. Poor drainage systems
9. Challenging ground conditions
10. Inadequacy of systems- Lack of forward planning
11. Lack of development control by Lusaka City Council
12. Poor appreciation of good sanitation and facilities
13. Poor solid waste management

The team then identified the 7 most important problems, the lead institution and collaborating partners as elaborated below:

	Problem identified	Lead Institution	Who will they collaborate with?
1	High water table vs. application of Eco-san sludge	Ministry of Energy & Water Development	Local Authority, community
2	Limited Supply of treated water & high cost	Lusaka Water & Sewerage Company	MEWD, NWSCO, DTF, LA, WDC
3	Lack of development control & enforcement by Lusaka City Council	Lusaka City Council	WDC, DHMT
4	Dependency syndrome	Ward Development Committee	NECOS, ZDC
5	Poor solid waste management	Lusaka City Council	WDC, Community & NECOS
6	No space for public facilities	Lusaka City Council	WDC, Community & MEWD
7	Poor drainage systems	Lusaka City Council	WDC, NECOS, DHMT, DWA, WASAZA

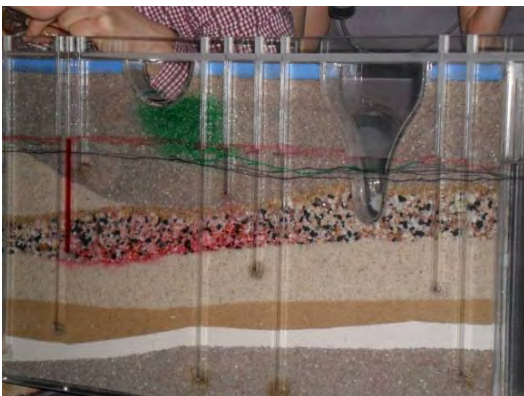
In a third step each participant (from the lead and from the collaborating institution) identified the actions he or she could undertake together with the other stakeholders to tackle each problem. In this manner all stakeholders developed their 'To-Do-Lists' with clear objectives and a date in an integrated approach. The two roundtable groups (Chunga and George) came together and gave each other a presentation regarding the specific roles, responsibilities, timeframe and the line of communication.

5.0 Interactive Session (Groundwater Model)

All participants came together for an interactive session on the BGR groundwater model. The model demonstrates groundwater contamination in selected “aquifers” made from different granulates. In the example below the green contamination plume enters through a pit latrine into the unsaturated zone and –after reaching the groundwater surface – pollutes the boreholes next to it. The red contamination plume travels even further than the green one, as it has entered a coarser aquifer with faster flow rates.



Picture 18+19: Model demonstrating groundwater contamination from an abstraction well (red) and a pit latrine (green).



Picture 20: After a few minutes the red and green colors have spread.

6.0 Conclusion and Follow-up

Participants of the workshop mainly came from the operational level of the various institutions from the sanitation, groundwater protection and town planning sector. This resulted in a high knowledge density and thus the To-Do-Lists became very action-oriented. Lusaka City Council will now review old settlement plans, adapt them according to the results gathered. New partnerships between the different sectors were formed, taskforces set up and other concrete commitments made.

Delegates from other African countries attended and observed the workshop, and came to the conclusion that the workshop format makes a lot of sense but needs to be prepared by a person with a lot of insight into the local set-up of institutions in all involved sectors.

A major motivation of the workshop was to define concrete activities towards an improvement of the situation in George and Chunga by combining efforts in groundwater protection, sanitation provision and planning. The To-Do-Lists reflect that this motivation has been fulfilled.

The workshop evaluation shows that the workshop was very successful. Both participants of the roundtables and observers underlined that the event was useful and relevant to them, especially for getting in contact with other stakeholders (provision of networking) and for sharing ideas and experiences. In addition it improved the understanding of participants of the link between sanitation, groundwater and town planning. Some participants also mentioned that the gained knowledge and lessons learned from the workshop are beneficial for their daily work (see evaluation results, Annex VII).

A half-day follow-up workshop will be hosted by WASAZA in Lusaka on 7th April 2011 with the objective to get an overview of the state of affairs regarding the activities in the To-Do-Lists. The lead institutions of all To-Do-Lists will report on their activities with contributions from the collaborating institutions. Another topic to be discussed will be how the To-Do-List can be developed further. Finally the role of the lead institutions on possible follow-up activities will be discussed. With the follow-up workshop the realization of the To-Do-Lists will be fostered and networks will be strengthened.

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Appendix I: Workshop agenda

Groundwater Protection and its link to Sustainable Sanitation and Town Planning

February 8 – 10, 2011 in Fringilla

Monday 07.02.2011

- 17:00 Registration
19:00 Dinner and get together

Tuesday 08.02.2011

- 08:00 Registration
- 09:00 **Welcome notes**
Dr. Friedrich Hetzel (BGR/BMZ)
The District Commissioner Lusaka District, Ms Kalulu
The Permanent Secretary for MEWD, Mr. Kasonso
- 09:30 **Information Exchange Session**
Introduction of participants Mpala Nkonkomalimba
Explanation of workshop structure Vanessa Vaessen (BGR)
- 10:00 Coffee break
- 10:30 **Presentation**
Legal framework and background study George
Chitaku G. Mucheleng'anga – NISIR (15 min)
- 10:45 **Round Table Session**
Participants introduce their engagement in the case study area
Finding a common language
Assets and Needs Assessment for case study area
- 10:45 *Observers: attend round table*
- 12:30 Lunch
- 13:30 **Knowledge Session: sustainable sanitation & groundwater protection**

- Groundwater in Lusaka – a resource needing protection
Dr. Roland Bäumlé and Levy Museteka – GReSP (30 min)
 - Questions (15 min)
 - Sustainable sanitation – Overview on sanitation options & projects in Zambia
Chris Kellner – Wasaza & Jackson Mulenga – DTF (15+15 min)
 - Questions (15 min)
- 15:00 Coffee break
- 15:30 **Knowledge Session: sustainable sanitation & groundwater protection**
(continued)
- Ecosan case study from Kenia
Patrick Onyango (15 min)
 - Questions (15 min)
- Discussion on all input presentations (30 min)
- 16:30 Interactive session with the **BGR Groundwater Model**
- 18:00 Dinner
- 19:30 Socializing

Wednesday 09.02.2011

- 08:00 Departure for **Field trip to case study areas**
Transect walk in case study areas: Group A: Chunga, Group B: George
- 09:00 Theater Performance in the areas (by Kandodo and Kaselo Theater)
- 12:00 Departure to Fringilla Lodge
- 13:00 Lunch
- 14:00 **Round Table Session**
Elaboration of a To-Do-list:
Getting an overview about the existing activities and approaches, getting suggestions of new approaches
- 14:00 *Observers: Discussion on situation in their countries*
- 15:30 Coffee break
- 16:00 **Round Table Session (continued)**
Elaboration of a To-Do-list:
Elaboration of an action-plan, getting a joint consensus of appropriate solutions, fostering of the individual role
- 16:00 *Observers: Discussion on groundwater protection in practice*
- 18:00 Dinner

Thursday 10.02.2011

- 08:30 **Information Exchange Session**
Presentation of To-Do-lists and discussion on the different strategies
- 10:00 Coffee Break
- 10:30 **Round Table Session**
Mixing the groups and learning from each other
- 11:30 **Round Table Session**
Original group: formulation of milestones and way forward
- 10:30 -13:00 Observers: Discussion on how to better incorporate groundwater protection with regards to sanitation into town planning*
- 13:00 Lunch
- 14:00 **Information Exchange Session**
Presentation of milestones and way forward
- 15:00 Evaluation of workshop by the participants
- 15:30 **Closing Session**
Wrap-up and handing out of certificates of attendance
Closing Remarks by The Permanent Secretary MLGH - TBC

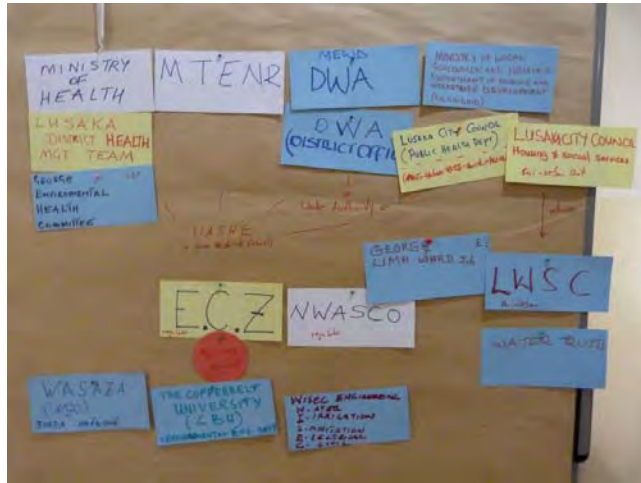
Appendix II: List of participants

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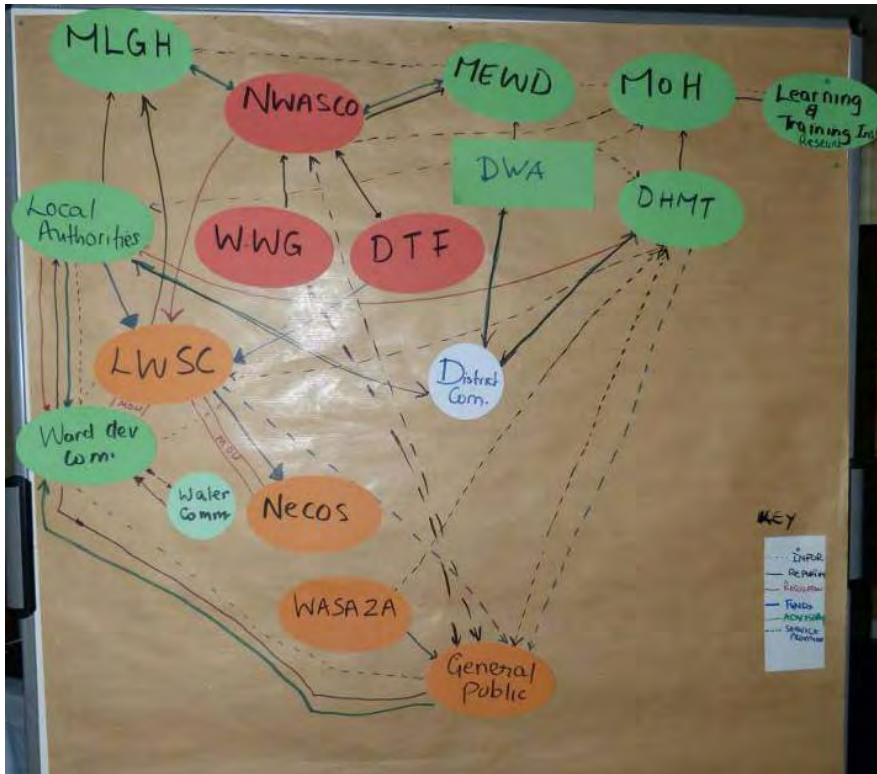
Appendix III: Stakeholder analysis of the roundtable discussions

George Roundtable



Identified stakeholders and their relationship for the George compound

Chunga Roundtable



Linkages, responsibility/line of communication between organizations (final stakeholder analysis)

Annex IV: To-Do-Lists of Chunga

To-do-List
Limited supply of treated water high cost

issue identified: better and
cheaper supply of water

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Lusaka Water and Sewerage Company, LWSC <i>Mr. Alistair Changa</i>	Supply-1	Develop boreholes around the area in interaction with LCC and WDC	Supply-7, 22	December 2011	
	Supply-2	Construct supply network in interaction with LCC and WDC	Supply-7, 22	December 2011	
	Supply-3	Connect existing kiosks to network in interaction with LCC and WDC	Supply 22	December 2011	
	Supply-4	Provide technical support to community and effort in	Supply 22	ongoing	
	Supply-5	coordinate water supply operations through P.U. Dept.		ongoing	
Collaborating institutions					
The National Water Supply and Sanitation Council, NWASCO <i>Kasenga Hara</i> and Devolution Trust Fund, DTF <i>Jackson Mulenga</i>	Supply-6	Dispatch WCC to area to sensitize community on WSS matters		Feb-11	
	Supply-7	Request MLGH to provide funds through LWSC for improvement measures		March 2011	
	Supply-8	Assist LWSC with proposal formulation to access DTF funds		March 2011	
	Supply-9	Ensure approved tariff is the one applicable	Supply-22	As soon as LWSC begins to provide service	
	Supply-10	Authorize LWSC to utilize sanitation surcharge for sanitation improvement	SWM-1	July 2011	
Ministry for Energy and Water Development, MEWD, DPI <i>Mutinta Diangamo</i>	Supply-11	Disburse funds for drilling of exploratory boreholes	Supply-12	1st November 2011	
	Supply-12	Exploration of boreholes			

To-do-List
Limited supply of treated water high cost

issue identified: better and
cheaper supply of water

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Department of Water Affairs, DWA <i>Aaron Kachunga</i> <i>Levy Museteka</i> <i>Frank Ngoma</i>	Supply-13	Monitoring/Drilling of exploration boreholes		after 31st December 2011	
	Supply-14	water quality monitoring		ongoing	
	Supply-15	advocacy on good water management practise		Feb-12	
	Supply-16	inform LWSC when to drill their productive wells	Supply-1, Supply-2	By 31st December 2011	
	Supply-17	vulnerability mapping			
District Health Management Team, DHMT, <i>Christine Shawa</i>	Supply-18	water quality monitoring		monthly basis	
	Supply-19	distribution of chlorine and on spot chlorination together with WDC and LCC		1st quarter Febraury/M arch	
	Supply-20	lobby for financial suppprt to provide adquate water supply	as funds are available from Disaster Management Mitigation Committee (DMMC) under District Committee	May 2011	
	Supply-21	information dissemination together with WDC and LCC			

To-do-List
Limited supply of treated water high cost

issue identified: better and
cheaper supply of water

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Ward Development Committee, WDC <i>Mr. Mulunda</i>	Supply-22	Dialogue with LWSC and NWASCO on water leakages and high water prices	Supply-6, 9, 4	30th March 2011	

To-do-List
High water table + presence of sink holes

identified issue: application of eco-san products /
water quality monitoring / protection

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Ministry of Tourism and Environment, MTENR (Lead)	Wat-1	planting of trees			MTENR
Collaborating institutions					
Ministry for Energy and Water Development, (MEWD), DPI <i>Mutinta Diangamo</i>	Wat-2	Disburse funds to DWA to put up monitoring boreholes		Mid March 2011	
	Wat-3	funds for monitoring drilled boreholes and Water quality monitoring		Mid March 2011	
Department of Water Affairs, DWA <i>Aaron Kachunga, Levy Museteka, Frank Ngoma</i>	Wat-4	drilling of monitoring boreholes			
	Wat-5	Monitoring the drilled boreholes		After April 2011/ would have started	
	Wat-6	Water quality monitoring		ongoing	
	Wat-7	Advocacy on good water management		1 year	
	Wat-8	technical information on aquifers		Apr-11	
Lusaka Water and Sewerage Company, LWSC <i>Mr. Alistair Changa</i>	Wat-9	Mobilization of resources through sanitation fund		Jun-11	
	Wat-10	Information through CBO's and Paypoints		Feb-11	

To-do-List
Solid waste and sanitation management

identified issue: improve (disposal of)
solid waste and sanitation management

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Lusaka City Council, LCC (Lead) <i>Mr. Sikazwe</i>	SWM-1	Improve secondary collection of Solid waste and sanitation	SWM-6, 7, 8, 9, Supply 10	Februray 2001	
	SWM-2	Identify market for compost	SWM-7	Aug-11	
	SWM-3	prosecute individuals not subscribing to SWMS	cooperation with police	February 2011	
Collaborating institutions					
Ward Development Committee, WDC <i>Mr. Mulunda</i>	SWM-4	Can provide human resources as volunteers	enagage with community	February 2011	
	SWM-5	Ward Development Fund can be accessed		February 2011	
Network for Environmental Concerns and Solutions, NECOS <i>Geshom Kanbanda</i>	SWM-6	do garbage collection	SWM-4	February 2011	
	SWM-7	price is cheaper then 5000 Kwacha per HH, Make dry toilets cheaper?		February 2011	
	SWM-8	build more dry toilets to reduce the diseases	SWM-5	February 2011	
	SWM-9	communicate 'demand driven' to community		February 2011	
Department of Water Affairs, DWA <i>Aaron Kachunga, Levy Museteka, Frank Ngoma</i>	SWM-9	Infomation-sharing for treatment plant (to LWSC?) and water users	Supply-4	February 2011	

To-do-List
No space for public facilities

identified issue: land reforms, make inofficial/
former unplanned land official for water supply

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Lusaka City Council, LCC (Lead) <i>Mr. Sikazwe</i>	Space-1	Identify appropriate sites for public utilities through mapping and surveying		Sep-11	
	Space-2	Aquire sites through - response and compensate - purchase from occupiers		Feb-12	
	Space-3	Contact DWA to identify aquifers	Wat 7, 8	?	
	Space-4	Cordinate and empower WDC	Space 5, 6	?	
Collaborating institutions					
Ward Development Committee, WDC <i>Mr. Mulunda</i>	Space-5	Advocacy for using the already existing infrastructure to convert into designed public buliding or negotiate for demolition of old facilities in order to create space for new public building		Apr-11	

To-do-List
Poor drainage systems

identified issue:
better drainage management

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Lusaka City Council, LCC (Lead) <i>Mr. Sikazwe</i>	Drain-1	Mapping and Surveying	Drain -13	Aug-11	
	Drain-2	Develop Drainage Plan	Drain-13	Aug-11	
	Drain-3	Mobilise resources at MoLG and Vice President to implement the plan		October 2011	
	Drain-4	Implementation	Drain 7, Drain-8	October 2012	
	Drain-5	Harmonisation of allowances from DMMC (Disaster Management Mitigation Committee)			
Collaborating institutions					
Ward Development Committee, WDC <i>Mr. Mulunda</i>	Drain-6	can provide human resources with Ward Development Fund		February 2011	
	Drain-7	can provide tools from WDF/LCC		February 2011	
District Health Management Team (DHMT) <i>Christine Shawa</i>	Drain-8	Information dissemination with WDC and LCC	Drain-2	May 2011	
	Drain-9	form Community-led total sanitation (CLTS)		May 2011	
	Drain-10	lobby for support infrastructure			
	Drain-11	Technical Support			
Ministry for Energy and Water Development, MEWD, DPI <i>Mutinta Diangamo</i> Department of Water	Drain-12	get in contact with LCC to fund	Drain-3	February 2011	
	Drain-13	Technical Support			
	Drain-14	go back to community and control every HH to participate by personal capacities and funds		February 2011	
Network for Environmental Concerns and Solutions, NECOS <i>Geshom Kanbanda</i>	Drain-15	NECOS can fund		February 2011	
	Drain-16	telling people the importance of working together and not dumping waste and faeces in drainage areas together with WDC		February 2011	

To-do-List
Lack of Development Control

identified issue: more sustainability in
managing water and sanitation

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Lusaka City Council, LCC (Lead) <i>Mr. Sikazwe</i>	Dev-1	Mapping and surveying the area		2012	
	Dev-2	Legalising the area to be recognised as an improvement area		Jul-12	
	Dev-3	Develop standards and guidelines for housing structures		Sep-11	
	Dev-4	Inssuranceof occupancy licences			
	Dev-5	Introduce community led total sanitation (CLTS)	Dev- 8,Dev-9,Dev-10,Dev-11	Aug-11	
	Dev-6	Engage WDC, Church & Police in all the activities	Dev- 8		
	Dev-7	Actual enforcement	Dev- 8,9,10,11, 12	Jun-11	
Collaborating institutions					
Ward Development Committee, WDC <i>Mr. Mulunda</i>	Dev-8	Work with the church, police and community.		?	
	Dev-9	Effective communication with LCC		?	
	Dev-10	Sensitizing the community		Feb-11	
District Health Management Team (DHMT) <i>Christine Shawa</i>	Dev-11	Form community led total sanitation (CLTS)	Dev-5	May-11	
	Dev-12	Actual enforcement	Dev-7	Mar-11	

To-do-List
Dependency Syndrome

identified issue: all users of water and sanitation
should become more independent of donors

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Ward Development Committee, WDC (Lead) <i>Mr. Mulunda</i>	Dep-1	Work with NECOS to establish the real problem	NECOS to work with	?	
	Dep-2	Needs assesment		?	
	Dep-3	Work with the community to establish data (education)	Dep-4	Mar-11	
Collaborating institutions					
Network for Environmental Concerns and Solutions, NECOS <i>Geshom Kanbanda</i>	Dep-4	NECOS helps develop data through collaboration with central statistics office		?	

Annex V: To-Do-Lists of George

To-Do-List
Sanitation

identified issue: to provide adequate, sustainable sanitation (taking groundwater into account)

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Lusaka City Council, LCC (lead) <i>John Mafuta Kamanga</i>	San-01	lead persons (participants of workshop: Kamanga, Sikazwe, Chipalala) to jointly brief Directors of Housing (HSS) and Public Health (PH)		3rd week of February 2011	
	San-02	call for a sensitization meeting with WDC on their role / to discuss on their role regarding sanitation		3rd week of February 2011	
	San-03	invite DHMT to above meeting	San-02	3rd week of February 2011	
	San-04	propose to Director HSS to provide a forum for a coordinated team to involve WDC, LWSC, DHMT, DWA and other stakeholders		3rd week of February 2011	
	San-05	organize a meeting to be attended by Dir.PH, Dir. HSS, Dir. Financing, Dir. City Planning on the need to come up with a model on how to provide adequate sanitation in peri-urban areas		to take place in two weeks	
	San-06	invite LWSC to attend the above meeting	San-05	3rd week of February 2011	
	San-07	communication between MLGH and LCC to be discussed in that meeting	San-05	3rd week of February 2011	
Lusaka City Council, LCC (lead) <i>Demus Chipalala</i>	San-08	carrying out routine inspections		on going	
	San-09	Reporting to the management	San-01	3rd week of	
	San-10	Conducting community awareness campaigns			
Collaborating institutions					

To-Do-List
Sanitation

identified issue: to provide adequate, sustainable sanitation (taking groundwater into account)

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
Environmental Council of Zambia, ECZ <i>Joseph Sakala</i>	San-11	develop, review and standardize sampling protocol, together with DWA, LCC and LWSC		18th February 2011	
WISEC Engineering (private company) <i>Richard Banda</i>	San-12	conduct public awareness education			
	San-13	Provision of VIP, PIT Latrines, good ventilation & Ecosan Toilets (Dry Toilets)			
Copperbelt University, CBU <i>Ikukumbuta Mwandawande</i>	San-14	propose and conduct research into appropriate low cost situation options for George Compound		February 2011	
	San-15	circulate the research outcomes to interested parties	San-14	mid of 2011	
	San-16	investigate and compare successful sanitation projects in order to development an inventory of documented successful low cost sanitation options from Zambia and other countries			
	San-17	get in touch with Research Unit of LCC to define their needs on how the inventory should look like and what they expect from the research			
	San-18	do a needs assessment for LCC, the community etc. on the above activities			
George Environmental Health Committee, GEHC <i>Chole Musonda</i>	San-19	Call up a community meeting (health education)		second week of March 2011	
	San-20	Organise and facilitate a workshop on sanitation and groundwater pollution			
	San-21	Formulation of concrete project proposal		on going	
	San-22	Identification of community needs and vulnerability (identified already)			
	San-23	Implementation of sanitary facilities (VIPs or other sanitary		second week of	
	San-24	Development of monitoring tools		on going	

To-Do-List
Sanitation

identified issue: to provide adequate, sustainable sanitation (taking groundwater into account)

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
	San-25	Monitoring of the project		on going	
	San-26	Representing the organisation GEHC at different fora (e.g. NGO WASH Forum)		on going	
	San-27	Reporting back from the for a to the members of GEHC		on going	
	San-28	to communicate the outcomes of the workshop to the NGO WASH Forum and to forward the information that LCC will only work with the NGO WASH Forum once it is registered (then the profile is given)		at next Wash Forum meeting	
Ministry for Local Government and Housing, MLGH <i>David Tembo</i>	San-29	informal follow up on communication between MLGH and other institutions (e.g. invitations to meetings)			
	San-30	to provide more specific information			
	San-31	follow up on LCC financing plan / budget for sanitation			
	San-32	be a member of task force on sanitation	San-04		
District Health Management Team, DHMT <i>Dr. Clara Mbwili</i>	San-33	brief management on outputs of workshop		18th February 2011	
	San-34	work with Principal Environmental Health Officer to brief Health Center Environmental Health Technicians/Officers on the need to accelerate the sanitation improvement agenda in George and Matero		18th February 2011	
	San-35	facilitate local level meetings and community sensitization activities to be stepped up in light of workshop outputs and environmental health data available		end of first quarter and ongoing sensitization	
	San-36	use existing coordinating fora (e.g.epidemic meetings) to advocate for accelerated action on identified problem by lead gov. Ministries. "Sanitation as a right"		this month (February) and ongoing	

To-Do-List
Sanitation

identified issue: to provide adequate, sustainable sanitation (taking groundwater into account)

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which did not participate)
	San-37	attend LCC coordinated meeting for WDC and CBOs	San-02		
Lusaka Water and Sewerage Company, LWSC <i>Kennedy Mayumbelo</i>	San-38	brief management on who lead stakeholder is		18th February 2011	
	San-39	provide data that lead stakeholders may need			
	San-40	attend meetings called in by lead stakeholders	San-02		
Ward Development Committee, WDC <i>Judith Lungu</i>	San-41	sensitization of community not to build pit latrines near boreholes at least 300 m away from boreholes		February 2011	

To-Do-List
Solid Waste

identified issue:
to provide adequate solid waste management

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
Lusaka City Council, LCC (lead) <i>John Mafuta Kamanga</i>	SW-01	advise the Dir. Public Health through Dir. Housing and Social Services to provide adequate solid waste management			
	SW-02	advise the Dir. Public Health through Dir. Housing and Social Services on the need to form a task force within LCC (Dpts) which will act as a watch dog			
	SW-03	advise the Dir. Public Health through Dir. Housing and Social Services on the need to involve other stakeholders such as WDC, private stakeholders (Community-Based Enterprises and private businesses)			
	SW-04	formulate by-laws to force producers of disposables (e.g. plastic bottles) to subsidize solid waste management			
	SW-05	to follow up if a fund like above mentioned exists that can be tapped into			
	SW-06	LCC field officers to attend and provide technical input to WDC meetings on solid waste management	SW-25		
Lusaka City Council, LCC (lead) <i>Demus Chipalala</i>	SW-07	carrying out routine inspections	SW-24	on going	
	SW-08	to follow up on opportunities to access funds from levies which LCC collects from companies which produce plastics and bottles	SW-05		
	SW-09	Reporting to the management		18th February	
	SW-10	Conducting community awareness campaigns			
Collaborating institutions					

To-Do-List
Solid Waste

identified issue:
to provide adequate solid waste management

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
Environmental Council of Zambia, ECZ <i>Joseph Sakala</i>	SW-11	work together with CBU on research and development of a strategy for management, segregation and recycling of waste		on going	NISIR, UNZA
	SW-12	Provide of garbage collection containers		on going	
	SW-13	create awareness		on going	
WISEC Engineering (private company) <i>Richard Banda</i>	SW-14	follow up with WASAZA if an association on waste management exists and if not, how it can be founded			WASAZA
Copperbelt University, CBU <i>Ikukumbuta Mwandawande</i>	SW-15	to carry out a study which considers the solid waste problems in George Compound and suggest suitable solutions to the problems, this can be jointly done between the Environmental Engineering Department of the Copperbelt University, URP (Urban and Regional Planning Department) and ECZ		first draft: mid of 2011	NISIR, UNZA
	SW-16	to conduct case studies in other similiar areas so that observed succesful options could be tried in George			
	SW-17	establish research contacts with Kenyan and Ugandan universities (for research proposals) through observers			
	SW-18	to include other research institutions in research proposals			
	SW-19	to get in touch with Research Unit of LCC to define their needs on how the draft report of the study should look like for them to use it and what they expect from the research			
	SW-20	to do a needs assessment for LCC, the community etc. on the above activities			

To-Do-List
Solid Waste

identified issue:
to provide adequate solid waste management

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
George Environmental Health Committee, GEHC <i>Chole Musonda</i>	SW-21	Conducting community awareness campaigners, in collaboration with WDC	SW-25		
Ministry for Local Government and Housing, MLGH <i>David Tembo</i>	SW-22	to follow up with LCC on solid waste management			
	SW-23	to follow up with organizations on "Make Zambia a Clean Country"			
	SW-24	to facilitate visit of Public Health Department LCC to George / provide transport for this activity			
Ward Development Committee, WDC <i>Judith Lungu</i>	SW-25	sensitize the zone leaders, community and CBEs		next Saturday (19.2.2011)	
	SW-26	define and communicate the training need in the WDC to LCC			

To-Do-List
Water Supply

identified issue:
To provide water at an economical rate,
taking the poor into account

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
Lusaka Water and Sewerage Company, LWSC (lead) <i>Kennedy Mayumbelo</i>	WS-01	to provide data on areas in need of improvement		ongoing	
	WS-02	advise management on concerns from field visit		18th February 2011	
	WS-03	start informal discussions with Nwasco, MLGH, WDC on increasing the lifeline water volumes		18th February 2011	
	WS-04	inform water quality unit to collaborate with DWA on groundwater quality assessment		18th February 2011	
	WS-05	inform water quality unit to collaborate with DHMT on resolution	WS-32	18th February 2011	
	WS-06	inform water supply unit to collaborate with DWA on borehole drilling		18th February 2011	
Collaborating institutions					
Environmental Council of Zambia, ECZ <i>Joseph Sakala</i>	WS-07	Monitor water quality		on going	
	WS-08	collect data of all stakeholders who capture water quality data for getting a complete picture of pollution, prevention		18th February 2011	
	WS-09	share the established sampling protocol with LCC/PHD	San-11		
	WS-10	include an field officer from ECZ to participate in sampling of LCC/PHD	WS-25		
WISEC Engineering (private company) <i>Richard Banda</i>	WS-12	follow up with WASAZA how the association can facilitate with private businesses to improve mode of delivery, agreeing on the following issues:			WASAZA
		Borehole development with sufficient gravel pack			
		Borehole redesigning			
		Provision of sanitary seal up to 5 Meters			
		Pumping tests to all level of depth and take samples			
		selection of better dynamic drawn down level			

To-Do-List
Water Supply

identified issue:
To provide water at an economical rate,
taking the poor into account

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
		Bacteriological Analysis			
		All laying pipes leading to water points all joints to glued with standard sealant (protection from pollution/ contamination)			
		Improvement in water distribution management			
Department of Water Affairs, DWA <i>Pasca Mwila</i>	WS-13	develop groundwater resources for urban water supply through the construction of deep productive boreholes		on going	
	WS-14	provide groundwater level measurements for water balance studies		on going	
	WS-15	groundwater quality assement		on going	
	WS-16	advise on the groundwater resource in terms of ist vunerability and protection			
	WS-17	collaborate with LWSC and other key players in water quality assessment			
	WS-18	brief the water quality unit over collaboration with LWSC			
Copperbelt University, CBU <i>Ikukumbuta Mwandawande</i>	WS-19	carry out a study which considers the solid waste problems in George Compound and suggest suitable solutions to the problems, this can be jointly done between the Environmental Engineering Department of the Copperbelt University, URP (Urban and Regional Planning Department) and ECZ			URP/CBU, NISIR, UNZA
	WS-20	conduct case studies in other similiar areas so that observed succesful options could be tried in George			
	WS-21	contact observers from Kenya and Uganda in order to establish research contacts (for research proposals)			
	WS-22	include other research institions in research proposals			

To-Do-List
Water Supply

identified issue:
To provide water at an economical rate,
taking the poor into account

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
Lusaka City Council, LCC <i>John Mafuta Kamanga</i>	WS-23	call for a sensitization meeting with WDC, residents and LWSC to discuss and come up with solutions on how water can be provided at an economical rate taking the poor and gender into account			
Lusaka City Council, LCC <i>Demus Chipalala</i>	WS-24	collection of water samples for bacteriological and chemical analysis		18th February 2011	
	WS-25	include an officer from ECZ when sampling water in Madimba and George compounds	WS-10		
	WS-26	Report to management			
Ward Development Committee, WDC <i>Judith Lungu</i>	WS-27	ensure water is chlorinated before used by people		ongoing	
District Health Management Team, DHMT <i>Dr. Clara Mbwili</i>	WS-28	brief management on outputs of workshop		18th February 2011	
	WS-29	work with Principal Environmental Health Officer to brief Health Center Environmental Health Technicians/Officers on the need to accelerate the sanitation improvement agenda in George and Matero		18th February 2011	
	WS-30	facilitate local level meetings and community sensitization activities to be stepped up in light of workshop outputs and environmental health data available		end of first quarter and ongoing sensitization	
	WS-31	use existing coordinating fora (e.g.epidemic meetings) to advocate for accelerated action on identified problem by lead gov. Ministries. "Water as a right"		this month (February) and ongoing	

To-Do-List
Water Supply

identified issue:
To provide water at an economical rate,
taking the poor into account

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
	WS-32	collaborate with LWSC and LCC to push for a resolution of the water supply problem in George as soon as possible considering health problems resulting especially cholera, typhoid, etc.	WS-05	at joint fora	
	WS-33	communicate resolution to NWASCO for them to get active	WS-32		

To-Do-List
Planning

identified issue: Planning should be more coordinated and include stakeholders (e.g. PSUP)

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
Ministry for Local Government and Housing, MLGH (lead) <i>David Tembo</i>	Plan-01	take and follow up on issues (see below) which were mentioned at the workshop on Planning / "be a messenger"			
		issues:			
	Plan-02	as a focal point MLGH should follow up on upgrading of unplanned settlements			
	Plan-03	Decentralization should go hand in hand with prerequisite resources			
	Plan-04	MLGH should ensure that structures below the ward such as WDCs and Zones can be legally recognized in the Local Government Act, since they have been omitted in the NCC Bill that has been presented to the President.			
Collaborating institutions					
Environmental Council of Zambia, ECZ <i>Joseph Sakala</i>	Plan-05	Advising on the need for EIA, PDCC, DDCC			
Department of Water Affairs, DWA <i>Pasca Mwila</i>	Plan-06	advise stakeholders on: potential areas for groundwater development; costs involved in developing the groundwater resources; groundwater quality status in areas of interests (using thematic maps)		on going	
	Plan-07	strengthen linkages for informative exchange and transmission amongst the key players			

To-Do-List
Planning

identified issue: Planning should be more coordinated
and include stakeholders (e.g. PSUP)

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
	Plan-08	develop groundwater vulnerability maps for the target area which can then be considered in the planning processes like PSUP (Participatory Slum upgrading programme)			
Copperbelt University, CBU <i>Ikukumbuta</i> <i>Mwandawande</i>	Plan-09	inform urban and regional planning department (CBU) about the outcomes of this workshop so that they could initiate collaborations with LA, MLGH etc. to improve the process/the situation			
George Environmental Health Committee, GEHC <i>Chole Musonda</i>	Plan-10	Formulation of an Action Plan for the GEHC			
Lusaka City Council, LCC <i>John Mafuta Kamanga</i>	Plan-11	conduct a workshop for the WDC to plan. This will include other stakeholders such as LWSC.			
Lusaka City Council, LCC <i>Demus Chipalala</i>	Plan-12	Management Issue (?)			
Lusaka Water and Sewerage Company, LWSC <i>Kennedy Mayumbelo</i>	Plan-13	provide input for District Development Coordination Committee (DDCC)		ongoing	
	Plan-14	provide input to other stakeholders on water supply and sanitation requirements		ongoing	
District Health Management Team, DHMT	Plan-15	briefing to Management at District Health Office		18th February 2011	

To-Do-List
Planning

identified issue: Planning should be more coordinated
and include stakeholders (e.g. PSUP)

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
<i>Dr. Clara Mbwili</i>	Plan-16	advocate for the formation of a Task Force or Working Group by the lead institution (MLGH). This is to be considered as one output of the workshop .			
	Plan-17	contribute technical knowledge to planning process once set up			

To-Do-List
Financing

identified issue: To develop a financing model for sustainable
WASH services provision and housing development

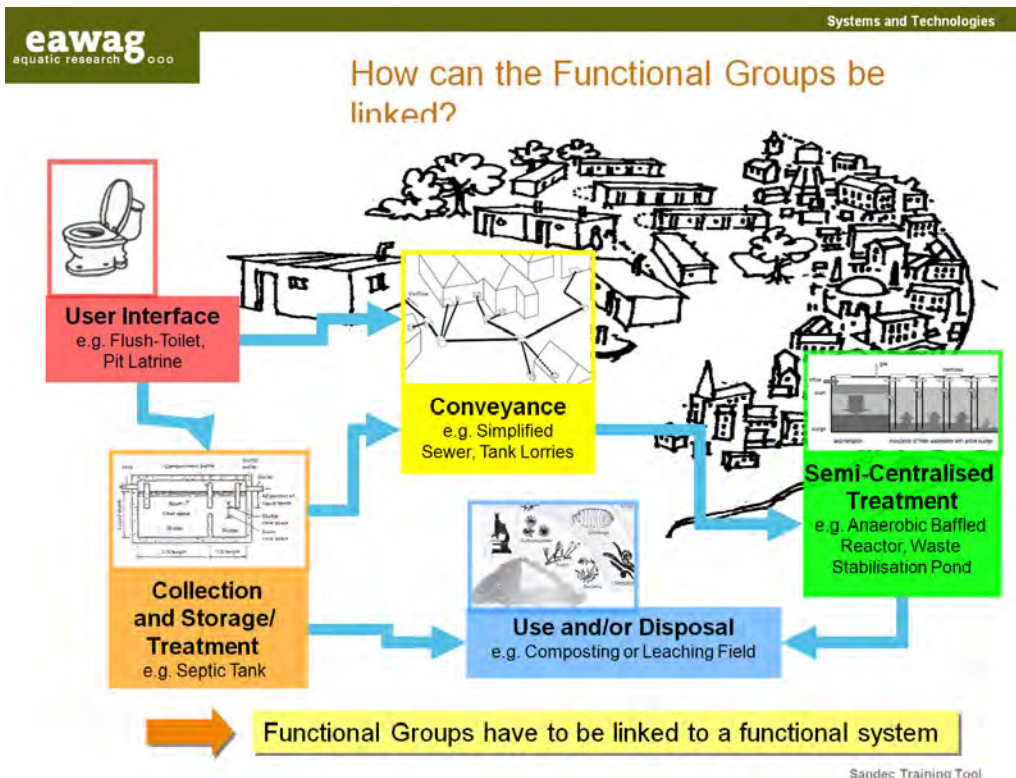
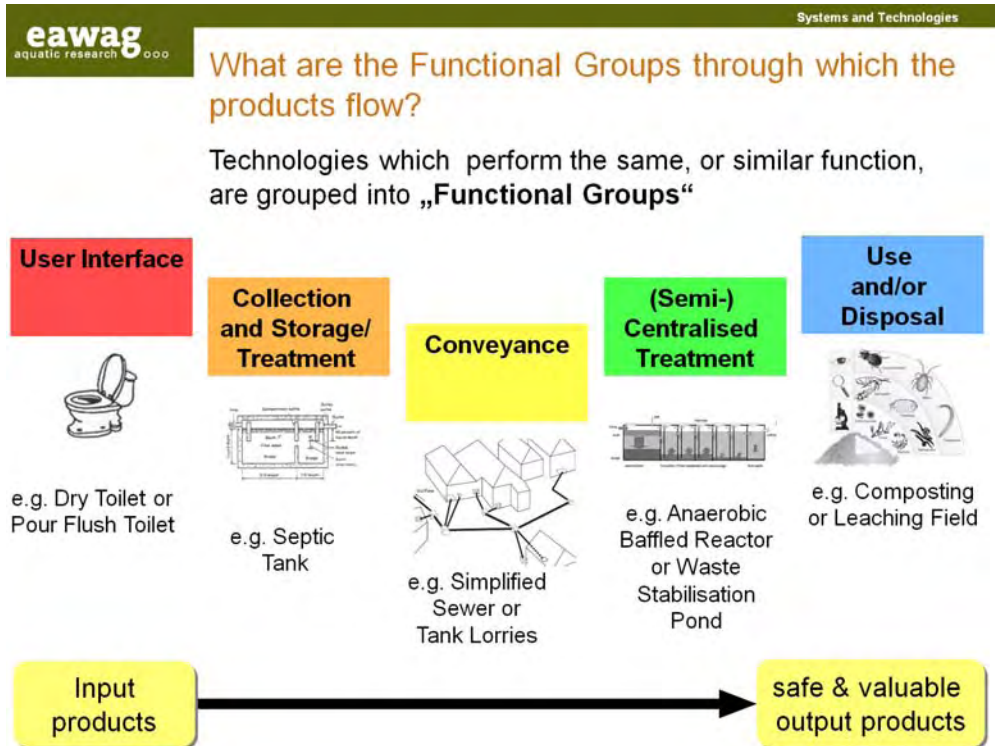
Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
Ministry for Local Government and Housing, MLGH (lead) <i>David Tembo</i>	Fin-01	take and follow up on issues (see below) which were mentioned at the workshop on Planning / "be a messenger"			
		issues:			
	Fin-02	as a focal point MLGH should follow up on upgrading of unplanned settlements			
	Fin-03	Decentralization should go hand in hand with prerequisite resources			
	Fin-04	MLGH should ensure that structures below the ward such as WDCs and Zones can be legally recognized in the Local Government Act, since they have been omitted in the NCC Bill that has been presented to the President.			
Collaborating institutions					
Department of Water Affairs, DWA <i>Pasca Mwila</i>	Fin-05	to advice stakeholders (e.g. MLGH) to request for financial assistance in areas of: borehole construction, water quality assessment		on going	
	Fin-06	to increase the amount allocated for water resource development (water supply)			
	Fin-07	to increase the amount allocated for groundwater research (exploratory boreholes which once drilled can be turned in boreholes for water supply)			
Copperbelt University, CBU <i>Ikukumbuta Mwandawande</i>	Fin-08	to talk to the department of urban & regional planning at CBU so that they could participate in devising suitable financing and implementation of projects in George compound (and if possible other peri-urban areas)			

To-Do-List
Financing

identified issue: To develop a financing model for sustainable
WASH services provision and housing development

Actor	No.	Activities	depends on activity No.	By when	Other institutions to consider (which have not participated)
Lusaka City Council, LCC <i>John Mafuta Kamanga</i>	Fin-09	make a proposal to the management to utilize a % of the WDF on financing sanitation			
Lusaka City Council, LCC <i>Demus Chipalala</i>	Fin-10	Management issue			
Lusaka Water and Sewerage Company, LWSC <i>Kennedy Mayumbelo</i>	Fin-11	provide data input for financial model development			
	Fin-12	provide data on areas needing financing			

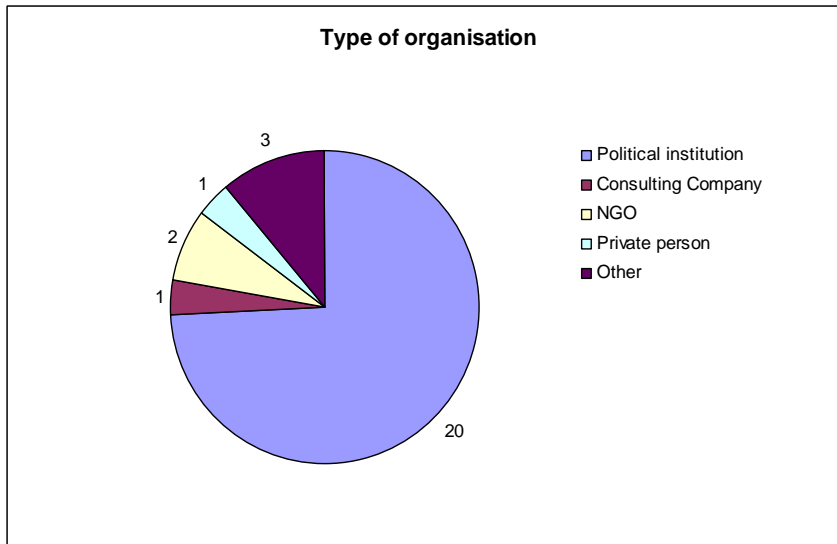
Annex VI: Concept of the Sanitation Chain (from EAWAG/Sandec)



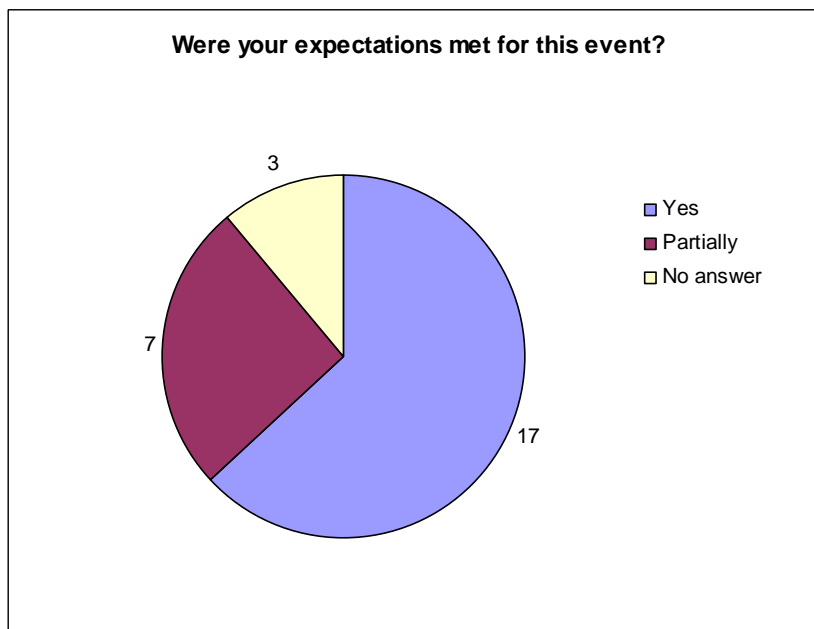
Annex VII: Evaluation results

In total 27 questionnaires have been filled out (by participants and observers) and evaluated.

Question 1: What type of organization do you come from?

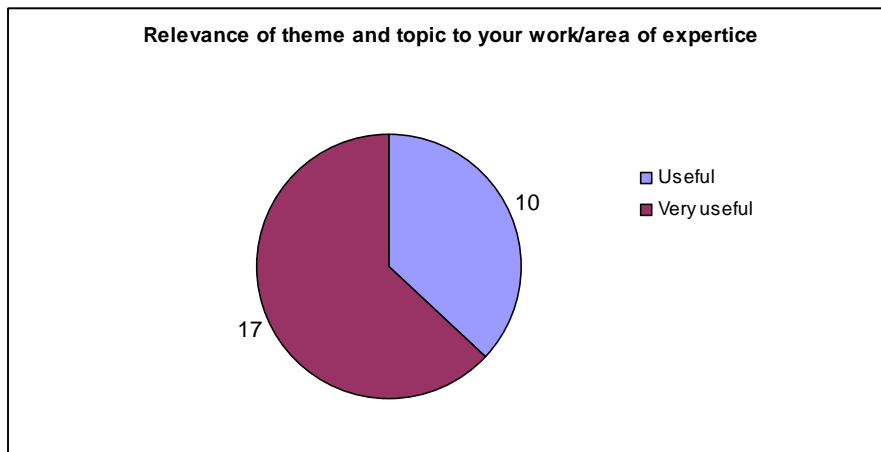


Question 2: Were your expectations for this event met?

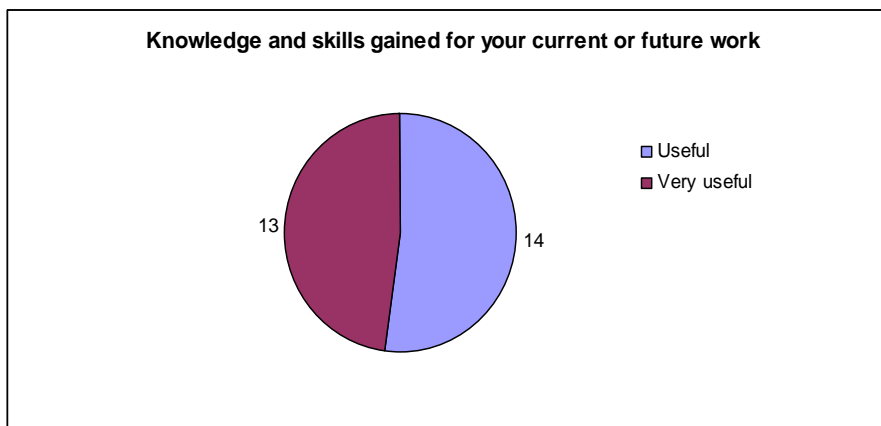


Question 3: How useful has this workshop been to you in terms of...?

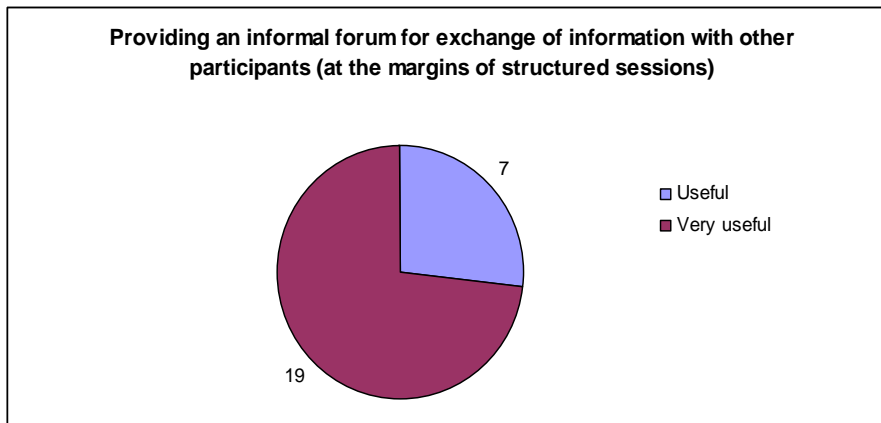
a) relevance of theme and topic to your work/area of expertise



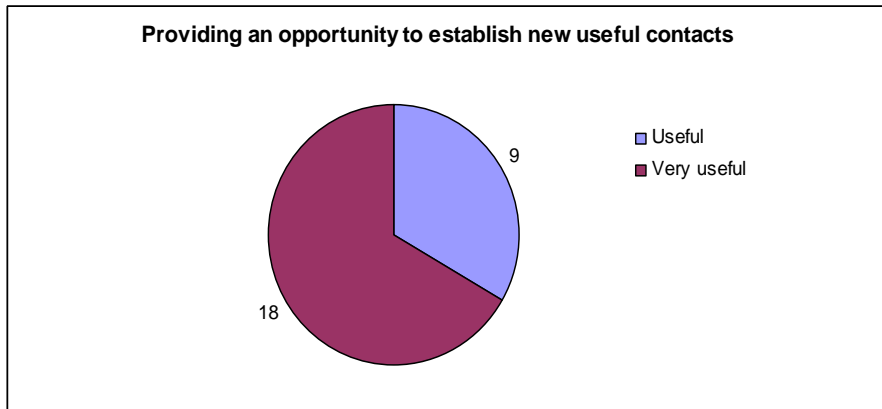
b) relevance of theme and topic to your work/area of expertise



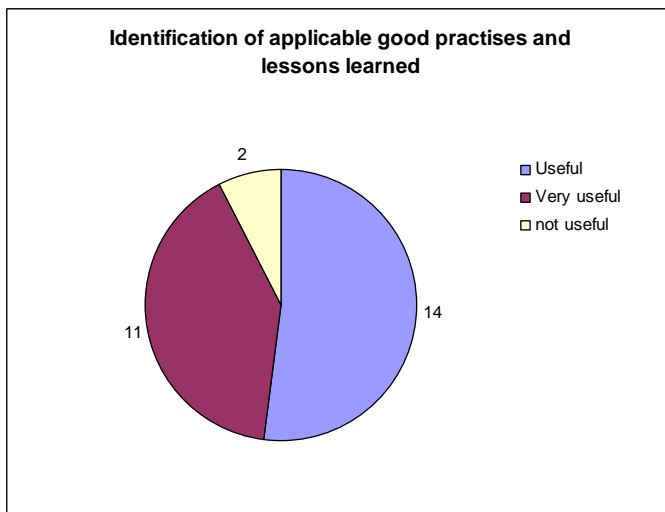
c) providing an informal forum for exchange of information with other participants (at the margin of structured sessions)



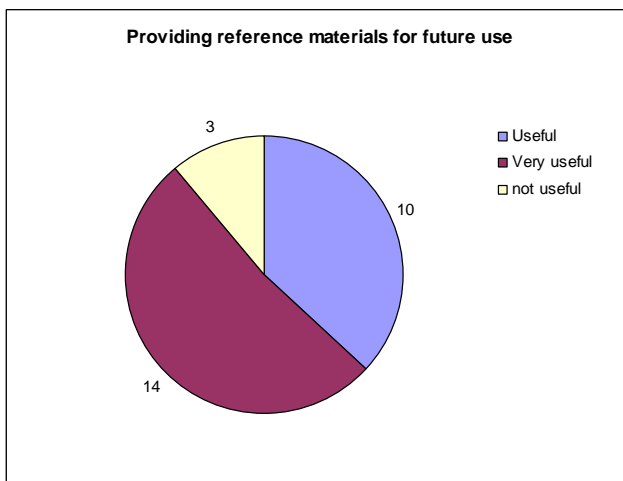
d) providing an opportunity to establish new useful contacts



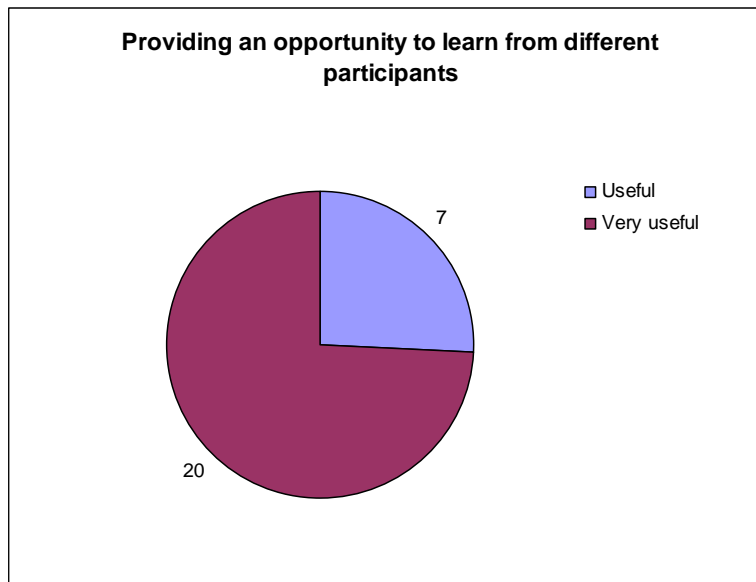
e) identification of applicable good practices and lessons learned



f) providing reference materials for future use



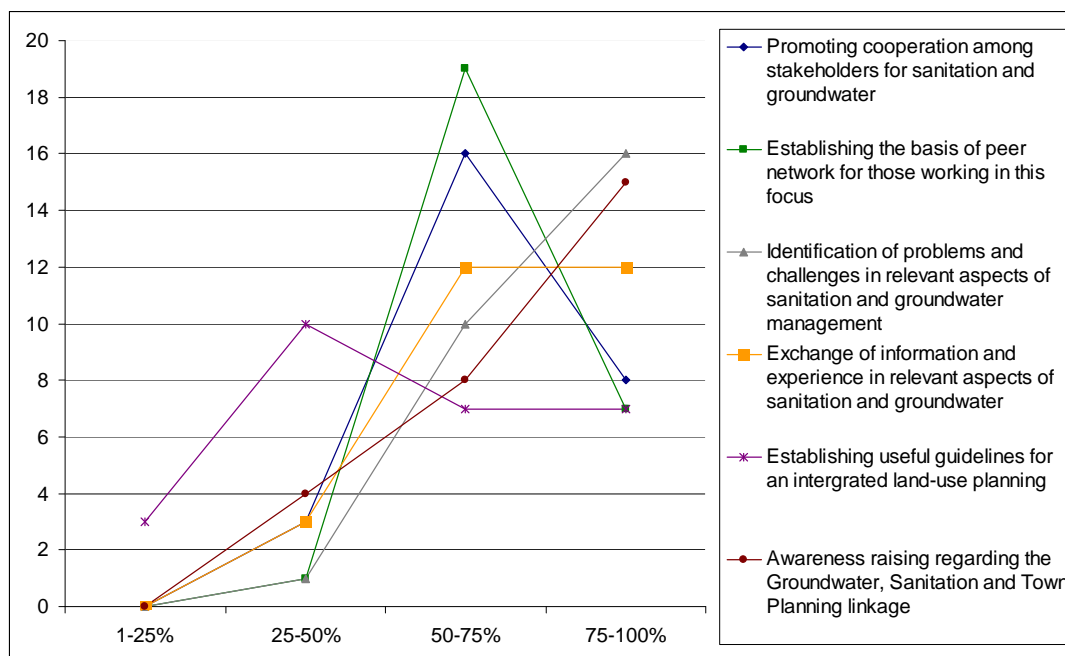
g) providing an opportunity to learn from different participants



Question 3: What 2-3 things did you most want to learn more about in this roundtable workshop?

- Learning how other countries dealing with similar issues (e.g. through case studies, examples)
- Impact of sanitation to groundwater quality, the linkage of groundwater protection and sanitation
- Advantages and disadvantages of the ECOSAN System and its application
- Town planning and its impact on groundwater
- How the practical problems of the case study areas (George & Chunga) could be resolved
- Agricultural reuse potential (in a safe way)
- Possible approaches of solving sanitation problems in low income areas, most appropriate sanitation options for unplanned settlements, how to provide sustainable water and sanitation services in densely populated informal settlements
- Dealing with problems such as water pollution in growing urban areas
- New sustainable low cost technologies in water and sanitation
- Scientifically proved and sustainable methods of managing waste water in challenged areas of George and Madimba
- Financing issues
- How the different processes in the water sector can be co-ordinated
- Problems faced by institutions (stakeholders) when they want to implement activities related to water supply and sanitation
- Networking with different stakeholders
- The role of each stakeholder in the implementation process
- Awareness raising regarding groundwater protection
- Water sampling protocols
- Way forward for resolutions made
- Possibilities of binding commitments
- Get to know and understand stakeholders with their respective concerns and preoccupations

Question 4: To what extent (in percent) do you consider this workshop achieved the following?



Question 5: As a result of what you leaned here, what will you recommend to be done differently (when you return to your work)?

- More coordination is required and more sensitization to the general public and policy makers.
- Information sharing, especially with the public should be clear
- to ensure that what was discussed will be used by following up persistently
- There is a need to improve the visibility of research results
- There is a need for an improved collaboration of all sectors dealing with research - recognition that research is needed
- to raise awareness regarding the groundwater, sanitation and town planning linkage
- to have a background in water planning is important of planning settlements
- to set up a working team on sanitation
- to improve water transmission and storage
- more communication amongst the different players, especially at the planning stage is necessary
- Planning's for mitigation measures should be within the scope of resources available. Institutions should stop blaming on another, they should consolidate their efforts and help one another
- Provision of appropriate water and sanitation services
- Information flow will be improved, there is a need to improve the feedback
- Collaboration and consultation of other stakeholders dealing with environmental health issues
- Considering water quality analysis
- Considering Sanitation facilities such as VIP latrines, ECOSAN
- to report back the workshop results to our director and recommend him to strengthen strategies for protecting the groundwater resources in the country (governmental institution)
- Collaboration with other organizations involved in the sanitation and water sector, better coordinated planning among relevant stakeholders
- Encouraging a multi-sectoral approach for solving sanitation issues
- Identification of actual problems regarding sanitation and collaborate with the relevant stakeholders to resolve them
- The growth of informal settlements must be stopped and actions have to be put in place for preventing environmental pollutions (especially to protect water resources)

Question 6 a: Are the guidelines you have established useful to you? If not, what should be improved?

Most participants mentioned that the guidelines or the elaborated To-do-List is useful for them. Further comments mentioned are:

- Currently the guidelines are adequate but in the future they should be developed
- The established guidelines are vital in order to achieve the target of protecting groundwater resources
- The water quality monitoring should be improved
- Town planning should be improved and should be more comprehensive to future changes

Question 6 b: How can the To-Do-List be used in your daily work?

The To-Do-List

- is helpful for future plans
- can be used as a reference
- will be a path to achieve the set objectives or goals
- is helpful for networking
- will be considered before projects will be implemented; thus all stakeholders should be involved to come up with the most appropriate options
- is useful for coordinating activities on water and sanitation issues
- is helpful for informing the key stakeholders
- contributes for a wider collaboration, promoting cooperation's among the people
- contributes to achieve synergies
- could be used to some extent as an input for research
- are a good reminder of what has been neglected in our everyday work

Question 7: How can the ongoing process be taken forward?

7 a: Do you think the exchange of information and dialogue among people working in the management of sanitation and groundwater, and town planning should continue?

All 27 participants, who fulfilled the questionnaire, are thinking that the exchange of information and dialogue among people working in the management of sanitation and groundwater, and town planning should be continued.

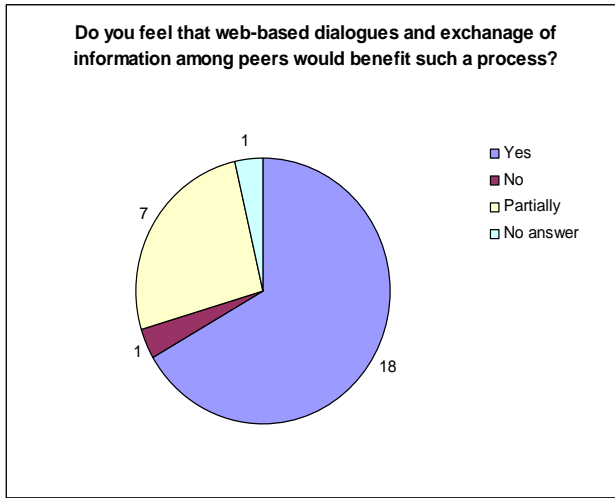
7b: How do you envisage this to be realized?

A lot of participants recommended to organize a follow up workshop to check the progress on the elaborated To-Do-List or to organize a similar workshop. An extract of suggestions could be find below:

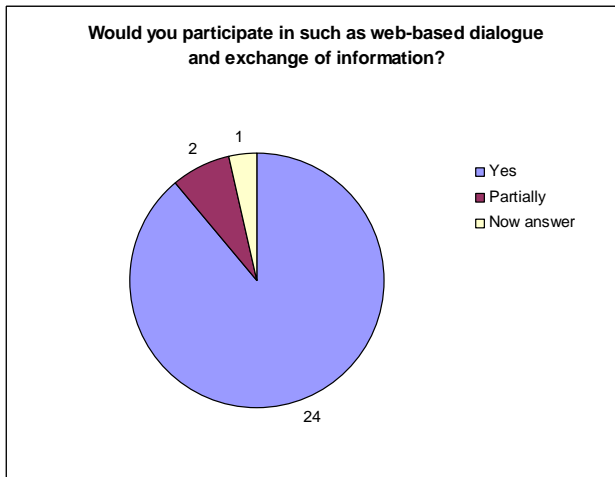
- Creation of a regular forum to review all action plans proposed to the matter
- Consideration of NGO forum activities
- Consideration of sector advisory committees (Housing SAG, Water SAG, HABITAT Forum)
- Usage of formal and informal contacts, continuation of networking and informal interactions
- Reporting back of the workshop results to higher authorities
- Exchange visits between different organizations to learn practically from each other
- Establishment of an integrated planning system
- Establishment of a working team to deal with sanitation issues
- To ask the involved stakeholders to give a progress report on the issues discussed
- Follow up by news sheet (within 6 month)
- Follow up workshop (within 12 month)
- Intensifying research issues
- Formation of working groups representing different stakeholders and providing these working groups with resources for research, tools and implementation
- More workshops on capacity building should be encouraged

- Organization of similar workshops (including a field trip)

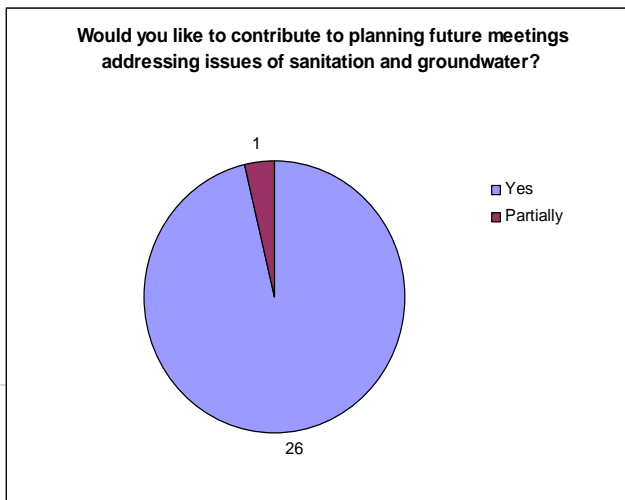
7 c: Do you feel that web-based dialogues and exchange of information among peers would benefit such a process?



7 d: Would you participate in such as web-based dialogue and exchange of information?



7 e: Would you like to contribute to planning future meetings addressing issues of sanitation and groundwater?



7 f: What type of follow up activities would you suggest (see also question 7b)? And what are the 3-4 most important issues you would like to see addressed?

Following issues have been mentioned which would like to see addressed or which should be considered within follow up activities:

- Different Geology (e.g. sandy aquifer, hard rock), quantitative microbial risk assessment
- Financing models, financing planning
- Financial mobilization for services and improvements in low income areas
- Research in policy and decision making
- Enhancement of research
- Review of the agreed activities: coordination among stakeholders
- Idea sharing between the different stakeholders
- Documentation or database creation on all related matters
- Health hazards resulting from dry toilets
- Water sampling protocols
- Local case studies
- Sustainable sanitation challenges in settlements
- Improvement of sanitation and water supply
- Provision of sanitation facilities in growing urban informal settlements
- Management of water supply
- Drainage Management
- Human waste disposal
- Upgrading of the George compound, improvement of water supply and sanitation services in the George compound in order to prevent diseases
- Improved decentralised decision making
- Better information exchange
- More action or implementation of identified solutions
- Inclusion of vegetation experts

Question 8: Do you have other comments?

- We need to explore investments rather than to give an excuse of lack of finance. With a proper prioritizing, beginning within our own institutions a lot can be achieved
- What has planned must be implemented
- Excellent facilitation
- Good and very important workshop