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**REPORT ON REGIONAL MEETING
OF GTZ SUPPORTED PROJECTS
IN WATER AND WASTE MANAGEMENT
IN SOUTHERN AFRICA:
OPERATION AND MAINTENANCE**

MAY 19 - 22, 1997

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INTRODUCTION

INTRODUCTION

From May 19 to May 22nd 1997, the Regional Meeting of GTZ Supported Projects in the Water and Waste Management Sector in Southern Africa met in Windhoek, Namibia.

The theme of the meeting was "Sustainable Operation and Maintenance". The meeting was hosted by the Department of Water Affairs, Ministry of Agriculture, Water and Rural Development.

The programme for the meeting was developed during a two day workshop in Geneva in February 1997. This planning meeting was attended by the GTZ advisor to CAWS, the National Co-ordinator for the CAWS project, Mr A Nehemia, Mr J Hueb, chairperson of the Working Group on Operation and Maintenance of the Collaborative Council on Water Supply and Sanitation, based at the World Health Organization in Geneva, three senior officials from the Department of Water Affairs, Namibia and Mr P Menche from P and E, GTZ Headquarters.

The programme developed is given in Annex 1. This regional meeting was planned in collaboration with the Operation and Maintenance Group of the Collaborative Council.

The participants included GTZ advisors and their counterparts from Water and Waste Projects in Southern Africa. A listing of the participants is given in Annex 2.

The meeting was very ably chaired by the National Co-ordinator for the CAWS project, Mr Abraham Nehemia.

OPENING ADDRESS

OPENING ADDRESS

**Presented by the Honourable Minister Helmut K Angula
Minister of Ministry of Agriculture, Rural and Water Development**

Mr Chairman, distinguished representatives from Eastern and Southern Africa, advisors from Deutsche Gesellschaft für Technische Zusammenarbeit, representatives from the World Bank, UNICEF, World Health Organisation, Ladies and Gentlemen.

I am very honoured to be with you here this morning. Your gathering here today is extremely important. It is very important in the sense that in the next couple of days you will be discussing one of the core aspects which affects the welfare and well being of the rural, peri-urban and urban communities in your respective countries and of Namibia.

But first of all let me welcome you all and thank the organizers and sponsors of this workshop, and in the same vein express my gratitude that Namibia was selected to host this very important workshop.

The rural and peri-urban communities, especially in Africa are a focal point for governments, donor agencies and international organizations when it comes to accessibility to safe water and improved sanitary services. Therefore improving and expanding the access to safe water and improved sanitation for the developing world and especially for Africa with its fast growing population, is an essential element of strategies to reduce poverty which substantially contributes to ill health, child death and stagnant rural development.

The goals of sustainable water supply and sanitation development are to provide a service that is adequate in terms of quality and quantity, reliable and convenient and that through effective utilization will lead to improvements in health and well being, leading to opportunities for increased economic benefits.

Large investments, totalling tens of billions of US \$ (dollars) have been made, either through governments capital investments or through donor assistance to develop the infrastructure in the water supply and sanitation sector during the last decade alone. Quantitatively, the number of facilities put in place is high. But what about the quality of service these facilities are rendering?

In most developing countries it is estimated that 50 % of improved facilities breakdown within three years after their installation. This is because emphasis is put on inventing new technologies and establishing new facilities and not on sensitization and mobilization of the communities as well as empowering them to take over the responsibility of managing, operating and maintaining the facilities.

The progress made in the supply of adequate and safe water is however threatened by natural droughts in some areas and pollution in others. In addition human failure to adequately address the operation and maintenance problems, has contributed greatly to poor operation and maintenance.

Key issues with respect to operation and maintenance of water supply and waste disposal systems should therefore be evaluated starting with the design stage of projects and should include:

the choice of technology, assessment of skills required and the availability thereof as well as other resources needed such as financial, organizational, material and other external inputs.

Problems with operation and maintenance also occur because insufficient thought has been given to the circumstances under which the technology used has to function.

This occurs when (for example) the technology chosen does not consider adequately the current (and - if possible - future) circumstances with respect to institutional set-up, socio-economic, environmental and staffing situation in which the option has to be sustained.

Ladies and gentlemen, I am advised that in Africa as a whole even after the International Drinking Water Supply and Sanitation Decade which lasted from 1980 to 1989, the situation with respect to the availability of water and sanitation facilities has not improved much. In the 80's in rural Africa, only 33 % of the safe water supply and sanitation facilities were in place and during the 90's it increased to 45 %. Even though the percentage of the required safe water and sanitation facilities increased, the number of people served decreased. During the 80's, 223 million people were not served, while during the early 90's, 237 million people were unserved.

Apart from population growth, a major contributing factor to decreased coverage is poor operation and maintenance which is a result of issues like war, poor organization, weak institutions and also the problem of continuous droughts.

The lesson learned from the International Drinking Water Supply and Sanitation Decade is that we should strive for:

- the adoption of supportive policies and legislation and appropriate technology,
- a community centred approach which is more effective than a technology centred approach,
- increased user involvement at all stages because it brings enormous benefits,
- realization that operation and maintenance are continuing fundamental problems,

- involvement of the communities, including the women in planning, technology choice, site selection and other issues affecting the role they have to play regarding operation and maintenance,
- establishment of appropriate institutions and the putting of emphasis on promotion rather than provision and
- assurance that the beneficiaries cover the operation and maintenance as well as the replacement costs.

Mr Chairman, regarding the situation in Namibia, we are not an exception with regard to the unwanted situation of faulty and malfunctioning facilities. We are however undergoing a transition period. This is a process in which the Government and support agencies have started seeing themselves not as providers but instead as facilitators. The role of government in the future will be orientated more to supporting people to manage their own water supply and waste disposal systems.

The Bulk water supply is in the process of being commercialized. The water distribution is the responsibility of municipalities in urban settlements and for the rural distribution we are in the process of handing over the responsibility to communities through their local committees. Much care is being taken in order to harmonize the responsibility of rural water distribution into the decentralization process which is also occurring in Namibia.

Various aspects of community management are therefore being considered e.g. cost recovery which is a crucial one at this stage. A series of workshops both at National and Regional levels together with an extensive community consultation has taken place over a period of one and half years. It has been a process of focusing on partnership and "let's do it together" rather than let us do it for them.

Our objective is therefore to empower the communities by providing the legitimacy and assistance needed to sustain community efforts including operations and maintenance. On the other hand, our people are positive especially because of the sensitization and training process undertaken by our Rural Water Extension Officers.

They have started to become aware of the reasons for the malfunctioning of facilities due to the lack of proper operation and maintenance. As in many other developing countries, about 60 % of the facilities in this country need rehabilitation because they are either abandoned or are not operating correctly.

Against this background, let me again express my appreciation for the enormous contribution that GTZ has made to the reform process in the sector. The fact that we have a group of GTZ experts here will contribute much to our efforts in achieving our objectives and also in formulating and revising sector strategies especially with regard to operation and maintenance.

Mr Chairperson, ladies and gentlemen, I am aware that the World Health Organization through the operation and maintenance Working Group of the Collaborative Council under the leadership of Mr. José Hueb, who is also among us here today, has done a tremendous job by producing quite a number of tools for operation and maintenance. But questions still remain and those are:

- How are we going to operationalise the tools and
- How are we going to ensure that grassroots level communities are going to acquire the information, adapt and implement it? How and where are we going to start at the country level?

I am convinced that all the answers to these questions are here with you and I am looking forward to seeing the proposed implementation strategies developed at the end of this workshop to make better operation and maintenance of water and waste disposal systems a reality in countries in Southern and Eastern Africa.

Once more welcome to Namibia, I wish you a happy stay and fruitful workshop.

I therefore declare this workshop officially opened.

**OPERATION & MAINTENANCE:
THE NAMIBIAN EXPERIENCE**

OPERATION & MAINTENANCE - THE NAMIBIAN EXPERIENCE

Presented by Mr Richard Fry, Under Secretary of the Department of Water Affairs, Ministry of Agriculture, Rural and Water Development

Namibia is a semi-arid to arid country with irregular rainfall patterns and consequently water is a scarce commodity. Smaller consumers in the interior of the country are almost entirely dependent on water extracted from subterranean sources. Apart from the underdeveloped areas, most of which lie in the northern, north western and north eastern parts of the country, indications are that the groundwater potential is in general fully committed and even over-utilised in some areas.

Where enough groundwater is available it has in many instances and especially in the communal areas resulted in the over-exploitation of other natural resources such as grazing and consequently resulted in a general environmental degradation.

Groundwater potential to support the smaller consumer in almost all communal areas must also still be thoroughly investigated and documented. This task did not receive enough attention in the past.

At present the main shortfall in water supply is in the rural communal areas where only about 60 % of the estimated 900 000 people have proper access to reliable sources of safe water.

Huge sums of money have to be invested in order to make this water available to the consumers. Holes have to be drilled and installed and pumping equipment, which is either fuel-, wind-, solar- or hand-driven but mostly fuel-driven, has to be put in place, operated and maintained.

Operation and maintenance of rural water supply facilities throughout the world is undertaken by a wide range of differently structured agencies. These range from community owned and operated water supply systems at one extreme to government owned and operated utility companies at the other.

The situation regarding operation and maintenance of rural water supply facilities in Namibia falls somewhere in between these two extremes in that Government owns and maintains the facilities on the one hand and that the rural communities are responsible for the operation of these facilities on the other hand.

Contrary to the general perception that water is a free commodity, the decision not to charge for water was mainly taken for political reasons by the previous dispensation. By applying this top to bottom approach, the former government ensured that certain sections of the Namibian society were being kept dependant and subdued.

Technically speaking, this policy has also proved to be a serious contributing reason for poor operations and maintenance of water supply facilities. Some underlying factors are as follows:

- It makes it difficult to run a viable self-financing system, even if Government provides the funding;
- When Government is short of cash, often it is the water supply sector which is a soft target and consequently experiences the greatest budget cuts and
- Government sometimes supports the purchase of technologies and systems which may not be the best or most appropriate.

In Namibia, the strongly ingrained culture of dependency on the government for their water supply has left the rural communities without the necessary skills to operate and maintain their water supply infrastructure on a sustainable basis.

Although Government owns and maintains most of the water supply facilities as has been mentioned earlier, it has been and still is expected from the rural communities to 'operate' their pumping equipment, operate only in the sense of starting and stopping the water pumps, though they have never been trained to even carry out this most basic procedure!

The lack of proper operation and maintenance skills results in a costly exercise because, should anything go wrong, semi- and unskilled people start tampering with the equipment in an effort to ensure a continuous supply of water. Often serious damage is caused to the equipment or even complete breakdowns occur.

At the same time, government employees struggle to cope with preventative maintenance and routine repair programmes as they are constantly occupied by handling and rectifying problems caused by major breakdowns.

Because large distances have to be traversed quite often to reach broken down schemes, transport costs also have a major impact on the allocated funds. Fact is, a vicious circle exists which is detrimental to the national economy as a whole.

Considering that Namibia has in access of 5 000 individual borehole pumping schemes, an idea can be formed of the enormous expenses that have to be incurred by Government (and, by implication, the taxpayers) annually to keep these schemes in operational order, expenditures that Government cannot afford.

Regarding sanitation services in Namibia, this sector, in a general sense, falls under the jurisdiction of the Ministry of Health and Social Services. For the purpose of this meeting, it should suffice to mention that the urban sanitation services are generally good with an estimated coverage ranging from 95 % in municipal areas to about 60 % in communal towns. However, the magnitude of the backlog is such that it deserves serious attention as increased urbanisation and a corresponding high population density is conducive to the transmission of infectious diseases.

Very few households in the communal rural areas have latrine facilities. This limited availability in the communal towns and villages contributes to the poor health status among residents of the communal regions and lower income groups.

Touching on the topic of waste disposal in general, certain functions relate to statutory and others to general responsibilities such as water quality and pollution control. All forms of water related waste disposal are subject to the general advisory and control functions vested in the Department of Water Affairs.

Municipal towns have well developed administrations with statutory responsibility for the sanitation and waste disposal functions which are discharged with a high degree of autonomy.

In proclaimed towns, the local authority has the full range of responsibilities on behalf of the town residents.

The unproclaimed towns, which are located in the communal regions and of which many are growing at quite a rate, are the responsibility of the Ministry of Regional and Local Government and Housing.

Hence, this Ministry is involved in all waste disposal functions except where the Department of Water Affairs and the Ministry of Health and Social Services have specific roles.

The responsibility for waste disposal in Government Centres lies with the Department of Works, or, to the extent that they are capable, with the user Ministry.

Where industries, like the mining industries, are located outside municipal boundaries, these industries have the full responsibility for their waste disposal.

Commercial farmers with their employees and their dependants take full responsibility for their own water provision and waste situation.

Uncertainty exists concerning the exact role of the future regional authorities, therefore the responsibility for waste disposal in the rural areas has not been resolved yet. The uncertainty also revolves around the fact that villages may vary greatly in size and complexity, and they are not formally planned. Local presence and capacity of relevant agencies (i.e. Ministry of Regional and Local Government and Housing, Department of Works and Department of Water Affairs) together with the nature of the village are the determinants, for the interim term, in deciding who is to be responsible in each individual case.

The present government of an independent Namibia has soon realised that urgent attention should be given to formulate a national water policy which will ensure that any development of the water and sanitation sector is undertaken in a sustainable manner. The discussions that followed culminated in the approval of the **Water And Sanitation Policy (WASP)** by Cabinet on 21 September 1993.

Since then, the objectives and strategies identified have been pursued on a continuous basis. National and regional consultative and awareness workshops have been held and community survey programmes carried out.

At a national workshop held in March this year, final conclusions were drawn from all these deliberations.

Recommendations were formulated according to these conclusions to be presented to Cabinet on how to improve the rural water supply sector and how to implement this policy.

Upon approval of the recommendations by Cabinet, the process of empowering rural communities to manage their own water supply can continue.

Many of the findings of the Water and Sanitation Policy principles are already in the process of being implemented. Inter alia this includes the increased attention being afforded to the reorganisation and development of the rural water sector. Water Point Committees, Local Water Committees and Central Water Committees are being established nation wide. Training of Water Point Committee members has been initiated and water supply schemes are being upgraded on an ongoing basis.

The ultimate goal is to ensure a sustainable rural water sector, at the same time developing and uplifting the rural population and creating a national awareness of the scarcity of our water resources.

It is firmly believed that in the end success will be achieved if all the stakeholders work together with the same enthusiasm, commitment and understanding as has been revealed up to now.

**SUSTAINABILITY OF WATER
SUPPLY AND
SANITATION SERVICES**

SUSTAINABILITY OF WATER SUPPLY AND SANITATION SERVICES

José A. Hueb

Division of Operational Support in Environmental Health
WORLD HEALTH ORGANIZATION

1. INTRODUCTION

Operation and maintenance of water supply and sanitation systems have been badly neglected in developing countries over the past years. Normally, the operation and maintenance of water supply and sanitation facilities are regarded as low profile areas, with construction of new facilities being given the highest priority and importance in the overall decision-making process. As a result, many water supply and sanitation facilities are collapsing and are only working with a fraction of their installed capacity.

Although many factors contribute to this situation, the greatest impact stems from a lack of effective management in the delivery of services and lack of awareness of the health risks involved in poor performance or absence of safe water supply and adequate sanitation services. For operation and maintenance to function properly, managers should formulate, carry out and evaluate programmes to improve the efficiency and effectiveness of water and sanitation services. Such programmes and activities should be prioritized, formulated and implemented as a conjunct of interrelated and interdependent action in which cost-effectiveness and health should be major concerns.

In order to address the above issues, the Operation and Maintenance Working Group (OMWG) was launched at a meeting attended by selected external support agencies at The Hague, in 1988. At its meeting in Oslo in 1991, the Water Supply and Sanitation Collaborative Council, which is coordinated by the World Health Organization confirmed the OMWG as one of its affiliated working groups. The Group's mandate is to promote cooperation between external support agencies and developing countries and to promote operation and maintenance as a substantial and basic component of programmes aimed at the sustainability of water supply and sanitation systems. The development, promotion and application of tools and methodologies for the formulation, implementation, monitoring and evaluation of programmes to improve Operation and Maintenance (O&M) procedures are also amongst the main concerns of the Group. Since the Oslo meeting the Group has met annually, issuing proceedings of each meeting.

2. MANAGEMENT LEVELS IN URBAN WATER AND SEWERAGE AGENCIES - THE SYSTEMS APPROACH

The systems approach serves as a means of managers to describe and reorganize the service framework of the water and sanitation agency and to allocate resources efficiently to achieve performance objectives. Systems, defined as the aggregate of elements which, arranged according to set patterns, interact to achieve specific objectives and purposes, provide a methodology which enables managers to study the interrelationships between the components of their agency. This approach facilitates detailed analysis of the agency, even in complex situations, without obscuring the overall picture. Groups of organizational functions constitute the organizational systems. Each of these systems is characterized by fields of specific action (operation, administration, etc.).

The following organizational systems have been briefly explained in this document: planning, operation, commercial, financial, human resources, and administrative support. The latter is a collection of systems of different kinds, including those responsible for the operation of the other systems, (transport, supplies, etc.). The whole group of systems, based on the functions normally performed by water supply and sanitation agencies, constitutes the basic agency system. Each system is in turn composed of various subsystems.

In addition to the systems mentioned above, separate consideration should be given to the processing of information, which, together with senior management activities, constitutes the organization's directing subsystem, by means of which targets, priorities, programming, responsibilities, distribution of resources and the entire decision-making process are determined. At the initial stage in a programme of agency development, these activities can be viewed as the linking factor between the subsystems and systems until the information needed to measure results, take corrective action, formulate new parameters and distribute resources has been established as a basis for management control.

2.1 PLANNING SYSTEM

The planning system aims at effective accomplishment of the objectives of the organization (the undertaking as a whole) in the long, medium and short term, through optimization of each component part to obtain an efficient input/product safe drinking water or adequate sanitation ratio, thereby achieving effectiveness in the attainment of the targets. This enables it to satisfy the external requirements of the environment in which it operates, by meeting the demand for services expressed by the community.

As a product of these activities, the agency generates physical expansion, institutional development and economic and financial programmes, with which to establish the feasibility of the objectives, plans and programmes of the organization, with the corresponding control of their implementation, supported by the information system. The agency carries out these activities through its subsystems for physical,

economic and financial planning, organizational planning, and programming and control.

2.2 OPERATION SYSTEM

The operation system consists of the conjunct of resources and activities necessary for administering the preparation of designs, the execution of construction work, the operation of the water supply and sanitation systems, and the maintenance of the installations and equipment used in those systems. It operates through its design and construction management, operation and maintenance subsystems for the attainment of its objectives, through activities at the various management levels of the organization.

2.3 COMMERCIAL SYSTEM

The commercial system is important for attaining the objectives of the organization (meeting drinking water and sanitation demands and regulatory requirements), serving as a tool for the promotion and sale of services, and for the recovery of the cost of delivering those services to the users who benefit from the, thus enabling the agency to achieve financial self-sufficiency. The agency performs its function in accordance with the policies, standards and plans established by it in the light of consumer demands and regulatory requirements. This system includes functions and activities related to consumption measurement, discharge (effluent) measurement, and invoicing and collection subsystems, in order to ensure sustainability in the attainment of the agency's objectives.

2.4 FINANCIAL SYSTEM

This embraces the entire set of policies and standards established by the agency for the performance of its financial requirements, together with the procedures and methods used for recording and evaluating financial collections and operations and reporting on their results. These activities are grouped together in the financial administration and accounting subsystems.

2.5 HUMAN RESOURCES SYSTEM

The human resources administration and development system is defined as comprising the entire set of policies and procedures related to human resources, establishing and maintaining the conditions for their optimal utilization, development and continuing training as required. To this end, a human resources demand and supply plan must be drawn up and the following activities carried out: post classification and grading, staff selection and recruitment, evaluation of under-utilization, training, human relations activities, through social welfare, industrial safety and worker's health.

2.6 ADMINISTRATIVE SUPPORT SYSTEMS

The supplies administration system, defined as the set of policies, standards and procedures that the agency adopts for itself, together with the goods and services necessary for the operation and maintenance as well as the construction of water supply and sanitation systems. It functions through three subsystems: stock management and control, procurement administration, and storage and distribution of materials (tools, spares, chemicals, etc.).

2.7 INFORMATION SYSTEM

The information system is of crucial importance to support decision-making processes in the management of the agency.

The sustainability and optimization of water supply and sanitation facilities should be achieved through the analysis of the management mechanisms of the water utilities and formulation and implementation of programmes addressing the different organizational systems.

3. MANAGEMENT OF RURAL WATER SUPPLY AND SANITATION SYSTEMS

The adequate operation and the effective maintenance of rural water and sanitation systems continue to be a major priority within the sector. Due to the fact that operation and maintenance of water supplies and sanitation in developing countries is highly neglected, data on the numbers of people served by water supply and sanitation facilities often are overly optimistic because, in reality, many of these facilities are broken or operating at reduced capacity. In most cases management systems have failed to provide the necessary guidance and structure for effective operation and maintenance of water supply and sanitation facilities. The deterioration of these valuable physical assets is a major loss to national economies which should be avoided and although most external support agencies do not fund operation and maintenance, rehabilitation projects have become an increasing part of many country support programs. Rehabilitation is a natural consequence of poor operation and maintenance which would not have been required, or would have been postponed if regular maintenance had taken place.

Many reasons have been identified as contributing to or causing the failure of water supply systems. These range from poor organizational structures in the responsible agency, lack of spare parts, inappropriate technology, lack of trained staff, tied aid, absence of career opportunities in the O&M sector, insufficient funds, legal framework problems, lack of motivation by sector personnel, non-involvement of the users, the low profile of operation and maintenance in the sector in general, inadequate tariff and collection systems and political interference. These causes tend to be interrelated and intertwined.

The Operation and Maintenance Working Group of Water Supply and Sanitation Systems (OMWG) identified the following main headings under which the main reasons for poor operation and maintenance can be grouped:

1. Sector Performance;
2. Institutional Performance;
3. Technology Performance and Environmental Linkages.

The key issues contributing to the poor operation and maintenance performance of water supply facilities were identified as:

- Inadequate Data on Operation and Maintenance
- Insufficient and Inefficient Use of Funds
- Poor Management of Water Supply Facilities
- Inappropriate System Design
- Low Profile of O and M
- Inadequate Policies, Legal Frameworks and Overlapping Responsibilities
- Political Interference

INADEQUATE DATA

There is an overall lack of data regarding operation and maintenance. Precise, accurate data on the number of systems which are not working are needed together with information on the main reasons why. Detailed figures are also necessary to determine how much it costs to undertake an adequate operation and maintenance programme for different types of facilities.

Data are also required on the rates of breakdown of different systems such as pumping stations, distribution networks, treatment plants in urban systems, small gravity systems, and diesel motor pumping systems.

Until this information is forthcoming it will be impossible to accurately assess the performance of operation and maintenance and compute the financial losses due to poor operation and maintenance. These exact financial data are urgently needed to demonstrate to decision makers the advisability of implementing good operation and maintenance programmes in order to reduce losses to national economies.

INSUFFICIENT AND INEFFICIENT USE OF FUNDS

Insufficient funding has been identified as a major contributor to poor operation and maintenance performance. This lack of funds hampers the operating and maintaining of water supply facilities as money is not available to buy spare parts, properly train staff and provide competitive salaries to attract high calibre personnel. External support agencies have traditionally been reluctant to finance operation and maintenance activities while national governments have often given it a low priority. National governments are frequently stressed for cash, especially hard currency

which is needed to pay for spare parts and the water supply agencies usually lose out to other, judged more important higher profile sectors.

The users are a potential source of finance for water supply systems. They are often unable or unwilling to pay. Usually it is that they are unwilling to pay rather than unable to. Evidence is mounting that even in the poorest and most underprivileged segments of the community people are willing to pay for a reliable, adequate supply of clean water but unwilling to be charged for an unreliable and unsatisfactory service. It is a vicious cycle. As the service level drops due to a lack of operation and maintenance the users withhold support and become less willing to pay which further constrains operation and maintenance activities.

Sometimes it is the inefficient use of funds rather than a lack of money which contributes to poor operation and maintenance. The poor management of facilities results in the squandering of resources which then reduces the viability of the water supply system. Those responsible for managing water supply facilities need to look carefully at their operations to ensure that they are operating efficiently. Common problems are too often many unskilled staff and poor logistical and organizational structures.

Losses of revenue from unaccounted for water are a problem for most systems. It is difficult to define what is an acceptable level for unaccounted for water. A figure of 25 % may be appropriate as a first target for an agency working at unaccounted for water levels of 50 %, but significantly lower levels can and should be achieved. What is an acceptable level of unaccounted for water has to be determined on the basis of local conditions, but true wastage should not be significantly above 10 % once illegal connections, free supplies, and leakage are reduced to acceptable levels and adequate metering, billing and collection procedures are maintained. High rates of unaccounted for water, whether they are caused by illegal connections, leakage, free water supply, or the result of inadequate commercial operations, result in significant financial losses and consequent poor service performance of the agency.

MANAGEMENT OF WATER SUPPLY SYSTEMS

The operation and maintenance of water supply facilities throughout the world is undertaken by a wide range of differently structured agencies. These range from community owned and operated water supply systems at one extreme to government owned and operated utility companies at the other. Some agencies are very small and may only be responsible for the supply to a small rural village using a low cost technology while other agencies may be controlling a utility employing thousands of staff and operating a high technology system.

However, no matter what the scale of the facility, the system will perform poorly if it is not managed efficiently and well. Typical management-problems include:

- inefficient organizational structures;

- absence of career structures for staff;
- low salaries; and
- poor relationships between the users and management.

The inefficient organization of many water supply agencies is a serious deficiency. If the organizational structure does not promote and allow efficient operation then the overall management will function poorly.

Personnel problems are another reason for poor management performance. Low salaries, absence of career structures, lack of trained personnel and the low profile of operation and maintenance as compared to new construction are all constraints. Some of these can be traced to a lack of sufficient funds in the agency but often they are the result of inadequate management.

The absence of transparent management and accountability to the users is another major issue. Often the users are not involved in the water supply agency and there is no feedback from the consumers to the management of the agency. This is particularly acute in government owned and operated agencies which tend to be bureaucratic. This non involvement of the users in the management of the agency results in stress and in some cases the development of a confrontational relationship between the agency and the consumers. Studies of well run water supply agencies have shown that good customer relations and a sense of management responsibility to the users are common denominations in these organizations, contributing to their overall success.

One of the lessons of the International Drinking Water Supply and Sanitation Decade has been the recognition that the user needs to play an important role in the development, implementation and operation of the facilities if the intended service is to be sustainable over the long term. This role varies according to local conditions. In rural and periurban projects, the user is likely to be intimately involved in the process and may assume planning, construction and, at a minimum, operating functions.

User participation must begin with the design stage, e.g. the intended user must determine what he is willing and able to pay for. Subsequently, management and operation of the agency must convince the user that he receives full value for the payment he makes. The means of doing so, other than providing good service, vary boards or committees in rural and periurban organizations to public meetings, consultations and other participatory activities.

INAPPROPRIATE SYSTEM DESIGN

No matter how good the management of a water supply facility is, if it is not well designed technically, it will operate inefficiently. Many water supply facilities have been badly designed, poorly constructed and use technologies which are inappropriate. When a facility is improperly designed and constructed even with the best will in the world it cannot perform satisfactorily.

There are many reasons for poor systems design. In some instances consultants are chosen by ESA's who are not familiar with suitable technologies for use in the developing world and specify equipment and/or designs which are inappropriate. In other cases, there may be political interference to promote one particular technology or equipment supplier and they may not represent the optimum choice for that particular situation.

A lack of communication between the system designer and the operators of the system is a further drawback. This applies equally to a rural village receiving a handpump well to an urban centre with complex facilities. The operators of the system need to be familiar with, approve of and be comfortable with the technology. In addition there needs to be a continuous feedback of information from the operators to the designers to pinpoint problems with the design and suggest remedial measures.

LOW PROFILE OF OPERATION AND MAINTENANCE

Operation and maintenance in water supply agencies has a low, and usually an inferior profile as compared to new construction and system extension. Thus for career minded engineers the route to top management positions is recognized to be through new construction and not operation and maintenance.

The emphasis on and recognition given to new construction is partly due to its political visibility. The provision of a water supply to many developing world communities is a vote winning exercise while good operation and maintenance receives few political accolades.

Within the water sector there is an insufficient appreciation of the following: magnitude of operation and maintenance problems, importance and the skills required to properly operate and maintain the facilities. In part, this is due to a lack of financial data. Accurate costs are not available which will demonstrate to decision makers the financial benefits of good operation and maintenance and conversely the losses to the national economy from poor operation and maintenance. An urgent priority in operation and maintenance is to collect precise figures which clearly show the financial benefits of operation and maintenance to decision makers in External Support Agencies and national governments.

The low priority assigned to operation and maintenance by decision makers is a severe constraint. In order to improve operation and maintenance of performance it must be accorded a high priority and importance by national governments in their programmes.

INADEQUATE POLICIES, LEGAL FRAMEWORKS AND OVERLAPPING RESPONSIBILITIES

There is a need for clear sector policies, compatible legal frameworks and a clear division of responsibilities and mandates within the water and sanitation subsector. Due in part to the low priority assigned to operation and maintenance, no clearly defined policies have been enunciated which adequately address this issue. Commonly the lines of responsibility between the various organization involved are often blurred. This is particularly true of the relations between water supply and sanitation where the maintenance agencies usually have no or limited contact.

The policies of ESA's with reference to operation and maintenance are frequently different and may be at variance with the approaches of national governments. National governments and ESA's should collaborate and coordinate their approaches in order to achieve higher levels of performance for O&M.

POLITICAL INTERFERENCE

Political interference has been identified as a serious contributing reason for poor performance of water supply and sanitation agencies. This is most noticeable in countries where the government is directly involved in owning, operating and maintaining the water supply facilities. Political interference manifests itself in several ways. In some cases, for political reasons, water is free or is not charged according to the costs of operation and maintenance and to cover capital costs. This decision not to charge properly for water makes it difficult to run a self financing viable system, even if government provides funding. When governments are short of cash, often it is the water supply facilities which are soft targets and experience the greatest budget cuts.

Political interference is often evident in the choice of technologies. Government officials may for one reason or another support the purchase of a particular technology or system which may not be the best or most appropriate selection. Equipment suppliers and ESA's frequently hinder the wise choice of a technology by lobbying politicians or through restrictive policies of tied aid.

The contracts awarded for building even small rural water supply facilities are significant and there is considerable competition between contractors to be selected. In some cases the job may be awarded for political reasons rather than on the basis of performance with the result that the completed facilities may be shoddily constructed.

A possible alternative for the better management of water supply facilities is to devolve the responsibility of managing systems from government to autonomous agencies which will manage the facilities under technical, financial and administrative guidelines from the government. This would greatly limit the extent of political interference by governments and allow the facilities to be managed more efficiently.

4. THE OPERATION AND MAINTENANCE WORKING GROUP

The focus of operation and maintenance has evolved within the Group from concepts which were predominantly of a technical nature to a general concept covering all kinds of activities carried out by water supply and sanitation utilities and by communities in order to sustain their public services and to maintain their existing capital assets. In this context it is stressed that Operation and Maintenance should be viewed not only under a technological or operational perspective, but also, and more importantly, should take into account the aspects associated with the overall performance of the water supply and sanitation facilities. Aspects such as institutional arrangements, organisation of the water supply and sanitation services and sound resources management (human resources, environmental, financial and economic aspects and assets management), should thus be among the issues to be tackled in the development of programmes addressing improved operation and maintenance.

The aims of the Group are to promote and support the improvement of operation and maintenance of water supply and sanitation services, as conceptualized above, and to raise the level of awareness of its benefits.

A number of tools (guidelines, manuals, and training packages) have been prepared by Group members. Whilst some of these tools have been fully developed and tested, others are still under preparation, as indicated below.

CASE STUDIES

Selected case studies covering different aspects of asset management and sustainability of water supply and sanitation systems have been prepared by the Group. Other case studies have been presented at workshops which, although not planned or organised by the Group were strongly influenced by the O&M conceptual framework developed between ESA's and water agencies in developing countries. The case studies provided the basis for defining priority issues and structuring the development of action plans, activities, and tools.

A total of 22 case studies describing different O&M projects and concepts have been compiled into a single document, which has been distributed to interested agencies. The document has been translated into French and is now being translated into Portuguese.

STATUS ASSESSMENT

This tool was developed as a response to the lack of suitable guidelines for assessing the status of O&M in both urban and rural areas. The activity is being implemented in three stages. The first stage, which has been completed, was a study to collect existing literature and information. The second stage, also completed, was a methodology to assess the status of O&M. The third stage,

currently being carried out, is the testing of these tools and guidelines in selected countries.

A GUIDE FOR MANAGERS OF WATER UTILITIES

This document is based on the principle that existing urban water supply systems can be optimised, and, as a consequence of having effective and efficient utilities, this can be extended to fringe and poor areas, minimising the need for the construction of additional production facilities.

Benefits will be maximised when the installed systems operate continuously to the extent of their capacity and conform to acceptable standards of quantity and quality.

The document has been prepared to help managers find solutions to problems preventing such efficiency and helps to consolidate technical and institutional development strategies. It was published in 1994 as an official WHO publication. It is also available in French and is now being translated into Portuguese and Spanish.

LEAKAGE CONTROL TRAINING PACKAGE

This document has been developed as part of an overall approach to the optimisation of water supply and sanitation facilities. Leakage control activities should not be undertaken as an isolated effort but should be part of a comprehensive programme addressing the whole range of constraints faced by a water supply agency.

The training and resource package adopts a logical and "user-friendly" approach to training water practitioners at a range of levels, from senior managers to leak inspectors. Each module can be varied in content depending on the depth of knowledge required for a particular level of trainee. For example, engineers and managers could explore in detail the institutional and financial aspects of leakage control, and would benefit from a cost benefit exercise to select and develop an appropriate policy. Engineers and technicians responsible for managing a system and detecting leaks would benefit from an understanding of these principles, but the main thrust of their programme would be based on those modules with a more practical and technical approach to system management.

UPGRADING OF WATER TREATMENT PLANTS

This document is a practical approach to improving the performance of a water treatment plant. Maximising the production potential of existing treatment plants leads to large savings - particularly relevant to less developed countries.

The document summarises several decades of field experience of upgrading and improving a wide range of water treatment plants throughout the developing world. Examples show how that water quality as well as capacity can be greatly improved.

Following editorial revision, a second draft has been prepared.

TRAINING PACKAGE ON O&M MANAGEMENT IN RURAL AREAS

By optimising water supply and sanitation facilities it is possible to defer capital investment in rehabilitation and construction of new systems. This training package is part of the Group's strategy for providing ESA's and water agencies with suitable tools for improving the performance in rural areas.

The training package has been designed to raise the level of training and to optimise the scarce resources for training activities in developing countries. Its use will greatly improve the implementation of training activities. It is aimed at professionals dealing with managing O&M in water supply and sanitation systems, and who have some experience in training and is expected to play an important role in the design and preparation of material, and in the organisation and presentation of O&M training courses. It will provide a guide for designing courses at both regional and national level. It provides hands-on material for preparing and conducting a course, which can be adapted to a local factors and resource persons.

The package has been tested in Namibia, and the findings used to prepare the final version, which is available for use by external support agencies or water agencies in developing countries. A French version is available now, and the package is currently being translated into Portuguese.

The document is ready for distribution and application by external support agencies or water agencies in developing countries. Rather than being seen as a final product for direct application, it should be considered as a model and a source document from which selected modules can be withdrawn to be assembled as a training package tailored for a specific target population.

MODELS OF MANAGEMENT SYSTEMS

The document "Models of management systems for the operation and maintenance of rural water supply and sanitation facilities" was prepared by the Water and Sanitation for health Project (currently EHP) under the sponsorship of the U.S. Agency for International Development, in collaboration with the Group.

The document evaluates the factors which influence the development of O&M management systems for rural water supply and sanitation facilities in developing countries. It describes models in eight representative countries and offers guidance to planners and designers in selecting the most appropriate one.

Models for rural water supply and sanitation facilities range from highly centralised ones managed by government agencies to community systems owned and operated by local organisations. Between these extremes is a continuum of management models that includes participation by government agencies, communities, and private organisations.

Management models are often characterised by the number of management tiers involved. The first tier is the government agency responsible for O&M at the national level. The second tier represents an intermediate body, either a regional government organization or a private group. The third tier is composed of local communities which operate and maintain their own facilities. The relative importance accorded to each tier defines the management model. Most countries use a two- or three-tier model, with responsibility varying from a strong central government role to a strong community role. Less common is the single-tier model, where either a government agency or the community has sole management responsibility.

TECHNOLOGY CHOICE

A manual for guiding the selection of technology for O&M is being developed. The aim of the manual is to inform national governments, ESA's, water and sanitation agencies, and communities of the implications for O&M when selecting a particular technology. Cost is often the prime factor, but in the long term a technology which is initially more expensive, but which has lower O&M costs, may be more appropriate.

NETWORK SURVEY

The Group's aim is to prepare a manual on the assessment of performance of drinking water production and distribution systems through measurement and monitoring techniques, to gain a better understanding of how these systems are operating. As with all the tools produced by the Group, this will be part of an integrated package of tools to optimise the performance of water supply and sanitation systems.

As indicated above, the Group has now reached a stage where it has successfully developed a number of tools to service the identified needs and address the constraints. Although some of these tools are in process of promotion and implementation, such a process should be intensified. The next stage is to consider the application of the tools in the context of servicing the key issues highlighted above. The Group is now conducting a decentralization process which will enable different region or country based implementation of operation and maintenance activities.

5. CONCLUSIONS

- a) The operation and Maintenance Working Group operates under the following general principles:
- The provision of water and sanitation services requires a service orientated attitude by the agencies involved. To ensure long term sustainability, water conservation and environmental protection, water supply and sanitation services should be managed on a financially sound and cost effective basis subject to effective legal and regulatory controls.
 - The water supply and sanitation services should be based on the principle of effective demand which can be defined as the standard of service that the users are willing to maintain, operate and finance to ensure adequate public health standards. The effective demand has to satisfy the priorities of the community at large.
 - The governments should be encouraged to devolve the responsibility for the water supply and sanitation services to the cities, towns and communities. The responsible agencies will be autonomous from government but manage the system under technical, financial and administrative guidelines set by national governments. The agency will be transparent and fully accountable to its consumers.
 - Sanitation is recognized as an undervalued item in the sector and emphasis is required for sanitation development and for forging closer links between water supply and environmental sanitation (solid and liquid waste management) in the planning of new programmes. Urban sanitation is a major issue, specially taking into account problems such as high population density, lack of sufficient water supply, lack of health and hygiene education and the impact on health from lack of adequate sanitation.
 - The basic needs of the disadvantaged segments of the population should be taken into consideration in the implementation of the above recommendations. Agencies may be required to provide service at lifeline tariffs for such groups or institute temporary subsidies to promote public health and economic development.
- b) The Operation and Maintenance Working Group is now ready to disseminate its tools and to provide support to External Support Agencies and national institutions for their implementation.

WORKING GROUP SESSION:

**ISSUES AND CONSTRAINTS TO
OPERATION AND MAINTENANCE**

GROUP 1

UTILITY COMPANIES (WATER SEWERAGE)

W Shawa
 TI Banda
 LS Niipare
 C Ngainayo
 KA Selotlegeng
 J Hueb

CON- STRAINTS	ENVIRON- MENTAL ISSUES	COMMER- CIALI- SATION V/S PRIVATI- SATION	EFFEC- TIVENESS AND EFFI- CIENCY	URBAN	
Lack of legal framework for commercial and corporate	EIA (Planning Stage)	Political commitment and government good will	Sound corporate policy on O & M	SEWE- RAGE AND WASTE DISPOSAL	ON-SITE SANITA- TION
Inability to pay by low income groups	Integrated water resources management	Develop-ment local capacity of the private sector	High level of UFW	Treatment of industrial waste	Determine responsibility for on-site sanitation
Inadequate water resources	Chemical contamination of water sources	Encourage out-sourcing	Develop-ment of MIS	Treatment of Waste Water	Selection of appropriate technology
Lack of enforce-ment of trade-effluent laws	Protection of water sources	Balance to be defined case by case basis (Models)	Manage-ment Training	Monitoring of effluents	Maintenan- ce of on-site
Political interfe-rence in tariff settings	Enforce-ment of Trade Effluent Laws	Autonomy	Sound cost recovery systems	Waste Water Re-use	Affordability for same

Non-payment of Government bills		Address tariffs for low income groups	Preventative maintenance systems		Sludge disposal
Lack of local capacity of the private sector		Legal framework	Availability and supply of spares		Demand creation for on-site sanitation
Unfavourable loan (ext) agreements		Ability and willingness to pay	Equipment and instrumentation problems (High Technology)		Health and Hygiene education
Lack of cooperation by customer on water conservation		Tariff based on full recovery of costs	Level of management (Community orientated)		
Poor marketing strategies			Drinking water Quality control	Balance Internal and external loans	
Customer interface problems			Service levels	Management audit	
Dependence on Government Subsidy			Regularity of supply	Efficient use of water	
Dependence on ESA's			Cost of treatment		
			Cost/difficult of O&M		

GROUP 2

MANAGEMENT PROCESSES, INSTITUTIONAL STRUCTURES AND INTERMINISTERIAL CO-OPERATION

Thomas Chiramba
 Ghebremicael Temnewo
 N Taleyana
 OM Serumola
 OM Chanda
 S Wragge
 Christian Nels

OPERATION AND MAINTENANCE OF WATER SUPPLY AND SANITATION IN BOTSWANA

INTRODUCTION	STATUS OF O&M	INSTITUTIONAL ARRANGEMENTS	FINANCIAL ASPECTS	PERFORMANCE AND CONSTRAINTS	ENVIRONMENTAL ASPECTS	HUMAN RESOURCES DEVELOPMENT	FUTURE ISSUES
Population: 1.3 million Area: 58 1730 km ²	Piped water supply: 6 towns 17 major villages 475 rural villages out of 499	Ministry of mineral resources and water affairs: Overall responsibility for water policy	Pricing policy based on: Equity Affordability Efficiency	Water quality	Pollution of ground water resources due to insufficient waste management	Training: Inhouse: artisans University: Technical and professional MTTC: Artisans	Need for a national sanitation master plan

<p>GNP pc: US\$ 2790</p> <p>GDP: US\$ 3 500 million</p> <p>Mining: 32.1 % GDP 76.3 % export revenue</p>	<p>Sanitation facilities:</p> <p>Urban: Activated sludge plant Oxidation ponds Septic tanks VIP latrines Trickling filters</p> <p>Rural: VIP Septic tanks</p>	<p>Department of Water Affairs: Overall planning, co-ordination, regulation for all primary water resources development</p>	<p>Cost Recovery: Urban/Towns: 100 % O&M Capital Major villages: 60 % of O&M Rural villages: 10 % of O&M</p>	<p>Water supply systems reliability</p>	<p>Sources of pollution Pit-latrines contamination Indiscriminate dumping of waste Bad quality effluents from municipalities</p>	<p>Localisation: High in DWA/WUC Low in district council</p>	<p>Decentralisation of O & M/management of water supply and sanitation schemes</p>
<p>Water supply coverage: BOTSWANA 77 % AFRICA 44 %</p>	<p>Most rural water supply schemes fall short of supply before the end of the design period</p>	<p>Department of Geological Survey: Hydrogeological investigations Protection and monitoring of groundwater resources</p>	<p>Water tariffs: Urban: tariff should reflect investment and O & M costs Rural: tariff should gradually recover 100 % of O&M costs</p>	<p>Unaccounted for water</p>	<p>Environmental protection: Formulation of guidelines Trade waste effluents agreement Formulation of enforcement legislations Waste water re-use</p>		<p>Pursuit of cost recovery efforts</p>

Sanitation coverage: BOTSWANA 55 % AFRICA 38 %	Sanitation O&M inadequate maintenance due to scattered responsibilities	Water utilities Co-operation: Urban Water Supply (6 towns)		Cost recovery			Clarification of sanitation responsibilities
	Break-downs: Response time: Urban/Major villages: < 1 day Rural villages = 2 days	Ministry of Local Government and Lands and Housing: Financial and technical assistance to local authorities for rural water supplies and sanitation projects		Constraints due to unclear responsibilities for sanitation			More commercialisation

	Technology: Urban: electrical motors Rural: diesel engines solar power RO desalination plants	Urban Councils: on-site sanitation Refuse collection O&M of water-borne sewerage systems					Improvement of management information system in rural water schemes
		District councils: O&M rural water and sanitation					
		National conservation strategy- agency: co-ordination of environmen- tal protection activities related to drought control, overgrazing Desertifica- tion and waste management					

		Ministry of Health: Enforcement of public health act. Water Quality monitoring					
		Community Involvement: Community participation important because of: Primary Health Care, sense of responsibility, and ownership in water sector and sanitation schemes					

		Management Tools: Urban: management information systems (MIS)- (computerisation) To assist in operational, billing and engineering management					
		Private sector: Supply of water equipment Construction of schemes Repair works/service contracts					

		Co-ordination: Interministerial water and sanitation committee co-ordinated water and sanitation matters at national level Co-ordination mechanisms weak					
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- O & M is ultimately the responsibility of the "owner" of the scheme
- Ownership as close as possible/feasible to the beneficiaries

DIFFERENT "OWNERSHIP SCHEMES" FOR DIFFERENT AREAS REQUEST DIFFERENT STRUCTURES

- **Urban Areas:**
Municipality/Local Authority (Water Utility or Agent)
- **Regional Areas:**
Associations of Municipality
Governmental Bodies
Utilities
- **Rural Areas:**
Community management
General training by local authorities
Specific Training by central Government to local authorities

DIFFERENT "OWNERSHIP SCHEMES" FOR DIFFERENT AREAS REQUEST DIFFERENT SUPPORT/CONTROL:

- Initial financial support from Central Government
- Diminishing subsidy for O & M from central Government
- An appointed Institution by Central Government to develop standards and monitor performance of O & M
- Clear Reporting Mechanism
- Develop clear scheme of service for central and local authorities on central level
- Central Government to assist in purchasing materials

CONSTRAINTS AND PROBLEMS

INTERMINISTE- RIAL CO-OPERATION	INSTITUTIONAL STRUCTURES	MANAGEMENT PROCESSES	
Inadequate co- ordination and co- operation among actors	Inadequate organisational structures	Insufficient financial management skills	Insufficient awareness in managerial level

Collaboration among regions/sub regions	Inadequate private sector involvement	Not enough technical expertise	Unclear responsibilities
Inadequate Government support to WSS institutions	Insufficient community ownership	Skilled personnel not in place in management	Inadequate billing and collection policies
High government bureaucracy		Inadequate management information systems	Inadequate O&M policy/strategy
Multiplicity of organisation		Insufficient information	Inadequate monitoring of performance
Structural changes needed for instituting systematic O&M		Unclear scheme of service	Inappropriate placement of skilled manpower
Centralised Dep. Unable to manage O&M activities countrywide			
Inadequate legal framework to support WSS institutions			

GROUP 3

TECHNOLOGY

Presenter: John Nangulu

CONSTRAINTS

TECHNICAL		INSTITUTIONAL AND SOCIAL		FINANCIAL
Incorrect system design	Influenced Technology	Cultural Barriers	User unfriendly technology	Rural areas not attractive to private investors
	Lack of information to guide technology choice		Political interference in technology choice	Inadequate investment in water supply and sanitation in Rural Areas
	Inadequate local participation in choice of technology		Failure of some technologies to ensure environmental safety	Government policies that discourage private investment
Very length purchase lead time of spare parts	Non-availability of spares locally		Corrupt influenced decisions	Investment into O&M as against capital expansion lopsided (Budgeting)
	Non-standardization		No adequate preparation of users for O&M	Non-availability of spare parts due to financial unattractiveness, for local dealers
Constant change in technology	Quality deficiencies	Suspect ownership	Imposed ownership	high investment cost eg. solar pumps

Lack of O & M manuals	Inadequate training in the technology		Women not yet fully regarded as target group for O &M	
			Waste is not yet regarded as a problem	

POSSIBLE SOLUTIONS

TECHNICAL	INSTITUTIONAL AND SOCIAL	FINANCIAL
Limiting models	Consultation with users a must	Improved revenue collection
Creating a regional data bank of quality and durability of plant/equipment etc.	Politicians to be made aware of consequences	Increased user participation in funding of projects
Local participation in choice of technology a must	Carry out EIA's before start of project (Planning stage)	Government to review policies to encourage private investors
Appropriate training	Transparency in choice of technology	Sensitise authorities for O & M needs
Guaranteed spares back-up for an agreed period	Educate users	
Keeping in tune with changing technology	Gender balanced participation	

GROUP 4

HUMAN RESOURCE DEVELOPMENT

Presenter: Patricia Geraghty

- Education Strategy
- Training Strategy:
 - Trained local trainers
- Long term
- Training programme
- CMBT:
 - Job description: Tasks: Units of competence
- National
- Effective MIS

- Exchange of knowledge
- Benefit from foreign experience
- Ensure effective "experts"

- Availability of trainable staff
- Actual numbers of trained people available
- Literacy/Numeracy
- Languages : Limited technology skills
- Lack of trainers : Lack of practical training
- Lack of training facilities : Assessment of training needs
- Recognition of certification : Lack of job descriptions
- Multi-skilling vs Single task : Training follow-up
- Performance appraisal

SOLUTIONS

- Privatisation
- Commercialisation
- Legal framework
- Community involvement ownership
- Standardisation
- Appropriate tariffs
- Effective \$ collection
- Effective billing
- Appropriate payment
- Job contracts for trainees

KEY PROBLEMS

			Political interference
			Lack of effective organization structure
			Budget constraints
	Recruitment into Public Service (MoLG)	Salary scales	
	Recruitment from other countries (pay/conditions)	Jobs for trained people?	
Willingness to be trained	Retention of staff	Loss of trained staff through resignations	
	Training capacity constraints - limit posts	Job structure allows use of new skills	

GROUP 4

O&M PERFORMANCE MONITORING

SOLUTIONS

THINK BIG, ACT SMALL, START NOW

Start				
Establish customer charter	Corporate plan and O&M strategy	Define realistic indicators	Consider cost effectiveness	Feedback to customer
Clear responsibility for O&M	Management process in place	Communication strategy in place		
Develop O&M Monitoring systems	Collecting/recording data	Processing data		
Redesign training	CBMT system			

KEY PROBLEMS

Lack of O&M personnel	Lack of existing data
Lack of performance indicators	Lack of strategic and/or corporate plans
	Lack of O&M strategy
Lack of O&M feedback	Staff/communication
Lack of O&M systems monitoring	Lack of data-basis
	Lack of recording system for O&M
	Expertise/skills

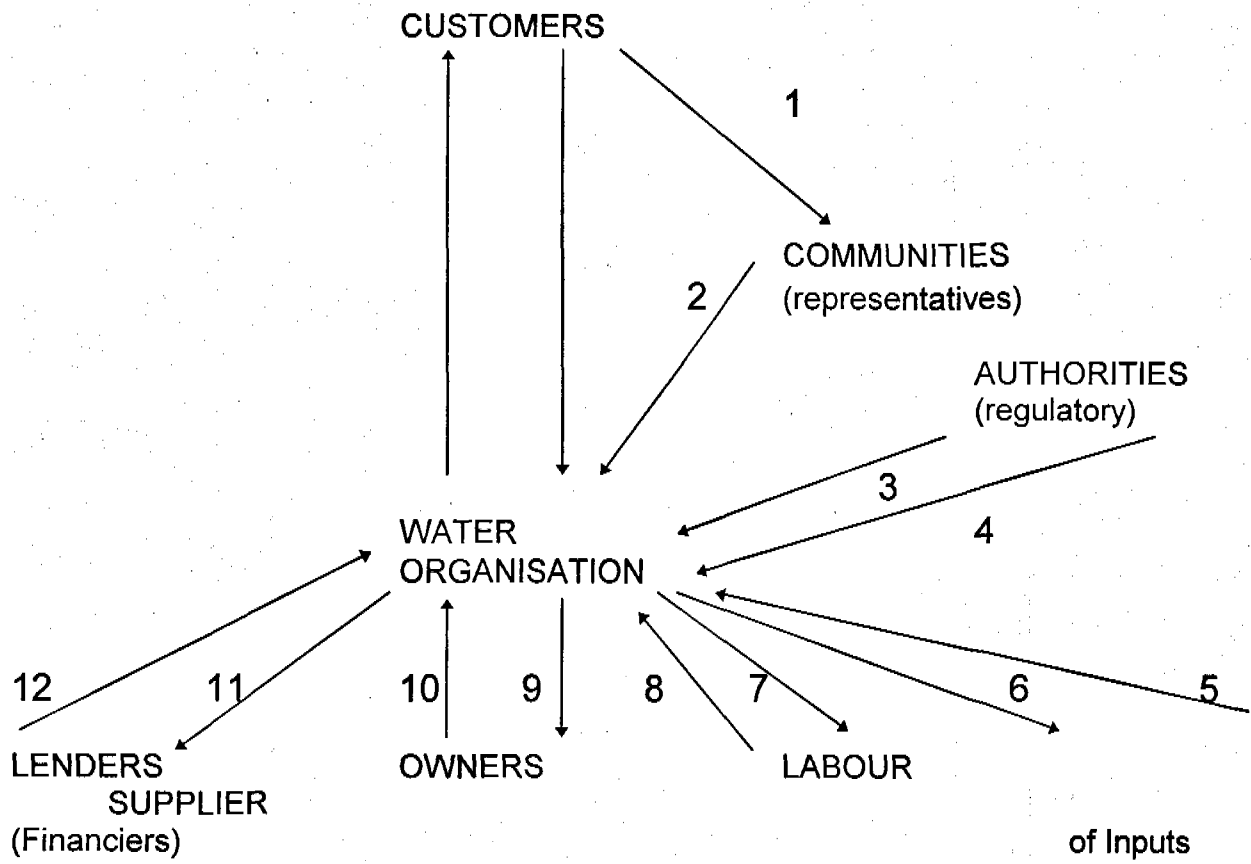
POSSIBLE INDICATORS

Repair time		Fees collected vs expenditures
Number of interventions/time	Production/consumption levels	Monthly budget variance
Infrastructure availability		% Revenue against billings
Water quality criteria	Effluent discharge criteria	% bad debt

Level of technical losses	Industrial discharge compliance	Direct costs of O&M
Staff Turnover		
% staff per 1 000 customers		Customer complaints/time
Trained staff available		Levels of water-related disease

GROUP 5

FINANCIAL SUSTAINABILITY, COST RECOVERY



- 1. complaints and demands
- 2. influence
- 3. takes, levies
- 4. regulations
- 5. goods and services
- 6. \$
- 7. \$
- 8. work
- 9. dividends, \$
- 10. assets, share capital
- 11. interests, \$
- 12. \$

ECONOMIC CONTEXT OF A WATER ORGANISATION

Capital-intensive	High working capital requirement	Services paid well after provision
Natural monopoly	Customer switching costly	
Mixture of high and low skilled labour force		
Very undifferentiated product		
Basic needs product	Customers = everybody	

	TARIFFS	
Cost Recovery	urban - rural cross subsidisation urban-peri-urban	"Social equity"
	customer subsidisation between categories (urban, industry, rural)	
	Progressive tariff structure	
	O&M training in rural areas ⇒ ↓ O&M costs	

EXTERNAL

Sources of Interference/ constraints	Form of interference	Consequences for financial sustainability	
Regulatory authority (framework)	delays in tariff adjustments	decrease in (net) revenues	
	patranage (reconnect customer X)	decrease in (net) revenues	
	inconsistant taxation system	decrease in (net) revenues	

	Public Service payment structure	inability to recruit and retain qualified staff	cost of errors of commission and commission
Legislation	Maintain mono-polistic environment		inadequate, capitalisation (owners)
Bureaucratic interference in procurement	undue in terference in tender process	inefficiencies	higher costs or lower output
Underdeve- loped capital markets/sys- tems		high prices low quality delayed delivery	
		higher cost of capital	delays in revenue creating investments

INTERNAL

1. Lack of effective revenue collection	2. Lack of effective costing systems	3. No responsibility accounting	4. High risks due to poor control environment
Delivery Payment Metering Billing WO WO	Why do we need it?	Why do we need it?	Why do we need good financial contract?
	To identify critical cost drivers	We want/need a consistent system of carrots and sticky	Lot of people which are potentially corruptible
	To cost your services	To measure and compare performance	Temptations to all sorts of fraudulent behaviour
	To get transparency (versus your customers)	To allow for entrepreneurial initiative	To enable the management to make sound and timely decisions
	To defend the price for the services	Facilitate more efficient allocation of resources	

**GENERIC GUIDELINES FOR AN
ACTION PLAN AND COUNTRY
LEVEL PROCESS**

GENERIC GUIDELINES FOR AN ACTION PLAN AND COUNTRY LEVEL PROCESS

The participants were asked to break down into working groups, the same as before to:

1. Develop guidelines for a generic action plan which could be used to develop country level action plans for O&M.
2. To outline a process to be applied at the country level to produce action plans.

The results of the group deliberation are given below:

GROUP 1

UTILITY COMPANIES

GOAL:

- To preserve and promote a clean environment that would facilitate O&M of Water Supply and Sanitation.

OBJECTIVES:

- To minimize and control surface/ground water pollution.
- To reduce O&M costs.

ACTIVITY

- Integrated water resources Management to be promoted
- EIA to be introduced at the Initial project planning stage.
- Protection of water sources to be promoted.
- Trade effluent Laws and requirements enforced.

GOAL:

- To establish commercially viable and sustainable utilities.

OBJECTIVES:

- Improve the level of service.
- To improve effectiveness and efficiency.

ACTIVITY:

- To establish and enhance political commitment and government support.
- To obtain and promote regulated autonomy for water utilities.
- To define the appropriate management options for commercially viable utilities.
- Establish tariff structures based on full cost recovery.
- Develop local capacity to ensure private sector involvement.

GOAL:

- Establish programmes aimed at the improvement of effectiveness and efficiency of utilities.

OBJECTIVES:

- Minimize overall cost in construction, operation and maintenance.
- Improve image of water utilities.
- Improve services

ACTIVITY:

- Ensure that sound corporate policies are established and in use.
- Establish and implement programmes to minimize UFW.
- Orient Management towards commercialization.
- Establish effective, corrective and preventive maintenance systems.
- Establish management Audit
- Develop MIS
- Promote efficient use of water.
- Formulate and implement:
 - service level standards
 - water quality standards
- Promote the need for regularity of supply

GOAL:

- Environmental pollution controlled through appropriate O&M of sewerage and waste disposal systems.

OBJECTIVES:

- Improvement of sewerage and waste disposal systems.

ACTIVITY:

- To promote effective treatment of Industrial waste.
- Improve O&M of Sewerage and waste disposal systems.
- Monitor efficient and enforce discharge standards.
- Promote waste water re-use according to adequate health standards.

GOAL:

To promote and implement appropriate Technology for on-site Sanitation.

OBJECTIVES:

Promote selection of Sustainable Appropriate Technology for on-site Sanitation in Peri-urban Areas.

ACTIVITY:

- Determine responsibility for construction, O&M for on-site sanitation.
- Promote health and hygiene education.
- Establish mechanisms for the selection of appropriate on-site sanitation Technology.
- Carry out an affordability analysis for on-site sanitation.
- Carry out Public awareness campaigns for on-site sanitation.

1

CIRCULATE THIS WORKSHOP
OUT TO NATIONAL STAKEHOLDERS

2

ESTABLISHMENT OF STEERING COMMITTEE

3

INTERMINISTERIAL
COLLABORATIVE COUNCIL
W&S COMMITTEE

W&S INSTITUTIONS

NATIONAL WORKSHOP

FOLLOW UP

GROUP 2

MANAGEMENT PROCESSES, INSTITUTIONAL STRUCTURES AND INTERMINISTERIAL CO-OPERATION

TO ENHANCE O&M THROUGH IMPROVED INTERMINISTERIAL COOPERATION, STREAMLINED INSTITUTIONAL STRUCTURES AND IMPROVED MANAGEMENT PROCESSES.

GOALS	OBJECTIVES	ACTIVITIES	RESPONSIBLE BODIES
To establish an efficient and effective interministerial co-ordination for O&M	To establish interministerial co-ordinating committee at national and Regional Level	Identify the key institutions contributing or involved in O&M	The lead Ministry to be identified
		Secure support/commitment at higher levels for the committees.	The lead local Authority to be identified
		Prepare guidelines on the roles and responsibilities of the committees.	
		Prepare and agree on communication links within committees.	
		Formalise meetings of the committee and follow-up actions	
A functional local/regional organisational structure for O&M put in place	Established/em-powered one unit at local level being responsible for managing O&M	Identify the O&M functions and their resource requirements	Regional Areas Association of municipality Government bodies and utilities
		Prepare organisational structure	Urban areas Municipality/Utilities
		Formulate scheme of service	

		Formulate job descriptions etc.	Rural areas: community management local authorities.
		Human Resource development	
To improve management decision making process	To develop a management information system	Carry out a survey on information deficiencies	Senior management of O&M Organisation
		Develop an information analysis tool	
		Establish an information flow channel	
		Create an information data base	
		Develop a feedback and follow-up mechanism	

ACTION PLAN:

IMPLEMENTATION STRATEGY:

- Lead ministry to carry-out some preparatory work
- Formulate guidelines
- Identify who is responsible at national level
- Agree on aims and objectives
- Identify and confirm the ministry or institution
- Committee to draft the TOR
- Workshop for senior managers in all key institutions
- Invitation by the Permanent Secretary

RESULTS:

- Establishment of the committee and framework
- Secretariat

IMPLEMENTATION STRATEGY:

- Sensitise management on the need an O&M organisation study to be carried out

Assumptions:

- In a situation where organisation realise inadequacy

Carry out the Organisation and Management study

Organisation itself

Engage consultant

Public service management department

Decision made on recommendations

RESULTS:

- Establishment of appropriate organisational structure and respective instruments
Implementation of new organisation

IMPLEMENTATION STRATEGY:

- Prepare TOR for the consultants
Study carried out by consultants

RESULTS:

- MIS in place

GROUP 3

TECHNOLOGY

OBJECTIVES:

1. Ensure application of appropriate technology
2. Ensure environmental protection
3. Ensure participation of women
4. Ensure generation of funds for O&M

GOAL:

- Contribute to sustainable WSS - service

OBJECTIVES:

1. Ensure application of appropriate technology
2. Ensure environmental protection
3. Ensure participation of women
4. Ensure generation of funds for O&M

ACTIVITY FOR OBJECTIVE 1.

- Form a regional body for data collection
 - Collection of data for existing technology
 - Collection of data on existing WSS - systems
 - Evaluation of O&M data and handover to decision makers
 - Develop appropriate training and education materials and perform training
-
- Hold consultative meetings with consumers for **OBJECTIVE 2**
 - Follow correct EIA procedures in planning stage
 - Enact and enforce water pollution regulations
 - Monitoring of environmental aspects regarding WSS-systems
 - Provide education and training on environmental aspects.

ACTIVITY FOR OBJECTIVE 3:

- Sensitise community on the need for gender equity
- Appoint women on regulatory functions for **OBJECTIVE 4**
- Sensitise water consumers on the need for revenue collection
- Introduce tariff systems for all WSS-service
- Enforce 100 % revenue collection
- Guarantee revenue income to cover O&M budget.

GROUP 4

HUMAN RESOURCE DEVELOPMENT O&M PERFORMANCE MONITORING

ACTION PLAN:

GAIN GOVERNMENT APPROVAL	GAIN STAKEHOLDER SUPPORT	ENDORSE POLICY DOCUMENT	DEVELOP ACTION PLANS	IMPLEMENTATION WITH STAKEHOLDER GROUPS
Country specific approach	National workshops	Specific country approach	Stakeholder workshops	As appropriate
	Regional workshops			
	Local workshops			
	Surveys			
	Advocacy			

OBJECTIVE:

- To establish an effective organisational structure for O&M on an national basis.

GOAL:

(common to 1, 2, 3)

An effective human resources development and performance monitoring system in place for O&M.

ACTIVITY:

- Start!
- Develop and implement an effective organisational structure
- Responsible agency: Top level internal management responsibilities
 - pay and benefits
 - job descriptions
 - job appointments
 - career structure

OBJECTIVE:

- To develop and implement an effective Training Strategy for O&M on a national basis.

GOAL:

An effective human resources development and performance monitoring system in place for O&M.

ACTIVITY:

- Start!
- Define an agreed national Training Policy
- Responsible agency: Government

- Assess training needs against job description
- Responsible agency: within organisations
- Implement training using CBMT approach
- Establish systems of assessing individual up to organisational level performance.

OBJECTIVE:

To develop a system of monitoring of evaluating operational performance for O&M.

GOAL:

An effective human resources development and performance monitoring system in place for O&M.

ACTIVITY:

- Start - collecting operational data etc.
- Establish customer charter
- Responsible agency:
 - Within organisation

- Develop corporate plan/O&M strategy
- Define management responsibilities and processes
- Develop O&M monitoring systems.

GROUP 5

PRIORITY ISSUES:

Scarcity of capital	Poor revenue management	Tariff calculation and billing and collection	Monopolistic inefficiencies inherent in legislation
		need for comprehensive tariff study	Government intervention

GOAL:

To achieve financial sustainability in water services including capital replacement and extension of services

OBJECTIVE:

- Establish proper regulatory framework

ACTIVITY:

- Elaborate various options of regulatory frameworks
- Initiate wide national debate on regulatory requirements
- Facilitate drafting of acts and regulations
- Enforce new legislation
- Monitor enforcement and effectiveness of new acts and legislations

organise courses on reg. Requirements

Ex: courses on forms of pr. Sect. Part.

OBJECTIVE:

- Establish a tariff-setting framework.

ACTIVITY:

- Calculate costs for different water supply operations
- Evaluate ability and willingness to pay for different target groups
- quantify and make transparent any X-subsidies.

Ex: specify development Levy

OBJECTIVE:

- Improve revenue management

ACTIVITY:

- Initiate national campaign on payment culture
- introduce computerised billing systems.
- Increase meter coverage.
- Facilitate payment procedures
- Link delivery of services to payment record.

OBJECTIVE:

- Community involvement in O&M

ACTIVITY:

- Involve communities from planning to implementation stage.
- Provide basic accounting training to communities
- Provide mechanism for financial control and monitoring to help in efficient and effective use of financial resources.

OBJECTIVE:

Achieve access to short and long term funds.

ACTION PLAN:

How to start the process?

1. Convince management of the Corp. about the necessity for establishing regulatory framework.
2. Prepare a Management paper for the board.
3. Board to prepare a proposal and convince Ministry to provoke debate.

CLOSING REMARKS

CLOSING REMARKS

Presented by Martin Shikongo, Head of Technical Division, Ministry of Local Government and Housing.

Mr Chairman,

Ladies and Gentlemen

I have the honour to close this Regional Meeting on Sustainable Operation and Maintenance of Water Supply, Sanitation and Waste Management Systems.

Allow me to make a few general remarks on the topic from my experiences as the head of Technical Services in the Ministry of Regional and Local Government and Housing.

I am sure that all of you go back home very enthusiastically and start trying to implement new action plans. I want to encourage you to be very courageous. At the same time, keep in mind a few things:

1. OLD HABITS ARE DIFFICULT TO CHANGE.

With all the best arguments in the world, some people will still refuse to change. So better prepare for that.

2. THINK IN PROCESSES

A very intelligent process of change management has to be initiated, which takes note of the difficulties and provides alternatives. Our change management process must also allow us to keep things operating at the same time.

3. MAINTAIN GOOD HUMAN RELATIONS

More often than once, you get stuck in a situation, where you don't fight over arguments but over persons.

4. BE PREPARED TO WALK IN CIRCLES

To change things takes time and not always happens in a rational and continuous way. You have to be prepared to go back a few steps and try all over again with a different approach.

5. ACCEPT THE NEED OF POLITICIANS

Politicians might sometimes intervene with our plans, but we can't simply shoot them to the moon so at some point in time we have to accept that we might have to go along with the second best solution rather than striving for the best.

6. SEE YOUR LIMITS

We cannot plan everything because our influence and funds are limited. I however found that sometimes mere luck or a favourable coincidence is on your side and helps more than any argument could.

Ladies and Gentlemen, I am particularly pleased that colleagues from our neighbouring countries participated in the meeting. The Ministry of Regional and Local Government and Housing has learnt immensely from your experiences. All our new town clerks received training in Botswana. Zimbabwe taught us a lot about community based water and sanitation management. Zambia's experiences with its utility company is highly interesting to us. Uganda is the shining example for the successful implementation of decentralisation.

We want to continue this close inter-regional co-operation.

I would like to congratulate you on the work done. From what I have seen at the boards, discussions have been very focused and detailed. I am personally very interested to discuss your findings and recommendations with our advisors from the GTZ.

Ladies and gentlemen, I hope you enjoyed your stay in Namibia. I hope that some of you take the opportunity to stay on a few days to see more of our beautiful country.

A last word of thanks to GTZ, Mr Menche, Abraham Nehemia who organised this meeting so well and to Mr Jose Hueb of the WHO for their support.

Again, thank you and do have a safe journey back home and stay in touch.

PROGRAMME

REGIONAL MEETING ON SUSTAINABLE OPERATION AND MAINTENANCE OF WATER SUPPLY, SANITATION AND WASTE MANAGEMENT SYSTEMS

PROGRAMME

MONDAY, 19 MAY 1997

- 08:30 - 09:00 Registration
- 09:00 - 09:30 Opening session
- 09:30 - 10:00 Coffee/Tea break
- 10:00 - 10:45 Namibia's experience in operation and maintenance
- 10:45 - 12:30 Overview on the Operation and Maintenance Working Group of the Water Supply and Sanitation Collaborative Council
- 12:30 - 14:00 Lunch
- 14:00 - 15:00 Consolidated paper on the status of operation and maintenance in the Region based on information from projects
- 15:00 - 15:30 Coffee/Tea break
- 15:30 - 16:45 Plenary session
- 16:45 - 17:00 Establishment of working groups

TUESDAY, 20 MAY 1997

- 08:30 - 12:30 Working group sessions on issues and constraints affecting O & M performance (5 groups)
- 12:30 - 14:00 Lunch
- 14:00 - 17:00 Plenary session: report on the findings of the working groups
- 18:00 - 20:00 Cocktail party

WEDNESDAY, 21 MAY 1997

- 08:30 - 11:00 Working group session: formulation of generic guidelines for preparations of action plans
- 11:00 - 12:30 Plenary session: report on the findings of the working groups and recommendations
- 12:30 - 14:00 Lunch
- 14:00 - 15:30 Discussion and tools and instruments
- 15:30 - 16:00 Coffee/Tea break
- 16:00 - 16:30 Next steps
- 16:30 - 16:45 Discussion on the next meeting
- 16:45 - 17:00 Closure

THURSDAY, 22 MAY 1997

- 09:00 - 12:00 Meeting of GTZ AMA's
- 14:00 - 17:00 Field trip to sewerage reclamation plant (If enough interest)

LIST OF PARTICIPANTS

LIST OF PARTICIPANTS

ANNEX 2

GTZ REGIONAL MEETING

19 - 22 MAY 1997

NAME	ORGANISATION	ADDRESS	FAX	TEL
Marysia Avis	GTZ - CAWS	Private Bag 13193 WINDHOEK NAMIBIA	264-61-213779	264-61-2963064 264-61-2963237
Tenthani Israel Banda	Lusaka Water and Sewerage Co.	Box 50198 LUSAKA	260-1-252578	260-1-251571
Hannes Buckle	Windhoek Municipality NAMIBIA	PO Box 59 WINDHOEK NAMIBIA	264-61-2902006	264-61-2902097
Osward M Chanda	Water Sector Development Group	P/Bag RW291X LUSAKA ZAMBIA	260-1-226904 E-Mail: wsdg@Zamnet.zm	260-1-238438 260-1-226941/2
Thomas Chiramba	GTZ/SWAM	Box 1425 OSHAKATI	264-6751-20589	264-6751-20575
Ian Fraser	World Plumbing Council	100 Farnham Road Lynnwood Manor PRETORIA 0081 SOUTH AFRICA	27-12-8037801	27-12-8037601

NAME	ORGANISATION	ADDRESS	FAX	TEL
Richard Fry	DWA Under Secretary	Private Bag 13193 WINDHOEK NAMIBIA	264-61-232574	264-61-2963065
Patricia Geraghty	WRD Eritrea	PO Box 1488 ASMARA ERITREA	291-1-124625	291-1-120355
Matty Hauuanga	Department of Water Affairs	Private Bag 13193 WINDHOEK NAMIBIA	264-61-230133	264-61-2963128
Dave Hojem	GTZ - Botswana Waste Management	P/Bag X12 GABORONE BOTSWANA	267-309953	267-309953
JA Hueb	World Health Organization	1211 Geneve 27 Geneva SWITZERLAND	00-4122-7910746	00-4122-7913553
Arthur Klauck	GTZ/WRD Eritrea	Asmara - Eritrea Avior Diaz Road House no. 6	00-291-1-126478	00-291-1-126515
Sabine Kruse	GTZ - Planning unit Ministry of Mineral Resources and Water Affairs	Private Bag X12 GABORONE BOTSWANA	267-374380	267-374380

NAME	ORGANISATION	ADDRESS	FAX	TEL
Helmut Lang	GTZ - RWS	34 Baines Avenue No. 12 Hampton Court HARARE ZIMBABWE	263-4-722752 Phone and Fax	263-4-737816
Zacharia Lukashi	Lusaka Water and Sewerage Co. Ltd	Box 50198 LUSAKA ZAMBIA	260-1-252578	00-260-1 233546/7
Nevert T Manjonjori	GTZ/RWS	Kurima House 6 th floor, 89 Baker Avenue PO Box 2406 HARARE ZIMBABWE	263-4-722752 Fax and phone	263-4-737861
Philemon Mashoko	Department of Water ZIMBABWE	PWE's Office Po Box 04715 Causeway HARARE ZIMBABWE	263-4-722752	263-4-738781
Harry McPherson	GTZ - CAWS	Private Bag 13193 WINDHOEK NAMIBIA	264-61-213779	264-61-2963064

NAME	ORGANISATION	ADDRESS	FAX	TEL
Peter Menche	GTZ-HQ, Division 414	Postfach 5180 65726 ESCHBORN GERMANY	0049-6196-79-6105	0049-6196-791260
Mushamba Paul JM	Department of Energy	P/Bag 7758 Causeway HARARE	263-4-791760	263-4-733095
John Nangulu	NWSC - National Water Sewerage Co- operation	PO Box 7053 Kampala UGANDA	256-41-258299	256-41-235377
Abraham Nehemia	GTZ CAWS	P/Bag 13193 WINDHOEK NAMIBIA	00-264-61-213779	00-264-61-2963072
Christian Nels	National Conservation Strategy Agency Waste Management Division	Private Bag 0068 GABORONE BOTSWANA	00-267-309953 Fax and Phone E-Mail: gtz- wmp@info.bw	
CM Ngainayo	East Kilimanjaro Water Supply Project/Kiliwater Co. Ltd	PO Box 244 MKVV/ROMBO TANZANIA	c/o GTZ office Dar-Es-Salaam 00-255-51-115901 Phone and Fax	00-255-51-116504 Phone and Fax

NAME	ORGANISATION	ADDRESS	FAX	TEL
Mike O'Leary	Lusaka Water and Sewerage Company (Ltd)	PO Box 50198 LUSAKA ZAMBIA	260-1-252578	260-1-250667
Jackson Opwonya	National Water and Sewerage Corporation	PO Box 7053 Kampala UGANDA	256-41-258299	256-41-256762
Tony Richards	GTZ ZAMBIA	P/Bag RW37X RIDGEWAY LUSAKA ZAMBIA	00-260-1-291946	00-260-1-291918 00-260-1-291919 00-260-1-291920 E-Mail: gtzpas@zamnet.zm
Thomas Schild	GTZ-Swam	PO Box 1425 OSHAKATI NAMIBIA	264-6751-20589	264-6751-20575
KA Selotlegeng	National Conservation Strategy Co-ordination Agency	P/Bag 0068 GABORONE BOTSWANA	00-267-309953	00-267-302050 00-267-309953
OM Serumola	Department of Water Affairs GABORONE	P/Bag 0029 GABORONE BOTSWANA	267-303508	267-3607173
Willie Shawa	Lusaka Water and Sewerage Co.	Box 50198 LUSAKA	260-1-252578	260-1-250667

NAME	ORGANISATION	ADDRESS	FAX	TEL
Volker Stehle	Department of Water Affairs, Namibia	P/Bag 13193 WINDHOEK NAMIBIA	264-61-230133	264-61-2963126
N Taleyana	Department of Water Affairs	P/Bag 0029 GABORONE BOTSWANA	00-267-303508	00-267-301981
Ghebremicael Temnewo	Water Resources Department Eritrea	PO Box 1488 ASMARA ERITREA	291-1-124625	291-1-120355
SM Wragge	GTZ WMP BOTSWANA	P/Bag X12 GABORONE BOTSWANA	267-309953	267-309953

**WORKING GROUP
DISCUSSION TOPICS**

WORKING GROUP DISCUSSION TOPICS

1. UTILITY COMPANIES

- Constraints/applicability
- Commercialisation/privatisation/how far to go/involvement of private sector/outsourcing
- Effectiveness and efficiency
- Cost effectiveness
- Environmental issues
- Social conscience/private versus public good
- Regulation
- Customer focus
- Models for utility companies
- Political interference/autonomy
- Legal frameworks/performance agreements
- Urban/urban sanitation and waste disposal

2. MANAGEMENT PROCESSES, INSTITUTIONAL STRUCTURES AND INTERMINISTERIAL CO-OPERATION

Constraints and problems
Decentralisation/centralisation
Appropriate government structures
Community management/roles of government and communities
Management models
Ministerial responsibilities and overlaps
Integrated water sanitation and waste management
Ministerial responsibilities and overlaps
Integrated water sanitation and waste management
MIS systems

3. TECHNOLOGY

Constraints to use of technology
Selection of appropriate technology
Social issues and user acceptability
Perceptions of technology
Local availability and share parts
Political aspects
Low cost versus appropriate technology
Environmental aspects
Long term versus short term costs

Standardisation
Sustainability of technology
Outsourcing
Ownership

4. HUMAN RESOURCE DEVELOPMENT AND O&M PERFORMANCE MONITORING

Constraints and problems
Personnel issues/career paths
Personnel needs for O&M
Training needs/service providers
Monitoring models
Performance indicators for personnel
Performance indicators for water supply, sanitation and waste management systems

5. FINANCIAL SUSTAINABILITY/COST RECOVERY

Constraints
Tariffing
Income generation
Subsidisation
Social equity
Ownership
Financial Management Systems
Socio-cultural issues