10TH ITN AFRICA CONFERENCE '98

30th November - 3rd December 1998
KCCT Conference Centre, Mbagathi
Nairobi, Kenya

Water and Environmental Sanitation in Low Income Urban Areas

Supported by
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10th ITN Africa Conference, 30th November-3rd December 1998, Nairobi, Kenya,

Water and Environmental Sanitation in Low Income Urban Areas

CONFERENCE PRE-PRINTS

Overall Objective

- **Increased access to sustainable water and environmental sanitation services for low income urban areas.**

Specific Objectives

- ✔ Create awareness and advocacy on the challenges faced in the provision of sustainable water and environmental sanitation services (WESS) in low income areas
- ✔ Share experiences on options for increasing access to sustainable WESS in low income areas
- ✔ Examine the policy and legal framework for WESS provision in low income urban areas
- ✔ Map out strategies on the way forward for sustainable WESS
- ✔ Enhance coordination and networking.

Expected Outputs

- ✔ Awareness creation on the challenges and options for increasing sustainable WESS in low income urban areas.
- ✔ Proposed options for increasing access to sustainable WES in low income urban areas.
- ✔ Proposed guidelines on policy and legal framework for provision of WESS in low income urban areas.
- ✔ Proposed strategies and action plan on the way forward.

Guide to Papers

PAPERS FOR PRESENTATION

SPEECH DELIVERED BY THE MINISTER FOR LOCAL AUTHORITIES PROF. SAM ONGERI, EGH EBS, MP, AT THE OPENING OF THE 10TH ITN AFRICA CONFERENCE NAIROBI, KCCT, 30TH NOVEMBER TO 3RD DECEMBER 1998.

Mr. Chairman,

Distinguished Guests,

Ladies and Gentlemen,

On behalf of the Kenya Government and on my own behalf, I wish to welcome you all especially those who have come to Kenya for the first time. Please feel at home and Karibuni Sana.

I am pleased to be here with you today during the opening of this important Conference. I have been informed that the Conference has brought together approximately 150 professionals working in the Water and Sanitation sector from all over Africa and from external support agencies to share experiences. Credit goes to the ITN Africa Centre which have organised this Conference and to NETWAS in particular for hosting it.

The ITN Africa network has been organising this annual event for a number of years now on a rotational basis. Kenya is honoured to have been chosen to host the 10th ITN Africa Conference. The operations of the ITN Africa include among others networking and information dissemination, capacity building for human resource development, promotion of appropriate technologies, applied

research, advocacy and advisory services and learning. These are important services which supplement the efforts of African governments to achieve an accelerated provision of services especially for the urban poor. It is important to emphasize the need to recognize the role of various actors and to promote lasting partnerships in the provision of these services in order to avoid duplication and wastage of resources.

The theme of this Conference *Water and Environmental Sanitation in Low Income Urban* Areas – is pertinent to today's prevailing situation in many of our African countries which are faced with surmounting problems related to rapid urbanisation. The rate at which the urban population in our towns and cities is increasing exerts a lot of pressure in the provision of urban services, especially the expansion of infrastructure including housing, roads, and the provision of water and environmental sanitation services. The problem is further compounded by escalating inflation, declining levels of external assistance and at times lack of proper prioritisation in allocation of resources. It is a well-known fact that under such circumstances, those who bear the brunt side of the harsh urban environment are the poor.

In order to meet the emerging challenges, we are called upon to look for alternative and innovative approaches in tackling the many problems in the sector. The Kenya Government has recently launched a Policy paper which lays out the framework for the development of the sector in the immediate and long term future. The need to mobilize and to review the traditional form of centralised management by government is at the heart of the new policy. It is

important to recognise the roles which can be played jointly and in partnership with the various actors including communities, non-governmental organisations and the private sector in order to maximise the benefits which can be achieved and transferred to the recipients/users of the services.

In this regard, my Ministry is at the forefront of trying new innovative institutional arrangements and reforms in the management of water supply and sanitation services in urban areas of Kenya. In 1996 a policy was developed and adopted to commercialize and draw in the private sector in the management of urban water and sewerage projects in nine Municipalities. The Government decided to implement this project in phases commencing with a pilot phase in three municipalities of Nyeri, Eldoret and Kericho. The second phase will involve the expansion of this project in three more municipalities of Thika and Nakuru. The important elements in this project include the creation of lasting partnerships with the private sector in order to draw on their entrepreneurial skills to enhance the management of these urban services in a businesslike manner. This is expected to enhance the provision of services to the users more affordable especially for the low income and vulnerable groups.

You will note that my Ministry is taking a systematic approach aimed at learning and adapting to the lessons gained in this new institutional reform arrangement. This is important if we have to avoid pitfalls in the improvement of old and development of new approaches.

The need to enhance efficiency in management of urban services through privatisation brings about another dimension to the problem.

One of the major problems relates to provision of services based on equity and ability to pay. In this regard, it is important to protect the urban poor by ensuring that there are polices and strategies in place which consider carefully the people's ability to pay for services. As a first step, tariffs should be formulated in a way which ensures that the poor obtain the provision of basic services at an affordable price.

There are other management arrangements which are slowly evolving especially those related to supply of services to low income areas including unplanned settlement areas. These need to be studied and developed further in the light of other related policies with a view to ensuring provision of affordable services. It is my hope that this Conference will look into many of these issues and come up with recommendations which could form a suitable basis for further adaptation by various countries for the betterment of the provision of services for the urban poor.

Ladies and Gentlemen, I wish again to welcome you to Kenya. Kenya is a country endowed with many resources including world famous wildlife. We have many National parks and Game Reserves which is always the envy of many of our visitors who come to this country. I

wish to urge you to take this opportunity at the end of this Conference to visit some of these resources. The Nairobi National Park is just a few meters across the road. And while I would I not like to invite you to jump over the Park fence to enter it – lest you become supper for the lions – I would urge you to at least organise your time to pay a visit to the Park to have a close glimpse of our wildlife resources.

Ladies and Gentlemen, it is now my great pleasure to declare the 10th ITN Africa Conference officially open.

TENTH ITN AFRICA CONFERENCE

Nairobi . November 30, 1998.

INTRODUCTORY REMARKS:

THE CHALLENGE OF SERVICES FOR THE URBAN POOR.

Jean H. Doyen, Regional Manager
UNDP-World Bank Water and Sanitation Program Eastern and Southern Africa.

It is a an honor to address the opening session of the Tenth ITN Africa Conference. The UNDP-World Bank Water and Sanitation Program has a strong and long lasting partnership with the ITN and in our case, that is the Group serving Eastern and Southern Africa, with NETWAS and IWSD.

The ITN's represent a case of successful transition from donors supported projects to independent regional institutions. Our role has evolved from parent and midwife to privileged partners.

Our collaboration with NETWAS and IWSD is based on simple principles. First we seek to associate them in all of our regional activities. Second, we establish mutual expectations that are equal or higher than the ones applicable to other contractors.

We want the ITN's to succeed because we pursue the same goal; i.e. to help poor people obtain access to better water and sanitation, and because we believe that there is strong complementarity between us and them. While we focus on advisory services for policy development, investment planning and learning and evaluation, we see the ITN's as regional pivots for knowledge development and dissemination and for capacity building.

My remarks are organized as follows. I would like first to review the challenge raised by services to the urban poor and then review key issues suggested for your reflection.

Despite considerable efforts over the last twenty years, the **lack of access to clean water and to basic sanitation remains one of the important determinants of poverty in Africa**. If one considers Sub-Saharan Africa as a whole, coverage rates have improved slightly but not enough to compensate for the demographic growth. A smaller portion of a much larger population still has no access to water of an acceptable quality and in sufficient quantity. The sad reality therefore is that the absolute number of people unserved has increased and, if present trends persist their number will double between now and year 2020 from about 200 million to about 400 millions. The situation for sanitation is even worst with the number of unserved growing to 350 million at the horizon 2020.

The bulk of increase in the number of unserved people will occur in urban areas. Africa is the fastest urbanizing continent with urban growth rates between five and six percents. By 2020 urbanization will have reached 50% from the present overall average of about 35%. The extrapolation of current trends for urban areas suggest that the number of people without adequate water supply services will grow from 70 million at present to about 110 million in 2010 and more than 200 millions by 2020. These outcomes are unacceptable; more of the same will not do. We, as water and sanitation professionals, have therefore to **find ways of stepping up the pace at which the poor are gaining access to water and sanitation services.**

Most of the increase in urban population will be absorbed by informal settlements or peri-urban settlements or more simply slums. In large African cities, these settlements typically provide shelter to 40 to 60 percent of the population. In Nairobi they shelter 50% of the population on 5 percent of the total surface of developed urban land. Until very recently, these settlements were considered as marginal and transitory by many governments. Countries are now facing the fact that they are here to stay. Attempt to bulldoze them away have only resulted in their rapid reappearance under even worst conditions after untold sufferings and dislocations by the very poor.

Governments, city planners, politician and external support agencies recognize that it is in these settlements that the challenge of urban poverty and environmental degradation will have to be met. The focus on poverty reduction as the overarching goal of development policies has brought renewed interest on urban poverty. It is also clear that the general movement toward participatory form of governance should give the urban poor a growing voice. **Improving the living conditions of urban poor is a priority to be met here and now**. Surveys show that urban poor rank water and sanitation as the services they value most.

It is therefore very fitting for the ITN's to have organized a conference on water and sanitation services for the urban poor. This theme is the central challenge faced by their clients and their partners.

The mission of the ITN's is to build capacity. Capacity has to do with the ability to apply relevant knowledge and organization to solve problems.

What knowledge do we have to offer ? The answer is: not much.

Let me nevertheless summarize the few tenets that I have gathered.

The first proposition that I would like to offer is that city-wide water utilities are critical as institutional anchors; i.e. is a well performing water utility is a **condition necessary** for accelerating the provision of water services to low-income urban dwellers. Water utilities in Africa are however operating at low level of efficiency and have limited prospects to improve their performance unless they undergo broad institutional reforms to strengthen or establish their autonomy and to bring in the necessary managerial capacity. While the need for reform is widely recognized the degree of commitment varies greatly from country to country. Progress in water utility reform is central to the drive to improve services to urban poor and to address environmental issues in informal settlements.

While a solid water utility is necessary, it is however **not sufficient** to meet the challenge of serving to low-income urban dwellers. For water utilities, extending services to informal and peri-urban settlements presents considerable risks due to the uncertainly of land tenure, low incomes, difficulties in revenues, vandalism etc. Many countries are searching for solutions involving partnerships between the main service provider, i.e. the utility, private vendors, community organizations and NGO's. The Water Utility Partnership has launched an effort to develop replicable models for such partnerships.

The conceptual basis for tacking the problem of environmental sanitation in low-income settlements is not well established. Traditional solutions based on central sewerage networks have proven inadequate and out of reach. Recommended approaches put forward **strategic sanitation planning** involving a range of options corresponding to community and households demand and ability to sustain. This approach calls form combining the use of trunk systems with community initiatives.

The fourth and final points concerns sequencing: i.e. can water and sanitation services be provided sustainably and up to scale without addressing broader issues of land tenure and municipal taxation and governance. The pragmatic answer is that something is better than nothing. The capacity developed by low-income communities in taking part in the development of water and sanitation services may in fact facilitate their involvement in more complex issues like land tenure regularization.

A you can appreciate we have a lot more questions than answers when it comes to water and sanitation services to low-income urban dwellers.

In light of the above, I believe that the objectives of this conference are well chosen:

(i) create awareness and advocacy on the challenge of water and sanitation services to low-income urban areas;

(ii) share experience on options for services provision;

(iii) map out strategies; and,

(iv) enhance coordination and networking.

I understand that have given yourself the task of developing a plan of action. I would like to suggest that in doing so you consider the broad plan of action recently adopted by the Africa Chapter of the Water Supply and Sanitation Collaborative Council which met in Abidjan two weeks ago.

My second suggestion is that as part of this plan of action you look carefully at the role of the ITN's in developing and disseminating knowledge on water and sanitation for the urban poor. In a situation where there are many stakeholders and role players and where there is so much to do, it would be particularly useful to identify **strategic interventions that will leverage changes and provide guidance for the development of operational programs.**

Needless to say that my colleagues and I at the Regional Water and Sanitation Group look forward to the results of your conference and to our continuing partnership with the ITN's in implementing its recommendations.

Thank you.

Nairobi, November 30, 1998.

Remarks by
Executive Director of NETWAS International
Mr Matthew N. Kariuki
at the Opening of the 10th ITN Africa Conference
Nairobi, KCCT, 30th November 1998

The Chief Guest Minister for Local Authorities, Hon. Prof. Sam Ongeri, Distinguished Guests, Ladies and Gentlemen. I wish to welcome you all to the 10th ITN Africa Conference.

We have here before us approximately 150 conference delegates who have travelled from different countries of Africa (east, west, north and south). We also have with us representatives from external support agencies and representatives of external resource centres from Europe who many times are partners of and friends of the ITN Africa Network.

Some of you may wonder what the ITN stands for. ITN stands for International Training Network for Water and Waste Management. It was initiated as a global network in 1984-85 under the auspices of the UNDP-World Bank Water and Sanitation Program. Regional Centres were set up in Africa and Asia and it had been envisaged to set up similar centres in Latin America. Support for the setting up of the various centres in Africa was provided by bilateral donors which include Swiss Agency for Development and Cooperation (SDC), UNDP, DANIDA, NORAD, CIDA, GTZ, Irish Government and African National Governments.

I am proud to say that the host of this Conference *Network for Water and Sanitation International (NETWAS International)* was the first regional centre to be set up out of the global centres with assistance from SDC and GTZ. NETWAS was housed by the African Medical and Research Foundation (AMREF) for almost eight years (1986-1994) before it developed into an independent NGO in 1995.

The initial objectives for the global network were information dissemination and training on low cost technologies. The centres were conceived to be institutions which would grow to become "centres of excellence" in their own right becoming advocates for the development of the sector while developing strong networks and partnerships with the various actors in the water and sanitation sector. This vision continues to be the guiding principle even to this day.

However, the objectives of the ITN have evolved to respond to the growing demand to bridge the gaps in the development of the sector. Today, the ITNs are involved to various degrees in the development and dissemination of new approaches related to management of programmes/projects, policy development, advocacy, applied research, environmental management and sector reform in general. Thus, it is true that the ITN has outgrown the original noble objectives because it has to continue to be a growing network – and not a static one – a network that responds to the emerging demands of the sector.

The ITN Africa Network evolved out of the global network as far back as 1989 when three of the centres in Africa agreed to be organizing an annual meeting of its managers and key staff to share experience. This continued to be a strong and useful forum and ultimately developed into a strong informal network regulated by the African Centres. The ITN Africa Network was officially launched in 1997 by its five Founder members on the signing and adoption of its publication "Operation Guidelines". Founder Members of ITN Africa Network are NETWAS International(Nairobi, Kenya) CREPA(Ouagadougou, Burkina Faso), IWSD(Harare, Zimbabwe), TREND(Kumasi, Ghana) and NCWSTI(Sovenga, South Africa). Additional centres/organizations have continued to join the ITN Africa Network and currently there are 13 centres in Africa. New organizations have applied and will be considered for admission in the course of this week.

The ITN Africa Network is not a closed club. At its Manager's Meeting in Ouagadougou, Burkina Faso in 1994, the Network agreed to open its annual meetings to the general sector actors by organizing the annual meetings in form of conferences. These conferences like their predecessor (ITN Managers Meetings) were to be hosted by the various ITN Africa centres on a rotational basis. The centres would agree on an annual theme which was relevant to the sector and which would form a basis for discussion and debate to promote learning and information sharing.

This year's theme was agreed during the 9th Conference in Pretoria, South Africa. It was believed to be a subject that was very relevant to the current problems of urbanization in the African towns and cities – problems where there are no ready answers. These are issues that need to be debated, developed, piloted and scaled up as we continue to learn more of the possible solutions

The objectives of this conference are:

- Create awareness and advocacy on the challenges faced in the provision of sustainable water and environmental sanitation services (WESS) in low income areas
- Share experiences on options for increasing access to sustainable WESS in low income areas
- Examine the policy and legal framework for WESS provision in low income urban areas
- Map out strategies on the way forward for sustainable WESS
- Enhance coordination and networking.

We hope that this Conference will be a forum for sharing experiences and learning. We hope that by the end of the four days, we shall come up with a few recommendations to solve some of the current problems. We expect that we shall have reflected adequately to leave ourselves with enough food for thought to form the basis for further research to find lasting solutions to the problems of the "Water and Environmental Sanitation In Low Income Urban Areas".

The ITN Africa Network philosophy is to collaborate with various national and regional sector organizations. It encourages partnerships with international resource centres that provide the centres with external technical support when needed. We hope to continue this partnership in order to enhance optimization of resources.

Mr Chairman, Hon. Minister, Ladies and Gentlemen. The hosting of this Conference by NETWAS International would not have been possible without the support provided by various organizations which provided representatives from their own staff free of charge to work in partnership with the NETWAS staff. I wish to single out the representatives of the various organizations (Eng. Ephantus Kamau - Ministry of Local Authorities, Eng. Makuro and Ms Wanjiku Ndwaru -Nairobi City Council, Ms Rose Lidonde and Mr Bazille Musuba - RWSG-ESA, Mr Joseph Waithaka - Ministry of Health, Mr Wilfred Ndegwa - WHO, and finally the representative of NETWAS International Mr Patrick Nginya. This team put many hours in the preparation and the organization of this Conference and we owe its success so far to them.

This Conference has been financially supported by the Swiss Agency for Development and Cooperation (SDC). SDC has been a consistent supporter of the global ITN since its inception, and has continued to support directly two of the ITN Africa Centres, CREPA and NETWAS. On behalf of the ITN Africa network, I wish to pass special thanks to SDC.

I wish to thank all of you, the delegates from the various countries who have come all the way to attend this Conference. I wish to assure you that without your participation, this Conference would not have been realized.

Finally, I wish to thank you Hon. Minister, for taking time to join us here to officiate in the opening of this Conference. Your dedication to the success of this Conference as shown by your quick response at very short notice, is the pride of the organizers and, the host NETWAS International in particular.

Thank you Mr Chairman.

Jo S.

Africa Consultative Forum on Water Supply and Sanitation

Abidjan, Cote d'Ivoire 17-20 November 1998

By Matthew N. Kariuki, Executive Director, NETWAS International

A four day "Africa Consultative Forum on Water Supply and Sanitation" was held in Abidjan, Cote d'Ivoire on 17-20 November 1998. The more than 130 sector professionals to the Forum were drawn from most of the countries in Africa. They included professionals from government sector ministries, non-government organizations, the private sector and from the external support agencies working in the continent. The Forum was organised by the Water Supply and Sanitation Collaborative Council (WSSCC) and was hosted by the Government of Cote d'Ivoire.

The purpose of the Forum was to enhance collaboration among water and sanitation sector professionals and external support agencies, thus fostering solutions to sector problems. There were three specific objectives:-

- Agreement on a statement setting out the current water supply and sanitation situation in Africa. The "Africa Statement".
- Identification of priority actions to address water supply and sanitation issues in Africa at country and regional levels. The "Africa Action Programme".
- Development of priority programme areas for the Africa Chapter of the Water Supply and Sanitation Collaborative Council. The "Africa Chapter" — "WASAI = Water and Sanitation Africa Initiative".

The opening of the Forum was graced by the Prime Minister of Cote d'Ivoire and was closed by the Minster for Infrastructure, Cote d'Ivoire.

In preparation for the Forum, the Africa Working Group of WSSCC had undertaken a sector review covering most of the countries of Africa. The team had published 2-volume review document which was presented at the Forum for discussion. The Executive Summary in Volume I of the review listed key issues identified through analysis of the countries' information. On the basis of the analysis, a Draft Africa Statement had been prepared. The Africa Working Group in conjunction with the WSSCC Secretariat had also prepared the ground work for the setting up of the Africa Chapter.

NOTE:
Membership of the Water Supply and Sanitation Collaborative Council is open to all professionals working in the sector. Interested persons can fill the application form enclosed in the document package and submit the same to WSSCC at the address shown at the bottom of the form. Alternatively, they can forward the same to NETWAS International who will submit it to WSSCC.

The Forum reached consensus on the three specific objectives it had set itself to accomplish. The "Africa Statement" was prepared and recommended for dissemination to various governments and professionals in Africa as a document that provides the vision for the sector. The "Africa Action Programme" which ties closely to the Africa Statement was also finalised. Strategies and a programme for setting up the Africa Chapter of Water Supply and Sanitation Collaborative Council were developed and will be implemented before the end of 1999.

The full Africa Statement is attached herewith.

Africa Statement

Water and Sanitation Africa Initiative

Africa Consultative Forum, Abidjan, 17 – 20 November 1998

Preamble

In Africa today over half of the population is without access to safe drinking water and two-thirds lack a sanitary means of excreta disposal. It is a situation in which the poor are adversely affected to a disproportionate degree.

Lack of access to these most basic of services necessary to sustain life lies at the root of many of Africa's current health, environmental, social, economic and political problems. Hundreds of thousands of African children die annually from water and sanitation related diseases. There are severe problems of environmental degradation. For women and children, collecting water is physically stressful and time consuming and often results in children not being able to attend school.

Despite significant improvements during the International Drinking Water Supply and Sanitation Decade (1981 – 1990), progress has now stagnated. More people are today without adequate services in Africa than in 1990. In comparison with other regions, Africa in general has had a particularly difficult time in holding on to the gains of the past.

Although African development is said to be a growing priority among the donor community, Africa in fact receives less of its share of total international development assistance than a decade ago.

In this light, professionals working in the water supply and sanitation sector from all over Africa have come together to seek solutions to their continent's problems. They have undertaken an extensive review of the water supply and sanitation sector throughout the continent with the objective of establishing the extent of the problem, identifying its causes and finding the way forward.

We commend this statement to political and civic leadership of Africa to respond with urgent actions for promotion of water and sanitation services. Our vision is of an Africa in which all citizens have access to safe and affordable water and sanitation services in the shortest possible time.

Constraints to Progress

Current levels of access to safe water and sanitation services are unacceptable, and at the current pace of progress full coverage will never be achieved. Over the past few decades a number of constraints to progress have been identified:

- Institutions responsible for water and sanitation service delivery in most countries operate in an uncoordinated and inefficient way. The enabling environment and legislative framework are often inadequate. Poor institutional management results in low cost recovery leading to infrastructure falling into disrepair and further reducing the quality and level of service in both rural and urban areas.
- Sanitation and hygiene promotion are given very low priority in sector programming and the allocation of resources.
- Women and men use water and contribute to water management in different ways. The pivotal role of women and children as providers and custodians of water supply is not given sufficient recognition in institutional arrangements for water supply and sanitation services.
- Inadequate attention to the integration of Water Resources Management leads to sub optimal, inequitable and unsustainable use, and transboundary conflicts.
- Networking with key sectors (e.g. health & nutrition, education, environment) has not been given sufficient attention resulting in lost opportunity for synergy, information sharing and exchange of experiences
- Lack of reliable data and monitoring mechanisms have resulted in poor planning and inadequate and poorly targeted resource allocation
- The sector has not responded adequately to the problems of urbanisation, resulting in grossly inadequate services to residents of peri-urban areas and informal settlements.
- Insufficient preparedness for and response to emergency situations, resulting from civil conflict and natural disasters , have resulted in enormous suffering, disruption of household and community economies and degradation of the environment.

Guiding Principles

Basic Right –Access to safe and affordable drinking water supply and adequate sanitation is a basic right and therefore a responsibility for all governments, who have signed conventions enjoining them to take appropriate actions.

Decentralisation of Service Delivery– Government responsibility should devolve from provider of water supply and sanitation services to facilitator and regulator, while ensuring increased resource allocation to the sector. Responsibility for ownership and management of facilities should be at the lowest appropriate level, through the most effective arrangement.

Demand Responsive Approach – Water Supply and Sanitation service delivery should be based on demand responsive and participatory approaches.

Partnership – Governments need to create an enabling environment to facilitate service delivery with due involvement of all partners including the private sector and civil society organisations.

Cost Recovery–Cost recovery should underpin sector investment decisions and actions for sustained services delivery. Appropriate safety nets should however be put in place to protect the poorest of the poor, taking into consideration willingness and ability to pay.

Actions needed

To address the huge backlog of unserved African people and achieve long term sustainability of services and optimal use of scarce resources deliberate action and commitment are needed from everyone responsible.

- **Sector Reforms** – Appropriate sector policies, legislative support and institutional framework need to be put in place to guide the stakeholders.
- **Capacity Building** – Because of the changing roles in the sector, development of human resources and institutional strengthening at all levels is necessary to ensure sustainable water supply and sanitation services, including links to appropriate institutions for emergency preparedness, to meet the needs of all the population. Special attention should be given to data collection and management as well as sector monitoring to ensure more informed decision making.
- **Financial Sustainability** – Questions of cost recovery, affordability and equity, must be addressed and appropriate funding mechanisms for sustainable service delivery developed, with attention to effective and efficient utilisation of resources.
- **Commitment to Maintenance** – Priority should be given to reliable arrangements for maintenance of installed facilities in order to prevent their premature deterioration and safeguard investments.
- **Commitment to Partnerships** – Where sustainable solutions have been achieved, these should be regarded as models at all levels. Pan African and South-South collaboration and the participation of the international and local private sector should be encouraged with adequate protection for the consumer.
- **Integrated Water Resource Management** – Efficient water use and attention to integrated water resources management can 'stretch' the water supply from existing investments and provide the opportunity for increasing service coverage at relatively low cost.

African Commitment and Strategic Concerns

Political commitment exists to address the issues noted above (OAU Decision 1998 Doc. No.CM/2057(LXVIII) Add 3). With reallocation at national and international levels, there are enough resources to support water and sanitation interventions. With increased democratic governance, people expect better services, and we the professionals should rise to that expectation.

We, as African professionals in the water supply and sanitation sector, are dedicated to implement the contents of this Statement. There is room for a great deal of action – action which is urgently required in the face of appalling consequences of inadequate service in the water supply and sanitation sector.

We express this commitment through the establishment of the African Chapter, Water and Sanitation Africa Initiative (WASAI) to coordinate the urgent actions needed to bring the vision to reality.

20 November 1998

INSTITUTIONAL ISSUES

Raising the Profile of Sanitation in Uganda

Tom Kayamba Mwebesa, Uganda

Introduction

The delivery of Environmental Sanitation in Uganda has been a step brother to that of Water Supply in the WSS Sector. It should been recognized that, when it comes to Health Benefits the supply of Safe Water alone is not as cost effective as the provision of sanitation facilities. Environmental Sanitation, particularly human excreta Disposal and improvement in hygiene practices are of paramount importance if the health of the people is to improve. The provision of water supply is important only if it is accompanied by adequate Environmental Sanitation and positive behavioural practices.

A critical factor in sanitation promotion is lack of community demand. To most people, water supply has a much higher priority than sanitation. Sanitation has an image problem and is difficult to tackle than the protection of water sources.

During the International Drinking Water and Sanitation Decade (IDWSD-1980s) most bilateral and multilateral agencies spent a lot of money on water supply and sanitation, but the diseases associated with poor sanitation continue to plague the world especially the least developed countries. One of the reasons for this situation could be the tagging of sanitation to water supply, which has the capacity to run faster than sanitation.

In 1992, the Health Ministers of Africa reviewed the status of WSS sector and noted that low attention to environmental sanitation continues to expose the urban and peri-urban poor and rural communities to many communicable diseases e.g. Dysentery, Typhoid, Cholera, Malaria, Intestinal Worms.

They recommended that member states ensure that the provision of safe water supplies is closely accompanied by the provision of sanitation facilities and hygiene education. Similar sentiments have been raised at various meetings, including the Africa 2000 Brazaville Conference and the Water and Sanitation African Institute (WASAI) Consultative Forum recently held in Abidjan.

Current Sanitation Status

Prior to considering to raise the sanitation profile of Uganda, the Environmental Health Division laboured to determine the national sanitation status; so as to be able to convince the political and civic leadership of the country on the magnitude of the problem.

Poor management of human excreta

The common parameter for measuring the levels of sanitation in Uganda is by latrine coverage. In the 1960s, and early 1970s, latrine coverage in some parts of the country was as high as 90-95%. By then the Economy was sound, chiefs and paramount leaders were respected, laws were enforced, and environmental health staff were adequately deployed and facilitated to carry out their obligations. Until recently, the situation has been the converse.

The socio-economic and political turmoil of the recent past, coupled with the breakdown of law and order in the country has seen a reduction in latrine coverage to 40-50% with the lowest recorded coverage level of 30.0% in 1983. Of recent "flying latrines" have aggravated the situation especially in the Peri-urban areas.

During the rehabilitation and reconstruction phase (1986-1995) efforts were made to improve on latrine coverage, and by 1993, levels had risen to 47.6% in rural areas and 65.0% in urban areas with significant regional variations e.g 4.0% in Northwest and 88.5% in South West. Latrine coverage levels must double to reach the status of the 1970s.

Inadequate solid and liquid wast e management

Most noticeable in urban and peri-urban areas is the disposal of domestic and trade wastes in open spaces and alongside the road networks. Offensive wastewater from bath places, food premises and processing plants indiscriminately disposed of, constitute one of the greatest environmental degradation factors facing the country.

On average, 800 tons of wastes are generated daily in Kampala city, while only 35.0% of that is disposed of and in a questionable manner.

Inadequate handling of drinking water

While a lot of effort have been put in providing wholesome water supply to both urban and rural dwellers, the dirty state of water collection materials and inadequate hygiene education, water from protected sources is progressively contaminated prior to drinking. In 1994, RUWASA undertook a study of 57 households drawing water from protected sources. The results revealed that only 9.0% of the households surveyed were consuming water of acceptable quality. The rest of the households had their water exhibiting E.coli, a common indicator for pollution through human excreta.

Excessive disease vectors

Poor surface drainage, indiscriminate housing developments (brick making) coupled with poor domestic hygiene has created a haven for disease vectors e.g. mosquitoes, houseflies, rats etc. The communicable diseases transmitted by the above vectors e.g. Malaria, Diarrhoea, and to a certain extent (in North Western Uganda) Plague contribute to the High Burden of Disease (BoD) facing the country.

Negative cultural beliefs and taboos

While most people may be aware about the importance of environmental sanitation, a lot of cultural beliefs and taboos still exist in some communities. Notable among these is the issue of the use of pit latrines by pregnant women, in-laws and children. The belief that washing hands with soap is only necessary after eating; while washing hands after visiting the toilet is a luxury.

Constraints to Sanitation Promotion in Uganda

Environmental Sanitation activities need to be given serious attention as we prepare to move into the next millenium. Some of the constraints originate from within the sector e.g. tagging the stigmatised sanitation to glamorous water supply, and according environmental sanitation a low profile on the development agenda.

Low Profile and Marginalisation of Sanitation

As already highlighted in the background, environmental sanitation related activities have not received the attention required. Such low profile/marginalisation cuts across all the levels of service delivery up to the household level. To most Ugandans sanitation is not a priority and not demand driven. Most of those in need of adequate sanitation facilities, the urban poor and the rural communities have the least voice and power in society. The moral degeneration and apathy derived from the past socio-economic and political turmoil have aggravated the situation, coupled with inconsistent commitment by political and civic leaders.

Institutional Problems

Better sanitation is a responsibility of all the citizens of any country. It is not a responsibility of the Ministry of Health alone. A good number of ministries, NGOs and agencies are involved in WSS activities, but most of them do not prioritise sanitation beside the elements of inadequate coordination and entrenched vested interests. An efficient institutional arrangement is vital in coordinating the various stakeholders/players and in guarding against conflicting roles and responsibilities.

Inadequate Policy and Legislature Support

The importance of improved environmental sanitation is not adequately reflected in the national legislation and is not backed by a coherent national policy. The proposed Health Services Act (to replace the Public Health Act), the draft National Health Policy and the five year Health Plan have highlighted sanitation on paper. What needs to be done is to operationalise the contents of these documents.

Lack of Successful Programmes

Sanitation promotion is greatly hindered by lack of successful sanitation related programmes from which authorities and community leaders can emulate. The achievements of the Home and Environment Improvement Campaigns of the 1960—1970s were short-lived due to lack of in-built sustainability mechanisms and periodic monitoring and evaluation. Where successful interventions exist, these need to be brought to the attention of political and civic leaders in order for them to make informed decisions.

Inadequacy of Human Resources

Environmental sanitation delivery is a specialised discipline which calls for professional handling. However, the human resource responsible for environmental sanitation promotion is inadequate - quantitatively and qualitatively. Some administrative unites e.g councils and sub-counties have no environmental health staff. With the abolition of Health Orderlies/Sanitation Aides in some districts, there are not community linkages. Over the years the status of environmental health staff has continued to be marginalised. At the district and county levels it is only the Environmental Health Officers who are not graduates, creating a "complex situation" in regard to other professionals. In 1968, KCC had a population of 350,000 and was served by 26 Health Inspectors and 14 Health Assistants. In 1998, KCC has over 1.2 million people and is served by 12 Health Assistants. The situation at district and sub-county levels is no better than that of KCC.

Inadequate Financial Support

While the proportion of government expenditure on health is increasing, environmental sanitation activities are not adequately funded. Most programmes in WSS sector, spend more on water supply than sanitation - taking an average of 3.3% of the estimated programme expenditure. (Examples: STWSP = 2.0%, WES-UNICEF = 3.8%, RUWASA = 6.0%; source DWD). Even within the PHC - MoH expenditure on sanitation is marginalised compared with CDD/ARI and UNEPI. For example in 1995/6 financial year, CDD/ARI spent 51.2% of GoU counterpart funding on the purchase of ORS which may reduce mortality form dehydration but does not prevent the incidence of diarrhoea - which is due to poor sanitation. The recent expenditure on controlling cholera and malaria epidemics are incommensurable with the amounts spent on preventing the two diseases.

Behavioural Patterns

Sanitation promotion is much more that the provision of pit latrines. It is a continuous process involving nature, society, behavioural aspects and the provision and maintenance of facilities. Behavioural change is a long process, which cannot be realised by sporadic hygiene education interventions. Increased advocacy and community sensitisation cannot be compensated by provision of facilities alone. We need to address the issues of lack of awareness, negative customs, beliefs, taboos and lifestyles.

Technological limitations

In terms of human excreta disposal, the technological options available to most communities are pit latrines. Yet the pit latrine is not the best device for "difficult" areas e.g water logged, rocky areas, slums/informal settlements. The use of communal latrines still faces resistance due to operation and maintenance problems. Inadequate solid waste management continues to degrade the environment, while sanitation options in emergency situations have severe limitations. Problems of cost recovery and lack of subsidies continue to make the provision of adequate sanitation a day dream especially for the peri-urban dwellers.

Inadequate Information Management and Research

Sanitation promotion lacks the necessary systems for management and administration. There are no adequate sanitation data banks and research facilities at operational levels, resulting to inadequate planning, monitoring, evaluation, networking and sharing of experiences.

Opportunities for Promoting Environmental Sanitation

Notwithstanding the above constraints, there exists opportunities for promoting environmental sanitation in Uganda if the political and civic society were to take their responsibilities very seriously.

Environmental Sanitation – the "Rising Star"

Currently environmental sanitation is one of priority areas on the development agenda and has been accorded a national definition to which all public and private sector interventions have to address. The broad definition environmental sanitation; "encompasses the isolation of human excreta from the environment in an acceptable manner, maintenance of personal, domestic and food hygiene, safe disposal of solid and liquid waste, the provision and protection of drinking water (safe water chain) and the control of disease vectors around the home and working place."

The narrow focus of equating environmental sanitation with the provision of latrine facilities; and a responsibility of the household was party responsible for marginalising sanitation service delivery. Environmental sanitation is a communal problem and calls for communal interventions.

Multi-sectoral Approach

In order to effectively put sanitation on the development agenda, a Sanitation Working Group – National Sanitation Taskforce is in place. It's membership comprises of "eminent professional /citizens" involved in the water and environmental sanitation sector, with specific Terms of Reference and a two year tenure of office.

Sanitation Concept Paper

The Taskforce developed a sanitation concept paper which highlights the national sanitation status. The paper was an eye opener about the poor sanitation in Uganda, and called for urgent interventions.

Sanitation Cabinet Memo

The Hon. Dr. C.B.C Kiyonga, Minister of Health, presented to the cabinet a memo reflecting on the poor sanitation in the country and advocated for the national consensus on the need for:

- National Sanitation Forum
- Finalising the National Sanitation Policy and Strategic Programme
- Launching the programme by His Excellency the President of Uganda

The first National Sanitation Forum was held at Kampala International Conference Centre from 16—17 October 1997. The forum's objectives included:

- To raise the level of awareness about the state of sanitation and highlighting the opportunities and challenges for better sanitation in the country
- Build consensus with implementers and donors about the need for National Accelerated Sanitation Improvement Programme(NASIP) and;
- Develop a National Declaration for Sanitation Promotion.

Kampala Declaration on Sanitation

Contains a 10 point strategy for promoting sanitation at all levels which reflect on:

⇒ Exemplary Leadership
⇒ Full community mobilisation
⇒ Coordination and multi-sectoral approach
⇒ Focus on primary schools
⇒ Forum at districts (including Sanitary Days)
⇒ Central role of women
⇒ Private sector/NGO development and service delivery
⇒ Capacity building at district level and
⇒ Development of policies and guidelines

Since the guidelines for implementing the declaration have been developed and discussed with District Authorities, who have approved them.

Environmental Policy and Legislative Support

To guide and facilitate individuals, communities, and institutions to contribute to the achievements of optimal sustainable sanitation standards and thereby improve the quality of life and alleviate poverty.

National Accelerated Sanitation Improvement Programme (NASIP)

Aims at reducing incidences of sanitation related diseases by accelerating sanitation promotion through a conducive framework, improved behavioural change, carrying out operational research, application of appropriate technologies, capacity building and adequate mobilisation for sub-sector.

The National Health Policy

Stipulates the need to promote household, institutional and community hygiene and sanitation through improved access to and use of sanitation facilities.

The National Environmental Health Control Regulations

As part of the Broad National Health Services Law, the regulations are being developed and shall be discussed with top level management team of the Ministry of Health.

- **National Health Services**
  Proposes the establishment of the Environmental Health Board to regulate the environmental health profession and coordinate sanitation activities.

- **The Constitution of Uganda**
  The 1995 Constitution of the Republic of Uganda, Chapter 3, Article 17 (j) mandates every citizen to promote and preserve a safe environment.

- **The President's Election Manifesto**
  The President's Election Manifesto (1996) highlights sanitation and hygiene as a priority area under the concept of Primary Health Care.

- **The Local Authorities Act, 1997**
  Mandates all District Councils to make ordinances and Sub-county Councils to make bye-laws to promote environmental sanitation in their areas of jurisdiction.

Conclusion

Why invest in environmental sanitation?

Environmental Sanitation is a human right and a responsibility for all citizens of any country. Adequate environmental sanitation affords individuals and communities improved health status and reduced expenditure on medical care. Contains environmental degradation especially in urban and peri-urban areas and contributes to the economic and social well being of the communities and the state at large.

Uganda is delighted to be part of the world wide sanitation movement. We appeal for the support of the rest of the African countries, international agencies (both multi and bilateral), NGOs and the world community at large so as to be able to galvanise the momentum that has been created.

The struggle continues.....

Tom Kayamba Mwebesa, Directorate of Water Development, Water and Environmental Sanitation Project, Kampala, Uganda.

Commercialisation of Urban Water and Sanitation Services

Eng. Malaquen Milgo, Kenya.

Background

Since the late 1980's, the Ministry of Local Authorities and GTZ have been engaged in a technical co-operation project aimed at strengthening the management of water and sanitation systems owned and operated by selected Local Authorities in Kenya so as to make them self sustaining in their operations and investments.

The Urban Water and Sanitation Management (UWASAM) project of the Ministry of Local Authorities has assisted in the establishment of Water and Sanitation Companies (WSCs) by Nyeri, Eldoret and Kericho Municipal Councils. The WSCs are autonomous institutions that will run on commercial principles. The project has continued to facilitate the consolidation of these companies and to provide technical assistance on financial management, operation and maintenance of Water and Sanitation utilities in other project towns namely Thika, Nanyuki, Nyahururu, Nakuru, Kisumu and Kitale. UWASAM also assists in the preparation of these water undertaking Local Authorities for the commercialisation of their water and sanitation services delivery functions.

Introduction

As a means of ensuring sustainability in services delivery and investments, the Government has decided to commercialise public water utilities, so that consumers meet the full cost of operation and maintenance. The Government therefore fully supports private sector participation and community management of services backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programmes. The aim of this is to encourage commercialisation of the supply of water services especially in the urban areas and community management in the rural areas.

The move to commercialise was justified by the following results of evaluation:

- Poor management of both system infrastructure and services to the public,
- Difficulty and delay in recruitment, and retention, of professional, top and middle management staff,
- Inability of Councils to attract qualified people due to the existing salary structures,
- Frequent transfer of funds from water sales to unrelated expenditure at the expense of water services leading in most cases to deferred maintenance of facilities, and thereby occasioning rapid deterioration of infrastructure,
- Lack of provision of renewals funds and loan repayments,
- Application of non-cost covering tariffs,
- Delays in approval of tariff adjustments,
- High water losses leading to unacceptable levels of unaccounted-for water,
- Inability of Councils to meet water demand,
- Over staffing with unskilled personnel,
- Low and late billing, and non-payment of bills which affects efficiency of revenue collection and operation and maintenance of infrastructure.

Institutional Options

The institutional options available for Urban Water and Sanitation services can be broadly categorised as follows:

- Option 'A': Public Ownership and Public Operation
- Option 'B': Public Ownership but Private Operation
- Option 'C': Private Ownership and Private Operation
- Option 'D': Community and user provision best suited for rural and/or peri-urban schemes.

Option 'A' can take two forms, with operation by:

A1: Public Department - Examples of Option A1 are the Water and Sanitation/Sewerage Departments (WSDs) already established in water undertaking Municipal Councils in Kenya. Results of evaluation indicate that effectiveness and efficiency (in terms of improved service delivery) of these WSDs is severely restricted by their having to operate within the Local Government structure, and their impact has thus been very limited.

A2: Public Enterprise - Under Option A2 the WSDs would be given a more autonomous structure by the formation of WSCs. The WSCs would be wholly owned by the Municipal Councils, but would be legally and financially independent, and operate under the Companies Act. Examples of such companies are Chipata and Lusaka Water and Sewerage Companies in Zambia.

Option B has 4 possible sub-options, as follows:-

B1: Service Contracts - Service Contracts (B1) are the simplest form of private sector participation, under which the Municipal Council would retain overall responsibility for operation and maintenance of the system, except for the specific services contracted out. Examples of such services could include: Meter Reading; billing and Collection; Equipment Rental; Construction of New Facilities, etc. They have the advantages of being of short duration (1-2 years), and payments are directly linked to the work performed. The experience of such arrangements in Kenya has not, however, been good particularly with debt collection in Nairobi City. It was also felt that the management of the water systems should be dealt with as a whole rather than be split into autonomous segments.

B2: Management Contracts - Management Contracts (B2) involves a more comprehensive arrangement, whereby the municipal council transfers to the private contractor responsibility for the entire management, operation and maintenance of the system. This means that

the private contractor is free to make day-to-day management decisions, without assuming any commercial risk. Arrangements of this nature are already in place between Local Authorities and private contractors. Examples are the contracts between Kipsigis County Council and African Highlands Produce co. (AHP) to manage tea estates, and between 5 Councils (Narok; Trans Mara; Samburu; Isiolo; Olkejuado) and the Kenya Wildlife Services to manage Game Parks. Management Contracts have also been successful as was the case of Kenya Airways. Within the water sector such arrangements have proved successful in other African countries, such as: Botswana; Zambia; Malawi; Ghana; Guinea Bissau.

B3: Lease Contracts - Lease Contracts (B3) are arrangements whereby a private operator rents the facilities from the municipal council for a certain period (normally 5 – 10 years), and is responsible for operation, maintenance and management of the system. The Council, as sole owner of the assets, is responsible for capital investment. Such arrangements have proved successful in the operation of water schemes in the Ivory Coast; the Central African Republic; the Gambia; Sao Tome.

B4: Concessions - In a Concession (B4), the private contractor has overall responsibility for the services, including capital investment. The fixed assets, however, remain the property of the Council, but they are entrusted to the contractor for the duration of the concession period (normally 20-30 years).

The third group of options, Option C, in which there is at least partial private ownership includes:

- C1: Build-Operate-Own-Transfer (BOOT)
- C2: Reverse BOOT, in which ownership is transferred from the council to the private sector;
- C3: Joint Ownership, or Mixed Companies, with part council and part private ownership;
- C4: Outright Sale to the private sector, through the stock exchange.

The degree of private sector responsibility, autonomy, and financial risk is lowest for Option A1 and highest for Option C4. In considering the institutional options, a key aspect taken into account was the current Local Authority responsibility for, and ownership of, the water supply and sanitation systems. It was strongly felt that ownership of the fixed assets should remain wholly with the Municipal Councils.

To reform the provision of infrastructure services by applying commercial principles of operation involves giving service providers focussed and explicit performance objectives, well-defined budgets based on revenues from users, and managerial and financial autonomy - while also holding them accountable for their performance.

The role best suited to the public sector would be:

- responsibilities within the National Water Policy;
- ownership of the infrastructure and investment planning and implementation, with access to funding sources and favourable terms not available to the private sector;
- sector supervision and regulation in terms of quality of service, and maintenance through the operating contract.

Within this overall framework the private sector could play a useful role particularly in improving the management of the system and in removing the services from the political arena to a large extent.

In order to adopt a conservative approach it was recommended that, as a first stage, private sector involvement be limited to Management Contracts (B2). In order to remove these services from the problems associated with operating within the local government system, it was felt that Water and Sanitation Departments should be transformed into autonomous Water and Sanitation Companies to be run on commercial principles.

In summary the recommendations were:
"That a management contract (B2) combined with a Water and Sanitation company (A2) is the option that would be compatible with the current institutional capacity in the Local Government Sector".

In cases where a Local Authority may exert undue influence, and in a bid to increase and institutionalise private sector participation, a further model could be implemented. The Stakeholders, together with the Local Authority, may form a Water and Sewerage Company. The shareholding could be say Stakeholders 51% and Local Authority 49%. The WSC so formed would then be vested with a management contract to manage, operate and maintain the system. The ownership of the assets would still rest with the public i.e. the Local Authority, including expansion of the system. An obvious advantage of this comes from the increased autonomy of the WSC and the Board of Directors arising mainly out of the joint ownership of the WSC.

The Water and Sewerage Companies

The resolutions by Eldoret, Kericho and Nyeri Municipal Councils led to the formation of WSCs by the respective Councils as follows:

Eldoret Water and Sanitation Company Limited,
Kericho Water and Sanitation Company Limited,
Nyeri Water and Sewerage Company Limited.

The WSCs are private companies limited by shares and run by a Board of Directors. They are registered under The Companies Act Cap. 486 of The Laws of Kenya with the registered offices of each company being in the respective municipalities which own them. The share capital of each WSC has been initially set at Kshs. 100,000.00 and divided into 5,000 shares each valued at Kshs. 20.00. The right of transfer of shares is restricted according to the Articles of Association.

The objects for which the WSCs are established are set out in the Memorandum of Association with the first being "to carry on the business of Water and Sanitation within the area under the jurisdiction of the respective Municipal Councils and its environs as specified in the

terms of undertakership".

The WSCs shall be autonomous in fulfilling their task of supplying the municipalities with water and sanitation services using financially sound and technically viable practices in their daily performance. In order to achieve this objective, the WSCs undertake to strive to meet appropriate customer service standards in mandated areas, promote environmentally responsible development of water resources and to manage human resources effectively and efficiently.

The WSCs shall be run by commercially experienced management teams, under the control of a Board of Directors whose members shall be in accordance with the provisions of the Articles of Association. The WSCs shall act as the Municipal Councils' agents for the supply of water and sanitation services, having a Legal Agreement (Agency Agreement) setting out the responsibilities of each party.

The WSCs are wholly owned by the respective Councils but in order to satisfy the requirements of section 4 of the Companies Act three additional subscribers who hold in trust one share each on behalf of the Council were incorporated in the list of subscribers. The subscribers to the Memorandum of Association are therefore listed as:

⇒	The Municipal Council	4,997 shares	99.94%
⇒	The Mayor	1 share (in trust)	0.02%
⇒	The Town Clerk	1 share (in trust)	0.02%
⇒	The Town Treasurer	1 share (in trust)	0.02%
	TOTAL	5,000 shares	100%

Structure of the Company

The structure of the WSCs follows the normal lines of a private company with:

⇒ Shareholders

⇒ Board of Directors

⇒ Corporate Management Team

The Council will exercise control over the Company through the Annual General Meeting (AGM) which is prescribed by the Articles to consist of the Mayor, Deputy Mayor and Chairmen of Committees. The business during the AGM would ordinarily be;

- Consideration of Annual Accounts,
- Consideration of Director's Report,
- Consideration of Auditor's Report,
- Appointment of Directors,
- Declaration of dividends (as appropriate)

The shareholders may also hold quarterly meetings, to discuss the ordinary business of the Board of Directors.

The Board of Directors brings together, on an equal basis, representatives from the State, Local Authority, and stakeholders, thereby illustrating the democratic nature of the WSCs. The Directors as outlined in the Articles of Association consist of:

⇒ The Mayor

⇒ The Town Clerk,

⇒ The Town Treasurer,

⇒ The Managing Director of the WSC,

⇒ Representative of the business/finance sector or the local KNCCI who shall not be a member of the Council,

⇒ Representative of women,

⇒ Representative of the Ministry of Water Resources,

⇒ Representative of the Ministry of Local Authorities,

⇒ Representative of consumers who shall not be a member of the Council.

The Corporate Management Team (CMT) consists of:

⇒ Managing Director,

⇒ Commercial Manager,

⇒ Technical Manager

In the larger WSCs it is envisaged that posts of both Operations and Engineering Managers may be required in addition to the Managing Director and Commercial Manager. The contracts for the CMT shall be performance related.

Levels of Governance

The running of any Company involves certain key roles:
Setting of strategic direction,
Operational management,
Monitoring and control,
Fulfilment of statutory obligations.

The guiding principle is: MANAGERS MANAGE, BOARDS OVERSEE

The role of the Corporate Management Team is:

- Generating strategy and setting operational goals, including preparing the Corporate plan and Budget,
- Effective attainment of goals,
- Resource deployment,
- Performance measurement,
- Day to day operations of the WSC in order to ensure effective, efficient and sustainable delivery of water and sanitation services at optimum cost within its designated limits of supply,
- Ordinary expenditure within approved budgets,
- Maintaining good public relations,
- Progress reviews.

The Board of Directors acts as the ultimate authority, reviews overall strategy, monitors and controls, considers significant issues and fulfils statutory duties. Specifically the Directors will:

- Approve staff terms and conditions,
- Approve corporate plan and budget,
- Provide management guidelines,
- Approve major contracts,
- Authorise major changes of policy,
- Approve tariffs in compliance with legislation,
- Set performance contracts for management,

- Prepare and adopt standing orders necessary for the due performance of their duties.
- The Board may enter into contracts with any other companies when, in the opinion of the Board, it is cost effective to do so.

Relationship Between Council and Company

The WSCs will provide water and sanitation services as Agents of the respective Councils. A form of Agency Agreement has been drawn up and is under discussion by the respective Boards of Directors and Councils. The Agency Agreement sets out the obligations and functions to be exercised by each of the two parties.

Among the functions set out in the Agency Agreement to be undertaken by the WSCs include developing five year business plan, setting performance targets and incorporating a detailed capital improvement programme and financing plan, and implementing the recommendations of the short and long term strategies. The business plan shall, in particular, address the issue of service to un-served low income consumers, identifying monies available from the WSC and required as grants for investments in low cost technologies to serve these consumers at appropriate service levels. This approach recognises the 'permanency' of the so-called 'slums' and/or low-income areas thereby providing for its inclusion in the planning for services provision. In the past these areas have been considered temporary and indeed in some cases referred to as illegal settlements. Interventions as regards provision of water and sanitation services have, to a large extent, been possible courtesy of catastrophes like for example a cholera outbreak.

Promotion of the Under Privileged and Women

In spite of fears among some people that commercialisation of Urban Water and Sanitation services will usher into the system abnormally high price increases which may not be affordable by the very poor, the WSCs will actually promote the interests of the poor in the following ways;

a) Development and application of tariffs that enable cross subsidies to the advantage of the poor, albeit with due respect to cost recovery;
b) Promotion of marketing orientation plans and practices which respect all customers, including the poor,
c) Promotion of provision of water at kiosks and/or stand pipes closer to the thresholds of the poor,
d) Inclusion of the under-privileged in the activities of action groups.

With regard to women, in addition to benefiting from measures a), b), c) and d) above, they will have the following additional accommodations:

(i) By providing water inside or closer to peoples' dwellings, the burden of water fetching by women and children will be considerably alleviated.
(ii) Women will be represented as a specific functional group at the highest level of the Company i.e. in the Board of Directors and the AGM.

Potential Payoffs of Commercialisation

Benefits to be reaped through commercialisation of water and sanitation services include

Improved technical efficiency leading to savings to service providers,
Reduced financial loss,
Improved productivity and pricing,
Enhanced growth and competitiveness of the economy,
Creation of policy environment conducive to inflow of investment resources,
Reduction/Removal of dependence on subsidies.

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Informal Tenure and Environmental Services

Dr. Washington H.A. Olima, Kenya

Introduction

The question of land in the urban context is not only very broad and complex but also economically and politically sensitive. Land is not only a basic-component of human activity but is also, in most cases, the most important means of livelihood. It is the foundation for shelter, food, work and a sense of nationhood (Apiyo, 1998). There is, however, no systematic study on how land tenure affects the nature of urban development. In Kenya, land tenure patterns are causing severe problems to the planning authorities with regard to the ability to plan the urban environment and to serve the interests of economic, political and environmental groups (Olima, 1993). This is because land tenure is a basic instrument of overall development policy, performing both an indirect and facilitating role as well as a direct and active one. Notwithstanding the legal framework of tenure, it fundamentally involves the occupants perception of his/her security in relation to the investment contemplated which will produce the desired development (Olima and Obala, 1998). Land tenure plays therefore a critical role in the individual's sense of participation in society, as well as in the investment of labour and capital likely to be made on any parcel of land.

Land ownership in low income urban areas in Kenya is relatively complex. This is particularly true for Nairobi. In some settlements, such as Kangemi, Kawangware and Githurai, there is individual freehold tenure. The majority of settlements in Nairobi are on public land, for example, in Kibera and Korogocho, either held directly by central government or vested on leasehold to Nairobi City Council and/or public corporations. In some cases, existing settlements are on public land that has already been alienated to private land owners other than the present settlers. The non-formal de facto land tenure is therefore widespread. This is a situation where land is acquired, occupied and used without permission from its owner. It is a form of tenure popularly referred to as squatting, mostly occurring on government land and undeveloped private land located near main employment centres for the urban poor. In Kisumu, for instance this form of tenure representing 0.18 percent is widespread in Kanyakwar, Migosi and Manyatta areas. In essence, majority of house-owners, however, have some form of quasi-legal tenure through temporary occupation licences or letters from chiefs on public land, or agreements with land-owners on private land.

Residential Environmental Services in the Low Income Urban Areas

The purpose of this paper is to highlight the influence of land tenure on the living conditions of the low income urban dwellers. The emphasis is, however, on the existing problems of water supply and environmental sanitation in the low income urban areas. In Nairobi, the land area covered by informal settlements is just over 5 percent of the total area used for residential purposes. This means that over half of the city's population lives on just 5 percent of the residential land area (Gok, 1997).

Development on land depends on who owns the land parcel. In addition, investment on land needs capital, which is often not readily available to the individuals. In the case of non-formal de facto land tenure, the security necessary for investment to take place must arise from each individual's calculation of the likelihood that his capital will be destroyed by action of the legal owner, the pattern of public attitudes towards innovative strategies, and the length of time that the settlement has existed as well as the size and degree of organization in the neighbourhood (Olima and Obala, 1998). Thus the inadequacy in the provision of the infrastructure facilities and services within the settlements is closely associated with the prevailing informal land tenure system. All in all, the social infrastructure in such settlements is poor. The influence of informal land tenure on the provision of residential environmental services within low-income residential urban areas include:

Environmental degradation

One major type of environmental degradation associated with urban development in Kenya is the uncoordinated urban land development. These haphazard developments have manifested themselves in the form of unregulated slum settlements, and illegal and unapproved structures. This has been encouraged by the prevalent and growing practice of unauthorised invasion on private or public land. Furthermore the physical layouts are relatively haphazard making it difficult to introduce roads, pathways, and drainage.

High congestion - Most settlements, particularly those on public land, have extremely high densities, typically 250 units per hectare as compared to 25 and 15 units per hectare in middle income areas and high income areas, respectively (Gok, 1997). High congestion due to overcrowding within the informal settlements exposes residents, particularly women and children, to severe environmental health risks which critically affect their ability to play a full economic role in the life of the city. The majority of residents are renters and most structures are let on a room by room basis with most households occupying a single room or part of a room as is the case in Korogocho and Kiambio settlements.

Inadequate water supply - Most of the urban services are non-existent or minimal. The provision of potable water is a serious issue within the informal settlements. Water is only provided to a few standpipes if it is provided at all. There are four main problems in the provision of water supply to informal settlements. These include:

- The provision of water by the NCC is generally insufficient to meet the demand in many areas.
- The kiosks from which most residents of informal settlements purchase water are inadequate in num-

ber. This scarcity of water tap points is causing a lot of inconvenience to the inhabitants of informal settlements.

- The pipes which supply water to the kiosks are in a very poor state of repair and maintenance allowing the water to become polluted through seepage.
- There is very high cost of the water. The observation carried out within the informal settlements revealed that water bought by the debe costs very much more per litre than the official metered rate charged to those who receive it piped to the house. For example, a twenty (20) litres jerrican of water costs between Kshs. 2 and Kshs. 3 in Kibera and Kiambio settlements.
- The provision of water is along time investment, and requires security of land tenure in order to attract the small micro- enterprises. The number of water kiosks when viewed in the light of income-earning opportunities can be encouraged through cooperate or individual efforts.

Poor sanitary conditions - All informal settlements face a host of environmental health and sanitation problems. The poor sanitary conditions within the informal settlements is a matter that needs to be addressed. These problems relate to solid and liquid waste management.

In most of the informal settlements, the solid wastes and refuse are placed in the open spaces existing in the areas. Even in the cases where dumping sites are provided, the NCC has been unable to clear the dumping sites on a regular basis.

The disposal of liquid waste in informal settlements is mainly through pit latrines and other on-site methods which are shared by a number of families and are the source of considerable pollution. Many overflow into open drains and pollute ground water sources (Gok, 1997).

In addition, there is poor drainage and poor access to health and education services in the informal settlements. All these problems can be attributed to the existing high poverty levels in terms of insufficient income. On the other hand, environmental poverty is an important dimension affecting residents of informal settlements. The urban poor are therefore facing hunger, malnutrition, inadequate clean water and serious environmental degradation which are consequences of lack of security of land tenure.

Summary and conclusions

Within the informal settlements, the lack of security of tenure has serious social consequences as it demobilises the people's ability to organise themselves so that they can reinvest in their communities (Apiyo, 1998). This is particularly serious where evictions are carried out, and aimed at people who have occupied and lived in a settlement for a long time. Evictions which are a consequence of land grabbing are a major cause of urban poverty. The results of eviction are destruction of property and people's development initiatives and displacement.

Symptoms of poverty should be providing environmental health measures such as improvement of sanitation, water supply, drainage and refuse disposal. However, it has to be realised that communities in informal settlements are not homogenous as there are many different interest groups based on income, age, status, religion, occupation and levels of dependency. Considering the fact that the residents living on private land, for example, Kawangware and Kangemi tend to have better conditions than those on public land like Kibera and Korogocho, there is need to revisit the land tenure issue. It is recommended that clear land policies with objectives to eradicate urban poverty by narrowing the gap between the rich and the poor urban dwellers be formulated. In order to provide security of tenure to the present residents of informal settlements and encourage them to invest in their development, the following strategies are proposed:

- Recognise existing settlements
- An immediate stop on allocations of all public land that is already settled
- Set aside suitably located land for planned settlements by low-income groups who may be affected by upgrading programmes
- Provide security of tenure to residents of recognised settlements. This is particularly crucial for settlements that are located on public land. An appropriate tenure system should be:
  - A tenure system which ensures that residents directly benefit, perhaps with a mix of ownership and rental.
  - A tenure system which reduces the possibility of present residents being bought out by higher income speculators.
  - A tenure system that is selected with the direct participation of the residents;
  - A tenure system which will encourage business investment.

The dual problems of urban poverty and inadequate human settlements conditions constitute two of the most fundamental challenges to politicians and policy-makers. However, present policies for human settlements development particularly land policy in respect to low income areas fail to cater for the special circumstances of the groups affected by extreme poverty.

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10th ITN AFRICA CONFERENCE
Nairobi, Kenya, 30th Nov. - 3rd Dec. 1998

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COLLABORATION AND INSTITUTIONAL CAPACITY BUILDING FOR SETTING UP APPRORPIATE STRATEGIES IN SUSTAINABLE WATER RESOURE MANAGEMENT IN PERURBAN AREAS
Case study of Sector 28 of Ouagadougou, Burkina Faso

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ABSTRACT

Water supply has always been one of the major issues the authorities in Sahelian countries such as Burkina Faso are dealing with. The most vulnerable and unsaved populations live in the periurban areas. This paper presents the case study of Sector 28, a periurban area in the western side of Ouagadougou, capital of Burkina Faso. The project was set up by CREPA in collaboration with the public authorities responsible of water resource management in the country, the utility in charge of water supply and the community. In order to achieve the objectives of the project which is to ***build institutional capacity and enhance collaboration for water resource management***, a set of endogenous mechanisms were developed by the community to make sustainable the actions.

CONTEXT

During the next twenty years if there is no concerted action to set up a strong global framework to deal with the political, economic, legislative and sociocultural issues related to water, its uses may lead to multiple conflicts and huge economic, industrial and commercial battle. The main source of life for human being will then be transformed to a vital strategic resource and therefore, to a scarce good on particularly new markets. In fact, the world population will multiply by 3 during the next century. The water demand will multiply by 7 while the irrigated land surface will be 6 times higher. In addition, during the last fifty years, the groundwater pollution has reduced the water reserve by 1/3 (R. Petralla, 1997).

During the past 9 years, many people believe in the assumption that only the market would be able to guaranty "the peace of water" and ensure an equilibrium because of the "real price" between a good quality of water service (which is less and less available) and a continuing growing demand. These people are not only from the group, which is willing to privatize everything. The lessons learnt from the privatization though must make us careful.

Actually 1 out of 5 persons is without safe water and half of the world population does not have adequate excreta disposal. This picture led the United Nations special session on water in June 1997, to recommend through the implementation program of Agenda 21 adopted during the Rio conference in 1992, that the economic assessment of water be done in the context of social and economic implication of the water resource. This assessment should reflect the satisfaction of elementary needs.

In order to ensure the long-term sustainability of the water resource, we must clarify the difference between the value and the price of water and promote an "ethic of water". Mister Frederico Mayor, the Secretary General of UNESCO talks about a "new ethic of water" based on active solidarity and subsidiary. The solutions being taken at the lowest possible level, allows an extended and participatory cooperation, giving the actors, particularly women, the possibility to make decisions and use local "know-how" (M.L. Bougerra 1997).

Based on this last principal of sustainable development of water sector, the community of Sector 28 with the support of CREPA implemented the "Solar water pumping and sanitation project" in collaboration with Office National de l'Eau et de l'Assainissement (ONEA which is the water and sanitation utility in Bukrina Faso) and the International Water Resource Center of the University of Ottawa in Canada.

CREPA is an Inter-States Institution with 15 country members from Western and Central Africa (Benin, Burkina Faso, Cameroon, Centrafrique, Cote d'Ivoire, Congo, Guinea-Bissau, Guinea-Conakry, Mali, Mauritania, Niger, Senegal, Chad and Togo). CREPA is one of the 4 Africa centers of the International Training Network for Water and Waste Management (ITN). This network was established during the International Water Supply and Sanitation Decade (1981-1990). Its mission is to contribute to the improvement of the efficiency of investments in the water supply and sanitation sector through the development of low cost appropriate technologies, and the adoption of participatory approach in the process of decision making for a sustainable development and the implementation of endogenous financial mechanisms to make actions perennial. CREPA has played a coordination and support role for capacity building for the implementation of strategies and sustainable policy with the communities.

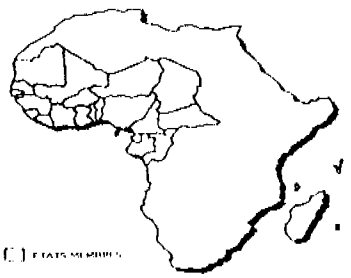


***Figure 1**: Country members of CREPA*

PROJECT AREA

During the mid 1980, Ouagadougou like most of the urban centers of Burkina Faso was under tremendous changes in term of urbanization. The main purpose of these changes was to improve the life standing of certain neighborhoods. In Ouagadougou, this led to the resettlement of thousands of inhabitants in the periurban areas. This is how Sector 28 was created in the eastern side of the city. The main economic activity of the population in that area is agriculture. The area is subject to seasonal migration (from May to November) due to the fact that farms are in villages not far from Ouagadougou. The small-scale commerce is the second economic activity of the population. This is mainly done by women in the markets and around certain water points in the project area. The life standing of the population is relatively low. The project area, like most of the periurban area of Ouagadougou has no water supply network or electricity grid.

INSTITUTIONAL COLLABORATION

The project of Sector 28 is the result of concerted actions of CREPA, public authorities, the utility, the municipality and the community.

The first level of that institutional collaboration process concerns the discussions/meetings of CREPA with the Ministry of Water and Environment and the water and sanitation utility ONEA, on the justification of the project and the expectations of each party. This was followed by the identification process of the potential sites. Two main reasons explain the enthusiasm of the public authorities. Firstly, the water and sanitation utility for many reasons cannot cover most the periurban areas. Secondly, the statuses of these areas (illegal settlements or newly legalized areas) make it difficult to put in place the network in a short time because they are not in the planning of the utility. This situation combined with the low-income revenues of the majority of the households the reasons why the utility is not extended the network. In the meantime, the utility has drilled boreholes, built water standpoints and autonomous water points managed under contracts by individuals. The particularly difficult management situation most of the water-points have gone through (mainly because of the misuse of the revenues of the sale of water, the lack of appropriate operation and maintenance and the lack of community involvement) has led to the outages of many of them. It became then necessary to find appropriate strategies for sustainable management. The solar water pumping system is implemented on the site of a water point, which used to be run by a diesel motor.

A project management committee is put place. This allows the involvement of the municipality, the religious and the traditional leader of the project area. This committee which defends the interest of the population was put in place by an assembly. It is composed of:

- 1 President
- 1 Vice-President
- 1 Treasurer
- 1 Deputy-Treasurer
- 2 Fontainers (Vendors)
- 4 Animators

The role and responsibility of each member of the committee are clearly defined. The committee is responsible of the protect and must regularly inform the community with which it identify the activities of common interest in order to sustain the project.

Down the road, the institutional collaboration was extended to the private sector. Many small enterprises have participated in the implementation of the project. This collaboration was then enhanced by the setting up of an "After-Sale Service" strategy. On the basis of a convention between a local enterprise (Sahel Energie Solaire) and the Management Committee, the system is regularly inspected by the

technicians of the enterprise and repairs are made wherever necessary for an annual fixe amount of $200.00US. Some members of the committee are trained in the daily maintenance of the system.

After the consolidating process on the field, the project is experiencing a new form of institutional collaboration. This can take 4 different forms:

i) Visits of the system by student from engineers and technicians training schools for training purposes;

ii) visits of the project by participants attending seminars and workshops on project management and community participation;

iii) visits of the project by other community based organizations interested in replicating the project;

iv) visits of the project by partners from external support agencies and people from other countries for experience sharing.

INSTITUTIONAL CAPACITY BUILDING

CREPA always look for developing capacity of relay structures such as CBOs, NGOs, private enterprises, etc., which are the main transmission channels to the target community. In order to ensure the sustainability of project in Sector 28, a set of mechanisms was set up based on the strategies CREPA elaborated and developed during years of studies and research-action. These are:

- Training of the project management committee;
- Training of two persons for the operation and maintenance of the system;
- Training of artisans;
- Training of animators to the communication techniques through the SARAR participatory method and the marketing of appropriate technologies;
- Setting up of weekly meetings to discuss the project activities;
- Creation of bank account for the revenues from the different activities of the project.

STRATEGY

In all activities undertaken in a sustainable way, CREPA's strategy relies on three interlinked components:

1°) Appropriate technologies, whose promotion and vulgarization are sustained by a dynamic process of transfer of know-how through capacity building at local level;

2°) Community participation, supported by a set of participatory approach tools to achieve effective involvement of all endogenous actors of the development;

3°) Endogenous-financing mechanisms, developed at community level to achieve short term self-financing of development activities, and long term water and sanitation sector financing.

The diagram below shows how the strategy works.

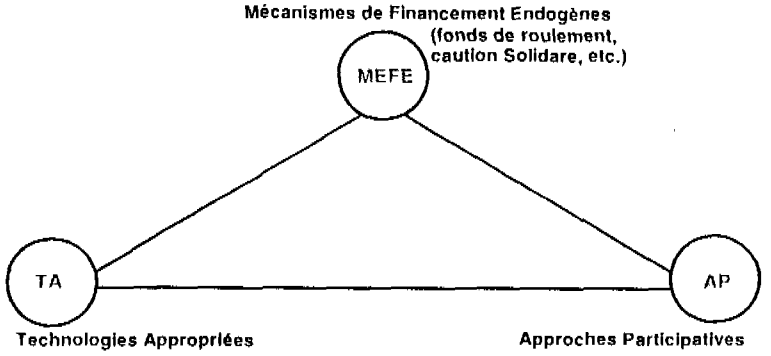
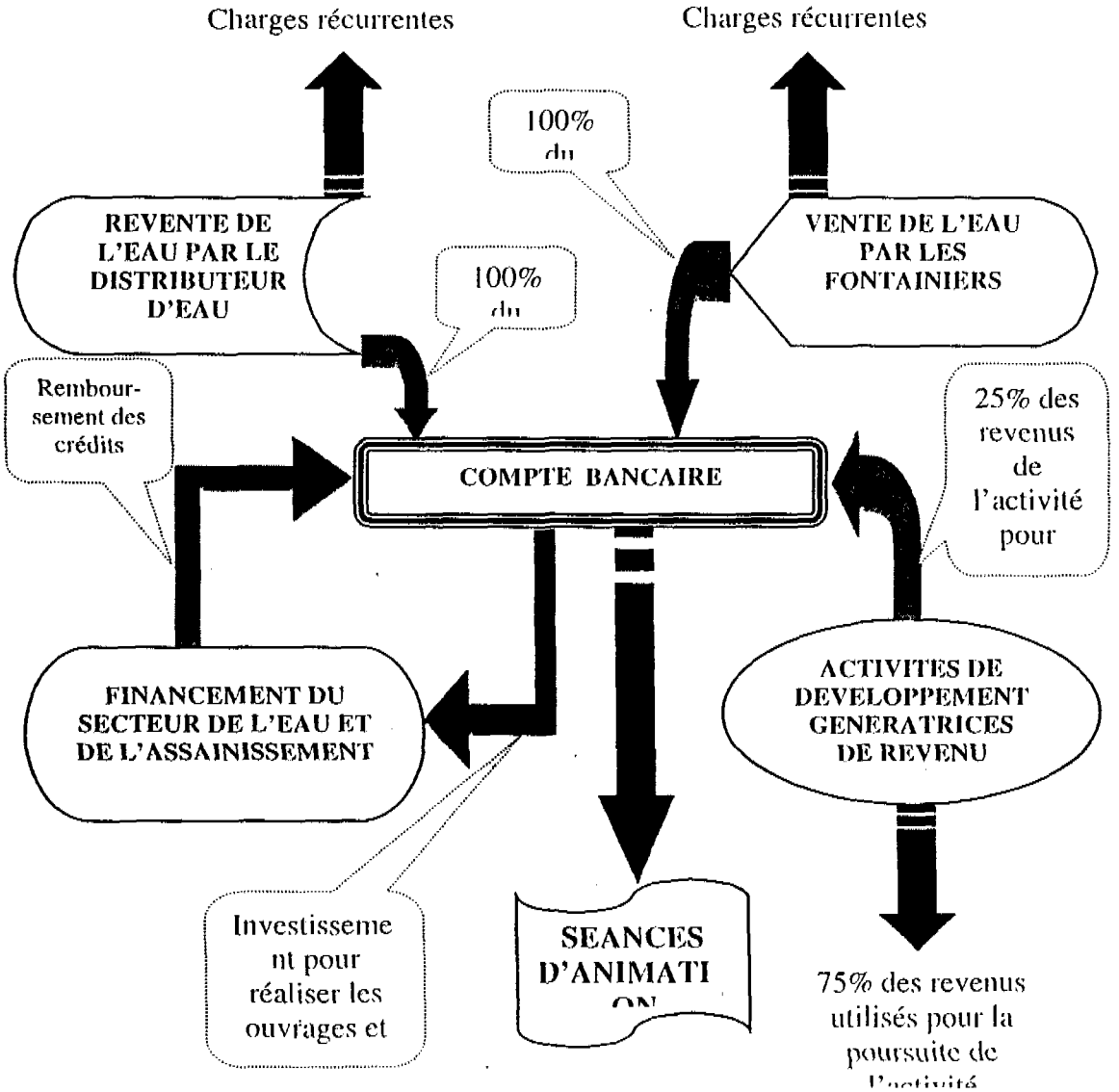


Figure 2: Diagram of CREPA strategy

The linkage between the three components on the development actions undertaken by the community contributes to ensure their sustainability.

This case study of Sector 28 is articulated around five main activities as shown on the diagram below.



➲ ***Sale of water at the water-point***

This is performed by 2 Fontainers (a man and a woman), both members of the management committee. Everyday when the pump starts running, they write down the index on the meter for the water pumped to the reservoir and for the water sold. They repeat the exercise at the end of the day. Controlled sheets elaborated by CREPA allow to estimate the unaccounted for water on one hand, and to verify the daily incomes on the other. The salary of each fontainer is 15% of the net profit. Therefore, the more they sell, the more they earn. This contributes a lot to motivate the Fontainers and therefore, to the efficiency of the work. The safety guard of the unit working every night is paid $20.00 US per month. The net profits of the sale of water are deposited in the project bank account. The economic analysis done on the lifetime of the project have given the minimum amount of money the committee must save to be able to renew certain components of the system and to deal with the operation and maintenance costs. The rest of the money is used to finance development activities in the project area. This principle applies to any activity (which can generates funds) undertaken within the project and generating funds.

➲ ***Resale of water using appropriate technologies called Water Distributors***

This is a simple system, easy to maintain and rapid. It is composed of a chart connected to a bicycle The chart contains 2 plastic barrels of a total capacity of 120 liters (60 liters each). The barrels are cleaned every morning before the work starts. The system has the advantage of covering a large area within a small timeframe compared to the traditional systems. The particularity of this system is that water is sold at the same tariff (15 CFA francs per barrel) no matter the distance within the project area. Three strategies are developed for the use of the water distributors: ***Employee system***, ***Rental system*** and ***Rental-Lease*** system.

In the strategy of ***Employee system***, the vendor uses the distributor and returns all the money he collected during the workday. The money is given to the Fontainers who are in charge of noting the number of tours he did in order to check the amount of money. To register his work day, the vendor must sign at the en of the day the control sheet on which the Fontainers have written the number of tours and the amount of money collected so that everybody knows how much is in the account. At the end of the month, the vendor receives a percentage of the revenue of the resale of water. This is a negotiated percentage and is always equal or less than 50% of the total revenue.

In the strategy of the ***Rental system***, the vendor gives every day a certain amount of money negotiated between $1.00 US and $2.00 US and anything he earns over that negotiated amount is his. The project is responsible for the maintenance of the system.

In the strategy of ***Rental Lease system***, the vendor gives a deposit of $80.00US representing 20% of the cost of the distributor. He uses the system and pays monthly a certain amount of money over a period of 12 to 18 months. At the end of the timeframe when he has finished paying the lease, he owns the system.

In each of the above three strategies, the vendor is linked to the project management committee by a contract. The net profits are put into the project bank account.

➲ ***Hygiene education***

This activity done by the animators who are members of the project management committee in the project area aims at:

- sensitizing the community on diseases related to water and poor hygiene practices;

- promoting the use of appropriate technologies for water supply and storage and sanitation;

- and sensitizing beneficiaries of equipment obtained through loans/savings systems to pay back within the timeframe.

There are 4 women trained as animators. Every Tuesday, Wednesday and Thursday afternoon they do animation and sensitization at individual household's level and in groups. At the same time, they

distribute the application form for people who are interested in having water and/or sanitation systems. These applications are then studied by the committee. Each animator is paid per afternoon session at $0.65 US.

➲ ***Development of activities generating fund***

These activities are all undertaken through demand-responsive approach. There are micro project either proposed by the management committee or by associations in the project area. Any activity that can bring together the community around a common interest on one hand is welcome. Most of the proposed micro project can generate enough fund to reimburse the loan used for the first investment, ensure sufficient rolling fund and contribute to finance the creation of other activities. The approach used is that they must be a project document submitted to the management committee for study. When it is approved, the committee finances partly or entirely the micro project on the basis of a convention signed between the parties in which the terms of reimbursement of the loans and of use of the revenues of the activities are defined.

➲ ***Financing the water and sanitation sector***

This is the last step of the process. The project must be able to continue and self-finance without CREPA, to undertake activities aiming at making it sustainable. Actually, the production of equipment and construction of sanitation facilities concern VIP latrines and soakaways for excreta disposal and Potable Water Pot for water storage. These activities are financed from the net profits of the above activities. The strategy used at this level is the ***Loan/Saving system***. Depending on the type of equipment of facility, the household makes an application that is studied by the committee. If it is accepted, the household pays a deposit (first payment) to get the system and must pay the rest of the money within three months. For people who have the capacity to pay cash, that can be done. These activities contribute to increase the financing capacity of the committee.

CONCLUSION

The project of Sector 28 is developed through the involvement of public authorities, private sector and community based organization. Because of its main objective which is ***to build institutional capacity and institutional collaboration to set up appropriate strategies for sustainable water resource management***, the project has been a major challenge for some and a relieve for others. A challenge, for the simple reason that communities living in low income periurban areas come from different regions and have different cultures , therefore do not have the same traditions. That context makes the process difficult to ensure a good involvement of users in the management. A relieve, in the sense that the mechanisms put in place to sustain the project allowed low income revenues people to have access to safe water every day, to create jobs through the development of activities generating funds, and to make funds available to finance the water and sanitation sector in the project area.

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FINANCING AND FUNDING MECHANISMS

SUMMARY OF THE PRESENTATION.

TITLE: Small Scale Enterprise Involvement in WES Services in Kisumu Municipality

NAME: Wangari Mwai
Researcher/Trainer on Participatory Research and Action

Senior Lecturer, Maseno University College.

SECTIONS:

(A) What is privatisation

(B) Why Privatisation

(C) Options for Privatisation in Kenya

(D) Privatisation and the Kisumu Municipality

(E) Illustrations.

(F) Conclusions and Recommendations

A. Privatisation: What is it

- Deconstruction/dismantling role of the public, government and parastatal sectors

  and

- Construction or transfer and support of private sector involvement.

B. Why privatisation: Objects??

- It is hinged on the hypothesis that private ownership brings greater efficiency and
- To enable the government agencies a"public sector" to shift focus from implementation and to concentrate more on policies and regulatory functions governing the sector.
- To encourage other actors to play a more active role in development.

C. Options for privatisation in Kenya.

(a) Competitive bidding

(b) Public offering shares

(c) Sale of shares by private placement

(d) Negotiated sales in so far as preemption rights exist and have been exercised.

(e) Sale of enterprise assets (including liquidation)

(f) New private investments in enterprises

(g) Employee/management by buying out

(h) Leasing or award of management contracts.

D. The Kisumu Municipality:- A case!

Privatisation in this case is taken to mean the growing involvement of small scale enterprises in water and environmental sanitation services.

Do you know Kisumu? A few tips.

(a) Port township situated on the Kenyan shores of Lake Victoria

(b) Located in Winam Division, Kisumu District of South Nyanza Province, Kenya.

(c) 1984 municipality population was 167,000

(d) Has a diversity population

(e) Level of income determines where you settle withing the municipality

and

(f) Subsequently the side of the WES gap you are to be found in

(g) This municipality especially its lowest income settlement (slums) are usually associated with cholera.

(h) A municipality that has had a poor public WES services performance (e.g dry water taps)

E. Maybe because of the poor performance in water and environmental sanitation services, this is one area that small scale enterprises have ventured in.

- Illustrations of water, solid waste, and faecal disposal.

F. Conclusions and Recommendations.

- The hypothesis of effectiveness and efficiency of the private sector has been proven by this case

However,

- The private sector invorment in this cased has not adressed hte provision of water and environmental sanitation services to he poor. Those who can pay will, what of those who cannot?

Furthermore,

- When a disadvantaged poor live without services, the potential for the contamination of ground water and the lake water used by all and sundry, is very high.

- Kisumu municipality has high potential for privatisation, but the "public sector" needs to be conscientized about it so that they can *** faster.

- Privatisation is a new and recent phenomenon in Kenya nd Africa in general.

Therefore,

- People view it with a lot of suspicion and hence fierce debates have often arisen. There is need to raise awareness and conscientize our people about it.

SITUATION ANALYSIS OF FAECAL DISPOSAL (PRIVATE)

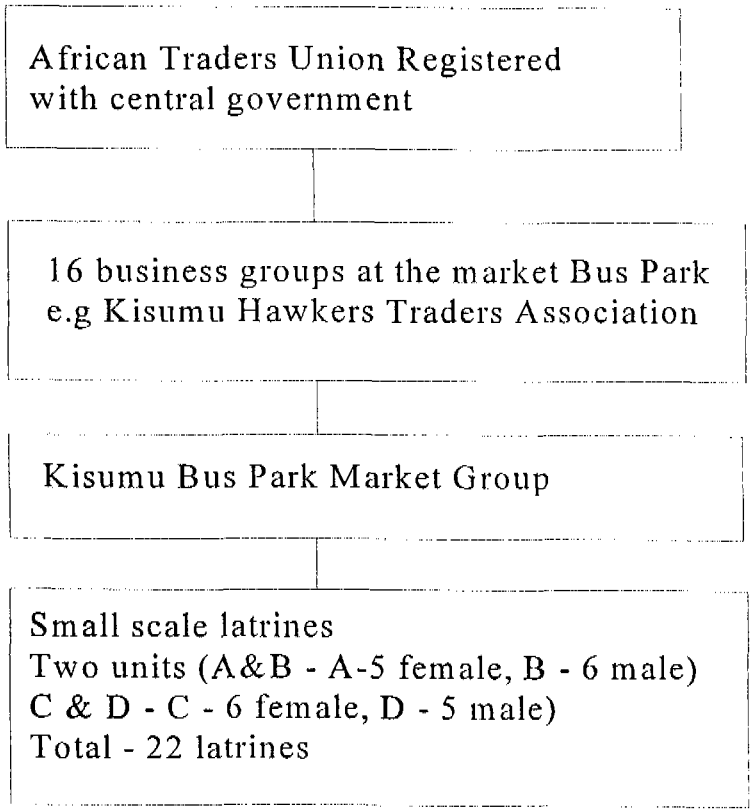
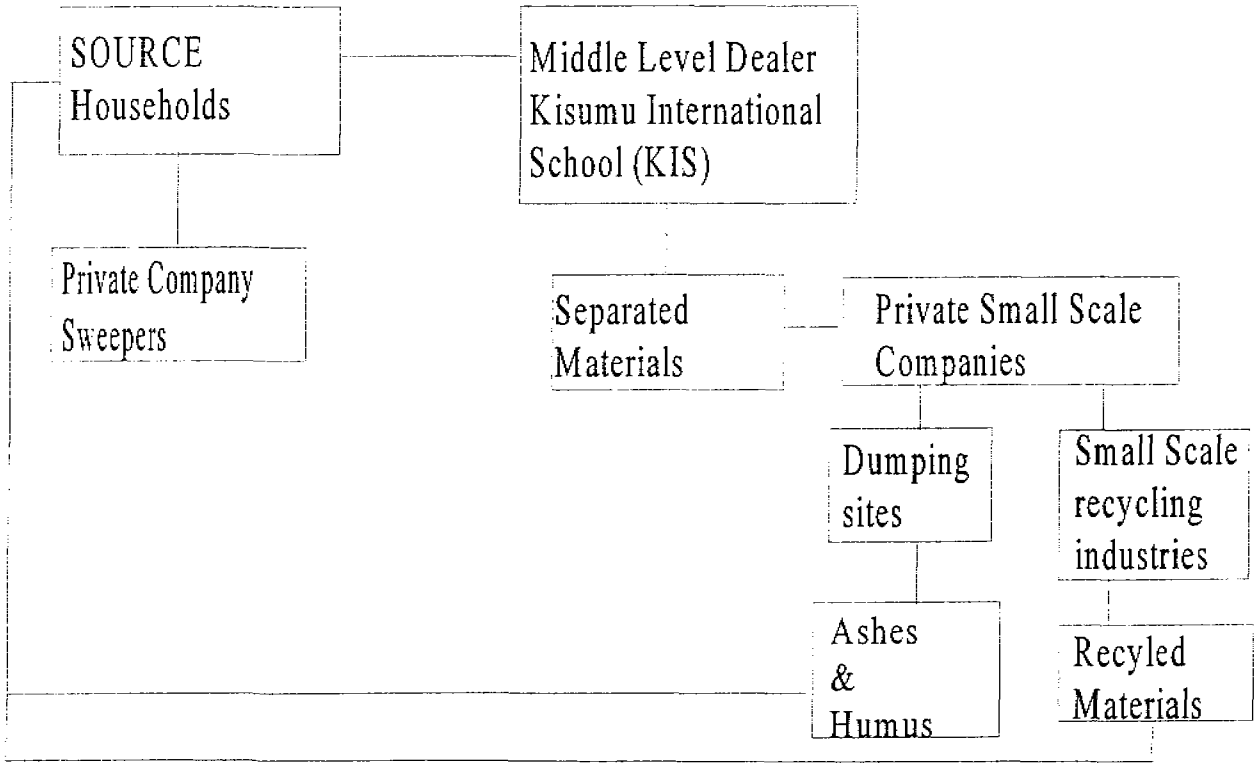
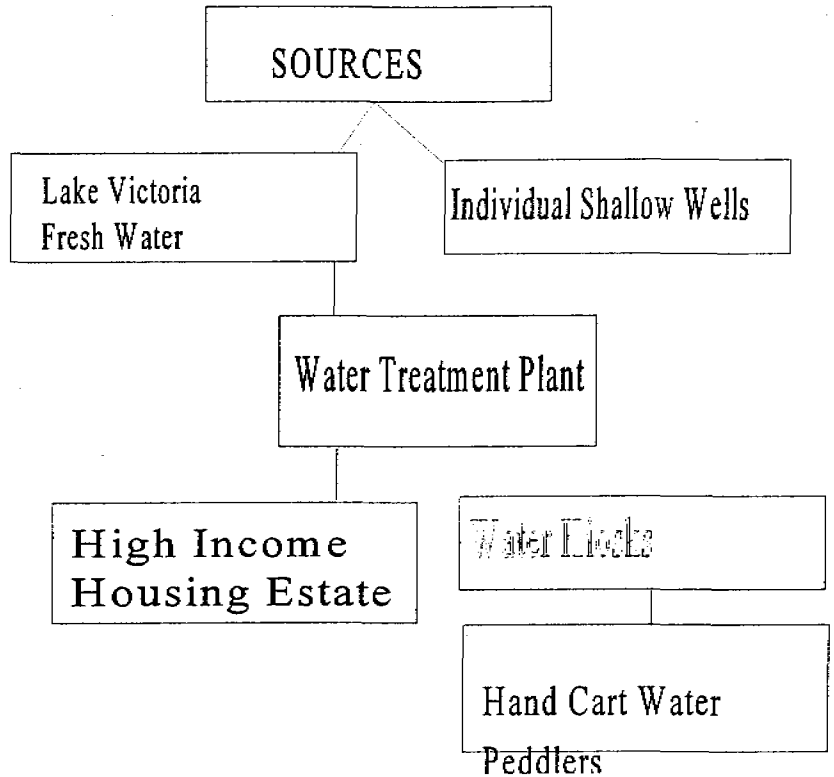


Fig.III: SUMMARY OF SOLID WASTE DISPOSAL.



Situation Analysis for Water.



Micro projects financing of water supply and sanitation In Zambia

P. Chola, Zambia

INTRODUCTION

The Microproject Unit (MPU) was established in 1991 when the Social Recovery Project (SRP) and the Microproject Programme (MPP) joined together to supplement each other in funding community initiatives to help mitigate the negative effects of the Structural Adjustment Programme (SAP) on the vulnerable groups in society. The interventions are mainly aimed at rehabilitating education, health, water supply and sanitation facilities. The two projects have similar approaches in their implementation and use the same criteria to identify and select the projects. This paper will however focus on the SRP, its achievements and constraints it has encountered in implementing its projects.

Selection Criteria

Zambia's National Water Policy advocates for the Water Supply, Sanitation and Health Education (WASHE) Concept and its strategies in implementing rural and peri-urban water supply and sanitation programmes. WASHE concept emphasises on women and youth participation in such programmes and project proposals will qualify for SRP if they meet the following criteria:-

1. located at a school, health centre or market
2. village of over 250 people
3. willingness and ability to participate and/or contribute 25% of total cost of the project
4. at least 50% women participate in decision making
5. absence of existing safe water source and sanitation facility
6. beneficiaries to come from low income groups

Components

There are three components to the SRP:-

- Community Initiatives Support
- Decentralisation and Institutional Support
- Monitoring and Evaluation

Organisation

The MPU is headed by two co-ordinators:- one for SRP and the other for MPP. The MPU is based in the Ministry of Finance and Economic Development reporting to the Permanent Secretary, Economic Development and Budget Division. It is a semi-autonomous unit with 25 professional staff, 20 of these on SRP payroll. There are 9 regional offices throughout the country forming a network supporting and facilitating district and community activities. The regional offices are playing a cardinal role to build capacities at the district levels to strengthen local government administration in planning and implementation of projects. The Permanent Secretary chairs the MPU Steering Committee that gives policy guidance to the MPU. This is a committee of line ministries , Inter-Governmental Organisations(IGOs) and Non-Governmental Organisations (NGOs), the main stakeholders in microprojects.

Funding

A total of 1082 projects have been funded since 1991 with a capital out lay of US$65,000,000. The source of funds were Zambian Government, World Bank, Norad and Finnida. About 50% of the projects benefited through the provision of improved water supply and sanitation.

COMMUNITY INITIATIVES

The SRP supports projects in the provision and rehabilitation of schools, rural health centres, water supply and sanitation, training, economic infrastructure including community managed roads and markets, environment, income generating and revolving fund. Most of the social sector and economic infrastructure in both rural and peri-urban areas had a water and sanitation component which are not reported separately but form part of the microproject.

Community Management

The community participates in the design, planning, implementation, management and maintenance of the project. By so doing the capacity of the community is enhanced so that it will be able to do other community managed projects; in this way a sense of ownership is nurtured and the community will be left with a greater sense of responsibility to look after the project and run in a sustainable manner.

In the implementation of a water and sanitation project the communities participate in the selection of a borehole site, population surveys, selection of technology to be used, planning of construction works and allocation of roles. In all these stages communities receive on-job training and are taken on site visits to go and see what other communities are doing in similar projects. Women participation is very much encouraged and it is mandatory that they are reserved membership sits of at least 50% in project committees.

WASHE Concept

The WASHE Concept is being popularised by the MPU. At each water point a Village-WASHE (V-WASHE) committee is established. The WASHE Programme tackles water awareness issues, good sanitation, health and hygiene education.

The V-WASHE committee reports to the District-WASHE Committee (D-WASHE). At the Provincial and National levels there are the P-WASHE and N-WASHE Committees. The N-WASHE Co-ordinator is tasked to establish and strengthen these committees. This task has been made easier by collaborating with the SRP; eliminating chances of duplicating efforts.

CO-ORDINATION AND COLLABORATIVE MECHANISMS IN IMPLEMENTING WATER SUPPLY AND SANITATION PROJECTS

Microproject Steering Committee

This committee is based in Lusaka and is chaired by the Permanent Secretary, Economic Development and Budget Division of the Ministry of Finance. Representatives from the line ministries of Water, Local Government and Housing, Works and Supply, Education, Health, Community Development and Social Services sit on this committee. The main functions of this committee is to provide policy guidelines and to provide checks and balances in the selection of the projects. The line ministries also make sure that there is no duplication of projects with those being implemented by the individual ministries.

Provincial Development Co-ordinating Committee (PDCC)

The Provincial Permanent Secretary chairs this committee. This is the provincial development planning organ and the secretariat is made up of the offices of the Provincial Planning Officer and Microproject Regional Officer. All provincial annual plans are consolidated and ratified by this committee before submission to Budget Office in the Ministry of Finance and Economic Development. The P-WASHE when established will be subset of the PDCC.

District Development Co-ordinating Committee (DDCC)

The DDCC is chaired by the District Secretary or Town Clerk. The Microproject Unit is represented by the District Planning Officer. All District development plans are submitted to the DDCC. However, funds to microprojects implemented in the districts are channelled directly to individual projects from Lusaka. The D-WASHE Committee is part of the DDCC.

Disbursement of Funds

Each project opens an account at the nearest commercial bank. The project WASHE committee will chose three signatories to the account among them a treasurer, who is usually a woman. The account operates on an imprest system and MPU reimburses funds after verification of goods and services procured and upon production of accountable documents. Auditors carry out prompt inspections; the quality of construction works is monitored by the MPU technical officers.

Decentralisation and Institutional Support

The overall strategy of SRP is to gradually empower and shift responsibility for project implementation to appropriate line ministry district offices and community based organisations. This is working quite well as the district and provincial staff are very much involved in the implementation of microprojects. SRP has been conducting intensive training workshops for provincial, district and community based extension workers in the implementation of microprojects. District officers have been trained in facilitation and technical skills. Training in capacity building both at district and community levels is crucial for successful and sustainable implementation of these projects.

The knowledge impacted into communities through WASHE programmes has created awareness for need of safe and adequate water supply and hygienic surroundings. Simple maintenance skills are taught through WASHE programmes which are essential to sustain the water and sanitation facilities.

Monitoring and Evaluation

MPU has been commissioning evaluation studies through private consultancies to physically assess its performance and review its field reports. Since 1991, four such studies have been done and the general conclusions are that:-

- The organisation structure and MPU strategies are working extremely well.
- The projects have successfully attained their intended targets.
- The communities have greatly benefited from the provision of water and sanitation facilities.
- Government has responded positively to poverty alleviation programmes for vulnerable communities after microprojects studies assessed the effects of SAP in rural and peri-urban areas.

ACHIEVEMENTS

Capacity Building

The community capacity to manage developmental projects has improved. Communities have acquired technical and organisational skills and are better able to make decisions. This empowerment has extended greatly to women as it is mandatory that 50% of membership of a project committee should be women.

Protection of the Poor from the Adverse Effects of Structural Adjustment Programme

The SRP's rigorous procedures at application and initial project appraisal ensure that only the deserving communities and the poor benefit. The beneficiaries in both rural and per-urban areas belong to low income groups.

Equitable Distribution of Projects

Even the most remote villages have access to the MPU. Water points have been constructed/rehabilitated through out the country. The projects are demand driven. Every school, rural health centre and village with a population of over 250 people with no safe water supply and sanitation facilities had their proposals approved and benefited from the MPU.

This achievement is greatly contributing to the attainment of government set target to increase national coverage of water supply and sanitation from 25% and 15% (1991) to 75% and 45% (2015) respectively. The coverage for water supply is currently estimated at 35% (1997).

High Quality of Construction Works

Water Supply and sanitation facilities constructed are of high technical quality and meet standard specifications.

Implementation of Decentralisation Policy

The SRP intervention in empowering districts and communities has greatly assisted government to implement the decentralisation policy. SRP procedures have given latitude to council and district line ministry officials to take active roles to articulate local needs and take positive initiatives to achieve them.

Influencing Government Policy on Poverty Alleviation and Reduction

Statistical studies and surveys done by the SRP have greatly influenced government to put in place measures to mitigate the negative impacts of the SAP to the extent that the World Bank and the donor community have started responding positively for more funding to projects that aim at poverty alleviation and reduction.

Establishment of Collaborating Link

By working together through the V-WASHE, D-WASHE, DDCC, DDCC and provincial and district leadership chances of duplicating efforts are eliminated.

Multiplier Effects

The other indirect benefits of good water supply and sanitation are all those positive effects that up lift the standard of living: reduced incidence of water borne diseases increased productivity and reduced health budgets for medicines; reduction on burden to fetch water by shortening walking distances to water points and time saved spent on other productive chores and leisure.

CONSTRAINTS

Long Distances to Banking and Shopping Facilities

For very remote communities shops and banks are located tens of kilometres away and it could take days to do banking and shopping transactions.

Poor Communication

Project staff at some regional offices are usually cut off from both communities and MPU headquarters. In some areas telecommunication facilities and roads are very poor and mail takes many weeks to and from headquarters. The MPU computer networks is not very efficient due to poor telecommunication.

Accountability

This is not a major problem, however, there had been some cases when funds had not been properly accounted for and project committee members have been disciplined.

Delays in Project Implementation

This is justified as more time is better invested in the initial stages to prepare communities for self-help chores. Many weeks and months are spent on mobilisation meetings and workshops to create an enabling environment for community participation before construction works begin.

THE WAY FORWARD

The main question are would ask after a well or a piped water scheme has been completed is:

How Sustainable are the Operations and Maintenance of the Schemes After the MPU has Pulled Out?

In addressing this question the SRP will continue to use the following mechanisms to improve the likelihood that the water supply and sanitation infrastructure created by the project would be maintained:

- enhance sense of community ownership and responsibility
- enhance community organisation and capacity for maintenance
- ensure technical quality during construction phase
- continue with monitoring of completed projects by the district/project staff to check on operation and maintenance performance by the community
- field inspections and emergency works.
- enhance gender sensitisation to increase women and youth participation in development projects.

CONCLUSION

The MPU in its current status should be supported in its programmes to improve the quality of life in the vulnerable communities. The philosophy and strategies employed in funding water and sanitation projects are very appropriate to ensure their sustainability after project completion.

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Declining urban sanitation in Zimbabwe. – is demand responsive approach the answer?

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ABSTRACT

Urban sanitation in Zimbabwe is characterised by waterborne systems. Increasing urbanisation has resulted in families erecting shacks on existing stands and sharing sanitation services. The sanitation services are thus overloaded. Local authorities either do not allocate enough revenue to operation, maintenance and investment in the large settlements or the management responsibility in small settlements is diffuse resulting in poor maintenance of the network and treatment systems.

Demand for services is high and management rather than technology is believed to be the constraint for sustainable sanitation service provision. The failure to implement and supervise regulations and bylaws is believed to be a major factor causing a decline in service provision.

The international picture

In urban areas of the developing world, inadequate sanitation is one of the principal health problems facing the poor. Almost 40% of the urban population in low income countries remain without adequate sanitation despite massive investments during the 1980's[1][2]. Consequences are largely restricted to the poorer communities of high density areas, informal and illegal settlements where sanitation systems are either not provided, have been allowed to fall into disrepair or are inadequate for the population they are expected to serve.

Official figures of population with adequate services are often difficult to believe and unfortunately "adequate" is rarely defined and may include situations where a hundred or more people are expected to share a single public latrine, or where simple pit latrines are an accepted technology for high density urban communities. The Habitat report on human settlements[3] presents a gloomy picture of a significant decline in service provision in urban areas of Africa.

The World Bank states that there is abundant evidence that urban families are willing to pay substantial amounts for the removal of excreta and waste water from their neighbourhoods [4]. As with water, this is most evident in those areas where people lack access to the service : In Kumasi, Ghana for example, the use of public latrines and bucket latrines accounts for large recurrent expenditures of about 2.5 and 1 % respectively of family income. In Kumasi and in Ouagadougou families are willing to pay about 2 % of household income for an improved sanitation system[4].

Table 1. Typical range of capital costs per household of alternative sanitation systems [4][5].

TECHNOLOGY	COST US$
Twin pit, pour flush latrine	75-150
VIP latrine	68-175
shallow sewerage	100-325
Small bore sewerage	150-500
Conventional septic tanks	200-600
Conventional sewerage	300-1,000

Conventional sewerage is considered too expensive for most developing countries but there are a range of alternative, cheaper, sewerage options that can cut costs to 20-30% of conventional sewerage (Table 1). Advances have also been made in sewage treatment from the relatively low cost stabilisation ponds to the Modified Activated Sludge processes. The important point being to develop and adopt technical solutions appropriate to the climatic, economic and managerial realities. However on the other hand the social and environmental goals place demands for a minimum level of service and it is the match between these two which must be found in terms of affordability and technical and managerial skills.

Other than technological issues, probably the most significant changes taking place relate to an acceptance of the important role that consumers themselves have to play. Water and sanitation services are a natural monopoly and consumers cannot force service suppliers to be accountable. However examples from around the world have shown that a separation of the regulatory and service functions has allowed a greater consumer involvement, more accountability of the service provider, and an improvement in services. New approaches in service provision such as the Orangi Pilot Project in Pakistan and Condominial sewerage in Brazil have provided examples of very successful partnership between a formal sector responsible for "trunk" services and communities responsible for "feeder" infrastructure [4].

Zimbabwe is not immune to these problems and, whilst generally proud of the level of its urban services, increasing pressures from rapid urban growth, economic constraints and the institutional reforms taking place under economic structural adjustment have already resulted in a decline in urban environmental health.

Coverage

The coverage and type of technology used in urban areas is documented in the national census data from 1992 (Table 2).

Table 2. Percentage of urban households using each sanitation technology by Province[6].

Province	TECHNOLOGY						No of Hholds
	Flush	Blair	Pit	Bucket	None	no data	
Manicaland	96.6	1.48	1.66	0	0.25	0.01	43857
Mashonaland Central	85.37	7.73	4.97	0.15	1.74	0.04	15684
Mashonaland East	87.94	4.88	3.69	0	3.14	0.05	15160
Mashonaland West	90.43	1.9	4.8	0	2.87	0	60767
Matabeleland North	91.44	1.33	5.53	0	1.64	0.01	16719
Matabeleland South	88.37	3.86	5.08	0.08	2.57	0.03	11964
Midlands	94.4	1.37	2.23	0	2.01	0.01	70196
Masvingo	97.01	1.04	0.93	0	1.03	0	24181
Harare	93.94	1.71	4.18	0	0.13	0.04	359216
Bulawayo	98.41	0.51	0.65	0	0.42	0.01	145962

From this table it can be seen that the coverage with acceptable sanitation (flush toilets) in the urban areas of Zimbabwe varies from 85 to 98%. A total of 42,996 households do not have access to adequate sanitation in urban areas on the basis of the census figures. However a closer look shows that there has been dramatic changes over the last two decades with densification rather than squatting absorbing the high urban population growth rates. In the high density areas of Harare shacks constructed in the gardens have resulted in the occupancy rate reaching an average of almost 17 people per stand in some suburbs with the number of households per housing unit ranging from 1 to 20. Not surprisingly in these areas 75% of households share toilets[7] and their main concerns are blocked toilets and dirty conditions.

In high density urban areas this densification has resulted in single stands actually housing up to 40 people as visitors, lodgers, or tenants in backyard wooden shacks. Existing sanitation services become overloaded causing increased blockages in pipes and overloading of the treatment facility. As the overloading is as a result of increased occupancy of stands, the local authority is not receiving increased revenue in terms of service charges. This situation is occurring in most cities.

Institutional arrangements

Responsibility for sanitation does not fall clearly within any government agency. Whilst local authorities are tasked with responsibility for service provision, unlike with water supplies, they do not have any technical agency to resort to for advice, policy guidelines or other technical support. The Ministry of Health and Child Welfare has assumed responsibility for rural sanitation but not for Urban sanitation. Urban sanitation standards are set and controlled through a variety of legislative mechanisms from the Housing Standards set by Ministry of Local Government and National Housing, the Public Health Act and the Water Act. The Ministry of Public Construction looks after wastewater treatment systems established at government institutions

Local authorities follow the appropriate legislation and bylaws which determine the standard of services to be provided. Within urban authorities there is usually a works division with a subdivision dealing with water and sewerage. The larger local authorities have a town engineer heading the works section and able to provide technical guidance for the authority. Smaller urban authorities may lack the services of an engineer and rely on artisans whereas growth points and rural service centres may lack even this level of technical support.

The sanitation services afforded to the urban population of Zimbabwe are primarily waterborne. Urban areas classified as towns or cities are not permitted to have ventilated pit latrines as a sanitation option for housing. Bucket systems used to be permissible in urban areas but have been phased out over the last few decades. They are no longer a permissible technology in terms of the Housing Standards Act and have recently been excluded as an acceptable technology in mines also (Mining (Health and Sanitation) Regulations, 1995)

At small urban centres such as growth points and service centres, pit latrines are commonly found. In these situations water supplies are often run by an authority other than the local authority and may not extend to the whole urban community. Additionally, these small urban centres are run by a local board or the Rural District Council who have neither the technical skills nor financial resources to be able to install and maintain full sewerage. Accelerated growth in these small centres is resulting in rapid deterioration in environmental conditions.

Environmental pollution

Unlike on site sanitation systems where environmental effects may be obvious and immediate, water borne systems have distant effects which may not be so obvious but are nevertheless important. The quality and disposal of treated effluent is a factor of major concern when considering the environment, health and the sustainable use of limited water resources. There is no mechanism in Zimbabwe for systematically recording how or where effluent is disposed of but the records from visits of the Pollution Control Unit of the Department of Water Development to waste water treatment works provides some insight into the methods used[8] (Table 3).

Table 3. Methods used for the disposal of treated wastewater in relation to the quality of the effluent. (Poor = most parameters do not meet required standards; average = more than half the parameters meet the standards; good = all parameters meet the standards).

Disposal method	Number of systems	Effluent quality (where available)		
		Poor	Average	Good
to natural waters	52	30	11	2
Irrigation	41	17	14	4
recycling	3	0	2	1
evaporation	9	4	3	2

Disposal of treated effluent has posed problems in that technology available for most urban centres, even when working satisfactorily, produces water of high phosphate and nitrate levels causing pollution and eutrophication of receiving water. Techniques for the full recycling of wastewater have not been widely adopted in Zimbabwe and the most significant method of avoiding pollution has been the use of effluent for pasture irrigation. This use is controlled by the guidelines laid down in the Public Health (Effluent) Regulations, 1970, which regulate the use of sewage effluent for irrigation purposes. The disposal of effluent into natural water bodies is controlled by the Water (Effluent and Waste Water) Regulations, 1977.

Privatisation

Large urban centres in Zimbabwe are considered to be providing a reasonably well managed service as regards water supply and sanitation, run on a full cost recovery basis. This is in an environment where there has been considerable attention given internationally to the benefits of privatised water utilities. The success of the systems in the municipalities might suggest that a water utility may not provide any particular advantages for Zimbabwe. However, there have been concerns that the full incorporation of water and sanitation services into municipal accounts and management results in revenue from these services being used to subsidise deficits in other departments rather than in ensuring the proper maintenance and development of water and sanitation services. It is for this reason that some municipalities have been considering separating the water and sewerage department to stand alone but still remaining within Council in an effort to improve efficiency and management of the services. This would provide a compromise between the privatisation advocates and the public concerns for efficient, accountable management of these essential services.

The small urban centres provide a completely different scenario where accounts do not balance, charges bear no relation to service provided, no one agency is responsible or accountable and there is a serious lack of technical skills. The possibility exists that management contracts for such areas may be an appropriate way to move forward.

Summary

We have a situation in Zimbabwe where urban sanitation standards are declining due to overcrowding, sharing of facilities, overloading of treatment works and poor management of small emerging urban centres.

Given the financing situation and the operation and maintenance status for urban sanitation systems it is essential that the management issue be addressed urgently. Local authorities should review the management system for water and sanitation services to ensure the revenues match the real costs, to ensure that adequate allocations are made for operation and maintenance of sanitation systems, and to ensure timely investment in new infrastructure to meet the demands of growth.

There is little or no accountability in the present system and the lack of effective policing from national level removes all incentives for urban sanitation to perform effectively and efficiently.

There is much attention being given at present to demand responsive approaches as a strategy to address many of the problems facing the water and sanitation sector. We see daily from press reports, research results and with our own eyes that people in urban areas, especially the unserved, demand safe, regular and reliable services. Usually they are unsuccessful in these demands. There are numerous examples in Zimbabwe and elsewhere where rural communities have dug pits for latrines and waited for the promised assistance which never comes. We are well aware of the literature which shows clearly that the unserved in urban areas pay more for their (poorer) services than the served.

The demand responsive approach must be used with care in urban communities. The interests of individuals or families or even small groups may need to give way to larger interests of the community. Sanitation solutions have to take into account impacts on generations to come (groundwater pollution) and risks to other members of the community (epidemics) such that there remains a need for bylaws and regulations. Demand responsive approaches will not overcome problems which are caused by a failure to implement or enforce bylaws and regulations and it is this which is the most common failure of urban centre management.

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SERVICE OPTIONS

Solid Waste Management in Low Income Urban Areas

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ABSTRACT

One of the most enormous challenges facing urban centres in developing countries is the management of solid waste generated by them. The service absorbs a significant proportion of municipal revenues. Rapid urban growth and economic decline in a number of African countries, over recent decades, have strained administrative capacities, reduced service coverage and steadily diminished the quality of service offered. Urban solid waste management services have , therefore, consistently failed to keep pace with demand and the insidious health and environmental effect of this neglect is greatest in low-income urban areas.

Poorly planned and inadequately managed dumping sites compound the situation. In Nairobi for instance, the Dandora dumping site is located in an area adjacent to human settlement. Waste disposal in this manner simply means removing waste from one human settlement and dumping it in another. And, from experience, what is waste to a person from a high income urban area is a valuable source of livelihood for others from low-income areas. If not properly managed, rotting wastes from such open dumping sites become a source of contamination and disease.

The smell attracts flies, and the heat generated by decaying waste offers a fine breeding environment for flies, which are the most effective transmitters of diseases. Lack of proper drainage and fluid-treatment facilities within the dumping areas also lead to pollution of both surface and groundwater resources. Lastly, lack of proper fencing exposes scavengers and children from neighbouring human settlements to poisonous materials and high risks of injury from glass and metal.

With the help of slides, this paper aims to highlight the health and environmental hazards of deficient solid waste management in low-income urban areas. It contends that solid waste should be seen as a resource that could benefit the poor sections of urban population and demonstrates that resource through recycling is a basic element in waste management. It, therefore, advocates for solid waste collection routines that facilitate early separation and sorting of waste for recycling. This helps to reduce the volume of waste disposed, avoid poor environmental conditions that scavenging on dumpsites constitutes, and promote the development of a commercial and industrial network based on the supply of raw materials extracted from waste. The result is a clean environment, reduced collection costs and employment opportunities in sorting, recycling and remanufacturing of materials extracted from solid wastes.

INTRODUCTION

Waste can be defined as "something which the owner no longer wants at a given place and time; and which has no current perceived market value" (Suess etial, 1983). The urbanisation of low income areas and the rapid growth of spontaneous settlements are taking place on a magnitude of scale that regional, national and local governments cannot cope with. At the city level, this is most noticeable in areas of infrastructure to handle the solid wastes. A perfect example is in the city of Nairobi where services have failed to reach low income areas such as Dandora, Kariobangi, Mukuru, Kibera, Kayole to name a few. In areas with existing solid management such as the posh residentials, the services have been fast deteriorating, calling in for the entrance of private individuals and companies to take up on waste management. These are Umoja, South B and C, Nairobi West, Westlands, Kahawa, Southlands, Parklands, Kahawa, Southlands, Parklands among other areas.

But why are developing countries lagging in solid waste management? Where does the problem lie and what efforts are being put forth by both local and national governments?

Management of solid waste globally is one of the most costly services to provide, typically, it absorbs up to 2 per cent of GDP and 20 to 40 per cent of municipal revenues in developing countries.

In Nairobi, the city council with a total of about 17,000 employees, with less than 5,000 on waste management and with very limited machinery is not satisfactorily serving the city of 3.5 million inhabitants. The total waste handlers, that is incorporating the private and the local government employees in Nairobi gives a dismal figure of one worker per 500 population! Shortcomings in planning and the use of inappropriate technology have contributed to serious wastage of resources and urgent efforts are needed in solid waste management.

Sources and classification of solid wastes

In low income areas, the sources of solid wastes are from the human settlements namely household wastes, dispensaries/clinics/hospital wastes, shops, small industrial wastes, institutional wastes, animal wastes.

Classification of the solid wastes can be carried out in the following ways:

1. Classification on the basis of origin - examples are domestic, institutional, commercial, trade and markets, demolition and construction.
2. Classification on the basis of nature of the components: organic or inorganic; combustible or non-combustible; putrescible or non-putrescible
3. Classification based on the kind of materials for example: garbage; rubbish; street refuse; construction and demolition wastes; ashes; dead animals; animal and human wastes

Classification on the basis of refuse material will be adopted for this Paper.

Table 1: Classification of refuse materials

Garbage	Wastes from the preparation, cooking and serving of food, Market refuse, waste from the handling, storage, and sale of produce and meats		From: households, institutions and commercial concerns such as: hotel, stores, restaurants, markets etc.
Rubbish	Combustible (primarily organic)	Paper, cardboard, cartoons, wood, boxes, excelsior, plastics, rags, cloth, bedding, leather, rubber, grass, leaves, yard trimmings.	
	Noncombustible (primarily inorganic)	Metals, tin cans, metal foils, dirt, stones, bricks, ceramics, crockery, glass, bottles, other mineral refuse	
Ashes	Residue from fires used for cooking and for heating buildings, cinders		
Bulky wastes	Large auto parts, tires stoves, refrigerators, other large appliances, furniture, large crates, trees, branches, palm fronds, stumps, flotage		From: Streets, Sidewalks, Alleys Vacant lots, etc
Street refuse	Street sweeping, dirt, leaves, catch basin dirt, contents of litter receptacles		
Dead animals	Small animals: cats, dogs, poultry, etc. Large animals: horses, cows etc.		
Abandoned vehicles	Automobiles, trucks		
Construction & demolition wastes	Lumber, roofing, and sheathing scraps, rubble, broken concrete, plaster etc. Conduit, pipe, wire, insulation, etc		
Industrial refuse	Solid wastes resulting from industrial processes and manufacturing operations, such as: food processing wastes, boiler, house cinders, wood, plastic, and metal scraps and shavings etc.		From: Factories Power plants, etc
Special wastes	Hazardous wastes: pathological wastes, explosives, radioactive materials Security wastes: confidential documents, negotiable papers, etc		Households, hospitals, institutions, stores, industry, etc.
Animal and agricultural wastes	Manures, crop residues		Farms, feed lots
Sewage treatment residues	Coarse screenings, grit, septic tank sludge, dewatered sludge		Sewage treatment plants, septic tanks

COLLECTION METHODS

Community waste disposal is mostly concerned with primary collection, and the choice between different collection systems at his level determines the main costs to the community in effort and money. Ultimately, all costs of waste disposal are paid for by resident in one form or another, and this choice is, therefore of special interest to the community. The choice of systems at the primary collection level can vary considerably, depending on the amount of labour, the level of community participation and the transport system used.

The following collection methods are common in developing countries:

No collection

This is a common system used in low-density housing areas. The community throws the waste 20-50 metres away from the house and leaves it there. Chickens, goals, ants and pigs eat the digestible parts form the waste the same day. Rotting becomes minimal, and fly or larvae breeding is reduced, owing to the chicken eating the larvae. In dry countries, the sun dries the remains and virtually no gases are emitted. The remaining small quantities are occasionally burnt.

Communal collection

Under this system, house holders discharge their wastes at pre-determined locations containing some form of communal storage facility, and refuse-collection vehicles visit these sites at frequent intervals, usually once daily, (not any more in Kenya), to remove accumulated waste. The principal advantage of this method is that it reduces considerably the number of sources from which waste has to be collected. The economies that result from the reduced number of collection points might, where public co-operation is poor, be transferred to the street cleansing service. Waste collection off streets is more expensive than directly from houses. The frequency with which communal storage facilities should be distributed is often dependent on the extent to which a community is willing to co-operate in its proper use

Block Collection

Under this system, a collection vehicle travels a predetermined route at presented intervals, usually every two to three days, and stops at selected locations, where a bell is sounded. Upon hearing the bell, householders bring their refuse containers and had them over to the crew, usually consisting of three men, which empties the containers and returns them to the householders. No containers are left outside household or premises or communal land.

Kerbside Collection

Here, the collection crew collects bins, bags and other containers of refuse which are deposited at the kerbside at fixed intervals, usually on two specific days in the week, when collection takes place. This system requires a very regular and well organised collection service, so that householders know when to leave out their wastes. Al-

though kerbside collection has not been used in conjunction with sounding of a bell or other signal to invite households to set out their waste containers, the increased use of this option could reduce some of the disadvantages of the system relating to the scattering of refuse by scavenging animals, theft of containers and traffic accidents caused by rolling bins.

Door-to-door collection

In this system, the collection crew enters each premise, takes out the container and sets it back after emptying the waste into collection vehicles. The lack of householder involvement in the collection process is however, offset by increase labour costs in entering all premises. Most important, door-to-door collection method only proves productive when collection is infrequent, typically once weekly.

STORAGE METHODS

Solid-waste storage facilities may be classified as primary (or individual) and secondary (or communal) storage facilities. In developing countries, it is essential that storage facilities be as far as possible, animal proof, insect proof and weather proof, washable and robust enough to meet the exigencies of normal use. The storage volume required for household wastes is a function of the number of premises served, rate of waste generation, family size and frequency of collection. Storage capacities required for commercial and institutional premises will be determined by premises size, nature and waste generation.

Primary waste storage

A variety of facilities are used for primary storage of solid wastes. Temporary containers, such as cardboard boxes and plastic containers, such as cardboard boxes and plastic carrier bags, are used in unserviced or poorly serviced areas. The introduction of a reliable collection service often leads to the use of permanent containers.

The provision of permanent containers is invariably voluntary but may be encouraged by propaganda standardised use of purpose-made plastic bags is often inappropriate for developing countries, since they require careful organization to distribute, are attractive for alternative use, susceptible to tear by scavenging animals and could add up to 50% of the annual cost of providing a refuse collection service.

Many of the primary waste-storage facilities commonly used do not project against breeding of flies, and the use of containers lids is essential to interrupt the breeding process. Plastic and galvanised iron bins with lids are commonly used in middle-income and high-income areas, but they are relatively valuable and, hence, susceptible to theft. The low cost alternatives are containers made from used car and truck tyres with capacities ranging from 30-80 litres, when fitted with a suitable lid.

Two hundred litre oil drums are used as primary storage facilities for commercial and institutional premises. They are however, very heavy to handle and do not facilitate speedy transfer into collection vehicles.

Depending on the method of waste collection, the standardization of primary, storage facilities could maximise labour and transport productivity. This is especially true for waste collection methods that rely on the direct handling of primary refuse-storage equipment by municipal workers.

Secondary waste storage

These may be either stationary or portable units. The most common stationary units are uncovered masonry enclosures with capacities between 1 and 5 metres and access for loading at the top and unloading through a slide flap door; and concrete pipe sections with capacities up to 300 litres.

Secondary waste storage facilities have been tried and frequently have failed. Waste is often scattered around the facility, and insects, rodents and animals are attracted to it. Besides creating aesthetic and health problems, stationary waste-storage facilities are operationally grossly inadequate waste has to be removed by raking out on to the ground and collecting in baskets before being carried to the vehicle. This is often demeaning, unhealthy and time consuming task which limits productivity of both labour and vehicles. The continued use of secondary waste storage facilities cannot be justified.

DISPOSAL METHODS

There are 4 methods of waste disposal which are all practised by low-income residents. The community participation in waste disposal is, therefore, first a question of organisation and motivation and, only secondly, a matter of knowledge.

Dumping

Controlled dumping of municipal waste is a safe and efficient method of waste disposal that, in the long run, renders the waste harmless and allows the land to be used again for other purposes. Controlled dumping prevents harmful environmental effects and is a relatively cheap method of waste disposal. However, it requires a great deal of land located at some distance from settlements, and might be difficult to find. It also demands great qualities of soil to cover the dumped waste.

In Kenya, it is almost in contrast, the dumping practices present. There is 'all over' dumping. Virtually, every small open space has been turned into dumping sites especially in the big cities. This has gone on unchecked by the local councils and has forced the residents to come up with solution to this problem, hence the famous 'No dumping' signs all over.

Composting

Composting has long been used in agriculture, but its application to the digestion of urban waste has only recently been developed. It is essentially a process by which organic matter (food, leather, wood, paper etc) decays.

In low income housing areas, as much as 90% of waste might be compostable.

In Kenya, especially in Nairobi composting is a rare disposal method except for rural settings where composts

consist of livestock wastes, sugar wastes etc.

Composting, can be turned into a profitable business in Kenya for holders of small vegetable plots and nurseries for potted and garden plants.

Incineration

Refuse contains about 25-60% water and 15-50% combustible material such as plastic, plant material and wood. The rest such as sand, stones, metal and glass etc are non combustible. During burning, hot gas is produced containing CO2 and a great number of acid gases. Some materials such as paints, plastics, rubber and synthetic textiles produce toxic fumes. All of these are harmful and constitute air pollution. Ashes will correspond to 15-30% of the original weight of the refuse.

The burning or incineration of waste is commonly done for sites where no collection is done or is possible. This is very common in the case of hospitals. In Kenya, for example, Nairobi Hospital boasts a very modern suitable incinerator.

For the household incinerators, sufficient quantities are required, and wet materials that can be composted should therefore not be place in the incinerator.

Old pre-colonial houses and institutions in Kenya boasts of incinerator facilities. A few of the present day buildings have incinerators.

There are consultations going on in the country for a possibility of a multi-million public incinerator which thinkers are of the view that the incinerator will put to rest the waste management problem.

RESOURCES RECOVERY TECHNOLOGIES

The recovery of usable materials or energy from waste is called resource recovery. The less processing needed before the reclaimed materials can be re-used, the more attractive it is economically. Waste paper from offices, for example, can be used for paper pulp without any further treatment, while newspapers will need de-inking. Similarly, clean transparent plastic can be used directly for the production of bags while soiled and coloured plastics have to be cleaned and sorted before use and can only be used for cheap products.

The simplest and most economical recovery method is separation. In the case of household waste, this requires a great deal of co-operation from residents. The recovery of glass bottles, paper and used textiles is a common example of this. In a few countries, kitchen waste for cattle feed is also collected in this way. For many other materials, however, it is not realistic to expect all the extra work and planning needed from individual households to separate and recover materials (e.g. metal, plastics, wood).

Waste from industry and commerce can be recovered in great quantities of uniform quality of specialized dealers. Hotels, restaurants and markets generate large quantities of kitchen and food waste that can be used as animal feed, with little processing. Garages discard oil products and metals, printing shops reject cuttings and misprints. These institutional sources of waste are naturally attractive sources of specialized materials, because of the quantities involved and the uniformity of the material.

On a community level in low-income areas, the separation of waste on a household level is very profitable. Door-to-door collection of usable materials can be organised, or alternatively, households can bring their collected paper, glass and plastic bottles to the transfer depot where dealers, might have their shops or market stands. The organisation of small processing plants based on wastes as raw materials adds to the general resource-recovery measures. This is a very economically viable undertaking.

In low income areas, there is an increased awareness of the usefulness of scavenging at different stages of the disposal process. In general, the earlier the scavenger can collect the material the more profitable and successful the work is. This is very evident with food manufacturing industries such as Swan Millers and Swan sweet manufacturers both in Kisumu.

There are women scavengers at the respective factory doors waiting for 'rejects' which they turn into consumables at the local market level. This is much preferable to scavenging on a dump, because there is little soiling and 'spoilage'. In the transport and compacting areas, much value is being lost - their load capacities and dumping trips are checked by the increase in scavenging.

There are two elements that directly affect the profitability of recovery of material - the scale of the operation and the point from which the material is extracted. The question of scale is related to the quantities that it is economical to handle, process and sell to manufacturers. It is only when the material is handled in tons, rather than in kilograms, that recovery becomes a viable enterprise. The point from which the material is obtained often determines the need for additional processing, especially separation and clearing.

Organisation of community-based resource recovery should therefore, select some materials to be separated at source which are of enough value and discarded in sufficient quantity to justify separate collection since the willingness of households is related to convenience and financial incentives, only a few materials can be obtained this way. These include old clothes, paper, plastic bags, kitchen waste, bottles, metals, furnitures etc. The further apart the transport route is between the house(s) and the dump site, the more labour is involved and the less valuable the wastes will become because of further 'depletion' of quality and transport costs. The best solution therefore, to combine "combined separate collection" at the household level with recovery from mixed waste in neighbourhood depots. This means that the primary collection system delivers the waste to a transfer and separation station where a large proportion of recoverable materials will be separated for commercial purposes, and only the residue will be collected by the municipal trucks for disposal. Communities have the possibility of organising their own primary waste collection cycles, resource recovery and refuse depots, as part of a settlement up-grading programme and this has the triple advantage of;:

- income generation
- organisational capacity development that is essential in participatory work
- environmental improvement

Extraction of urban waste is labour intensive with very little technology required. For example, with $100 per cent tonne spent on processing say scrap metal, a resale at $ 150 can be recorded when dealing with big iron plants.

The table below gives further details of income generation expected out a specific investment in waste handling.

Form of reclaimed material	Approx. Cost of recovery ($/tonne)	Nature of material for which reclaimed material is a substitute	Approx. Value of reclaimed material as a substitute ($/tonne)	Profit ($/tonne)
METALS scrap for steel-making & de-tinning	50-100+	Pig iron copper/Alum	150 1000	50-100 900
PAPER Pulp for n/print	50-200	Virgin pulp	300	100-200
GLASS containers for re-use	50-150	New glass	200	50-150
PLASTICS Scrap for recycling	300-500	New thermon plastics	600	100-300
TEXTILES rags for recycling or various fabrics	50-150	Virgin wool fibre Virgin cotton	4000 1500	3800 1200

Source: N.N Lohani, Urban Solid Waste: Recovery and Recycling

Recycling

Three technologies actively pursued in low-income areas are materials recycling, product recycling and conversion.

Materials recycling

This primarily the sorting out and reuse of an existing waste product, e.g. glass, paper, plastics, metal containers and other metallic substances. The scavenging at disposal sites is a common practice of the economically disabled in the society. Some scavengers collect specific wastes from house to house. They usually act for the middle men who economically are better placed and receive the lion share of the trade. The collected waste paper are recycled for production of packing paper.

Product recycling

Unlike recycling, product recycling consists of cleaning, overhauling and/or re-manufacturing. Re-manufacturing, mostly in the jua-kali industries, is the process by which large quantities of waste products, especially metallic substances like old car bodies, drums etc, are reworked and re-designed with other waste parts and/or new items to form an end product different from the original. Metal boxes, cooking stoves, pans, hoes, pangas and containers are among the items being re-manufactured from the wastes. Physical modification like re-treading of tyres also belongs to this group.

Conversion

Conversion techniques are the most economical and beneficial processes by which organic wastes are managed. Agricultural wastes are composed to be reused as fertilisers in the rural areas. Left over of crops, animal dungs, twigs from forests are used to supply energy during conversion. It is unfortunate that Methane from landfills is not tapped for reuse although Kenya does not have natural gas.

Recommendations

- Respective low-income country governments should enact laws and regulations to punish solid waste and environmental mismanagers.
- The developing country governments should look into ways and means of making solid waste a more viable and recognisable source of income. A case in point is Kenya where 'big' businessmen exploit street boys who toil looking for recyclable wastes for meagre earnings.
- There should be a serious emphasis on the development and use, as far as possible, relevant efficient, indigenous equipment that requires the least cost per tonne to operate.

The efficiency of solid waste management which bears such factors as minimisation of transport costs ,maintenance of an adequate and regular service should be looked into by both the waste generators and the users.

Decision makers and professional concerned with solid-waste management in developing countries should keep aware of what constitutes appropriateness vis-à-vis waste management in their country's context.

Optimisation of labour and equipment requirement, such that high productivity is ensured for labour and equipment.

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Environmental Sanitation Situation in Low-Income Urban Areas, Zambia

Osward M. Chanda, Zambia

BACKGROUND

Country Geographical and Demographical

Zambia covers an area of 752,614 square kilometres and is situated in the heart of Central and Southern Africa. It is land locked and shares it's borders with eight (8) countries namely; Zimbabwe, Tanzania, Angola, Namibia, Congo DR, Malawi, Mozambique and Botswana. Like most developing countries in Africa, Zambia faces great challenges in meeting the increasing demand for adequate, reliable and good quality Water Supply and Sanitation (WSS) services. The country's challenge is to meet the demand of more than 51% of the country's 9.5 million people that still do not have access to adequate drinking water and about 65% of the same population that do not have access to adequate sanitation. Investment levels to meet this great challenge are low due to budgetary limitations.

Currently the urban population accounts for about 50 per cent of the total population and this is increasing at a rate in the range of 6 per cent. The overall population growth in Zambia is 3.2 per cent. With this high population growth attributed to high birth rates and to the rural-urban drift, the urban population is set to become over 70 per cent of the total population of Zambia early next century. The majority of this new urban population is settling in informal urban or peri-urban settlements with limited or no basic services. The two most urbanised centres in Zambia being Lusaka and the Copperbelt provinces which together account for over 40 % of the country's population. These two provinces have the largest peri-urban areas. Outside of Lusaka and the Copperbelt the other major population areas are the provincial centres with Kabwe and Livlingstone being the most prominent. The country is experiencing urbanisation on unprecedented scale.

Environmental Sanitation Problems and Constraints

Poverty, underdevelopment and population growth represents a growing threat to Zambia's environment and to its people. In low-income urban areas the most serious environmental threats are due to inadequacy or absence of facilities for the disposal of liquid, solid and human waste, especially in peri-urban areas where drainage is poor and latrines are sometimes located next to wells causing a threat to drinking water. This poor environmental state is a threat to public health and has contributed to the recent epidemics of cholera and other diseases. Other major environmental concerns in urban areas include industrial emissions and disposal of hazardous waste, especially in the Copperbelt Province where mines and other industries are situated.

Environmental sanitation particularly in the low-income areas has received low priority in funding partly because it has less immediate appeal than water supply and the following three are the main blockages to progress:

- Lack of political awareness of the cost of the nation of poor environmental sanitation, which results in little results for change. The local politicians have not supported the efforts of the experts on the ground and have used the present situation as campaign material;
- Lack of clear institutional framework at community level to give it a high profile and;
- Lack of individual response to knowledge acquired on behaviour changes necessary to improved health.

Besides these, legal issues of land tenure is a major impediment to improved environmental sanitation. The local authorities cannot extent services to ungazetted residential areas, while the residents expect the local authorities to provide the basic services.

Current Initiatives in the Sector

The Government of Zambia has long appreciated the problems of the sector and the resultant poor service delivery. It thus in 1993 embarked on a programme to restructure the water and sanitation sector adopting seven sector principles to guide the water sector reforms:

- Separation of water resources functions from the water supply and sanitation;
- Separation of regulatory and executive functions within the water supply and sanitation sector;
- Devolution of authority to local authorities and private enterprises;
- Achievement of full cost recovery for water supply and sanitation services through user charges in the long run;
- Human resources development leading to more effective institutions;
- Technology appropriate to local conditions and;
- Increased government priority and budgetary spending to the sector.

A Water Policy was formulated in 1994 and the Water Supply and Sanitation Act No.28 of 1997 was enacted. These two instruments give the policy and legal framework of the Water and sanitation Sector in the country. The Act has opened new avenues for private sector participation in the water and sanitation sector, which range from service contracts, concession management contracts to Build Operate and Transfer (BOT) arrangements. Councils are establishing autonomous commercials utilities to run the water supply and sanitation services. Within this structure they have a wide range of options for private

sector involvement. The regulatory framework for urban water supply and sanitation is well elaborated and is being established.

In the rural areas the integrated water sanitation and hygiene education (WASHE) concept with community based management of water points is being promoted countrywide. The institutional setup and support for rural water supply and sanitation are very clear and well elaborated. An inventory of the existing rural water supply has been carried out and a database has been setup. Capacity building materials for training district and community committee have been developed and is being used.

While the development in both urban and rural water supply and sanitation framework is well developed, the low-income urban water supply and sanitation are lagging behind in the water sector reforms. This is largely due to the problems highlighted above.

The little efforts by non-governmental organisations (NGOs) mainly in water and solid waste in larger cities are not co-ordinated and hence the sustainability of the development is at risk.

The Zambian Government through the Water Sector Reform Support Unit (RSU) is currently developing a strategy for peri-urban water supply and sanitation which hopefully will come up with sustainable solutions.

This paper highlights the prevailing environmental sanitation scenario in the low-income urban areas focussing mainly on liquid and solid waste. An outline of the efforts being made to develop workable strategies for improved environmental sanitation in low-income urban areas.

PRESENT SCENARIO OF ENVIRONMENTAL SANITATION

The low-income urban environmental sanitation in Zambia has reached crisis proportions and is operating under crisis management.

In looking at the state of environmental sanitation in Zambia, we distinguish between two urban towns; the larger towns represented by cities with population above 400,000, which are characterised by the presence of commercial and manufacturing industries with large low-income settlements; and small urban towns which have low populations with less than 200,000 and therefore with more open spaces and fewer illegal settlements and few to no industrial activities. These small towns enjoying more free space within their areas.

Solid waste management

Solid waste management is not a priority issue in many of the small towns. More than 50% of the people in these small towns dispose off their waste (solid) in the open spaces which later serve as composite materials for agriculture gardens. The rate of solid waste generation in small towns is so low that waste disposal is not a major problem. Rubbish pits for solid waste disposal are also very common in small towns. In these small towns there are no private companies involved in solid waste management.

Larger towns have a high rate of waste generation needing quick disposal if unsanitary conditions have to be avoided. The drainage in low-income areas of both the large and small towns are non existent or are blocked by solid waste. This results in stagnant water with high contents of dissolved organic from the solid waste.

Solid waste management is practically non-existence in the low-income urban areas of Zambia. Piles of solid waste accumulate remaining uncollected for a long time in open spaces, on the road sides and in some disused empty spaces posing a great danger of pollution of unprotected shallow wells and groundwater. These dumping areas are a source of diseases and bad adour caused by decomposing garbage. Rodents and flies, being vectors of various diseases, find ready room for breeding.

Local authorities in low density areas and public places such or markets in the large towns are making efforts to manage solid waste, however lack of sufficient collection trucks to adequately deal with the amounts of wastes that are generated hinders any progress.

Private companies operating in solid waste management collect garbage from individuals and institutions at a fee. For once a week collection, charges ranges from US$ 20-25 for commercial premises and US$7-12 for residential areas. This service includes a provision of bins and polythene bags service and is mostly confined to the high cost residential areas. (Scheizer, 1998)

Since the beginning of the 90s, there has been increased non-governmental organaisations involvement in solid waste management in the low-income areas of the large towns. NGOs have had some very successful integrated programmes with the food for work approach. Road networks within the peri-urban areas have been improved and solid waste collection and disposal instituted. Other areas where the NGOs have scored successes is in water supply facilities where community based organisations are running facilities that have been put up with financial support from an NGO. A typical example at hand is the Chipata compound water scheme in Lusaka where Care International supported the development.

Liquid Waste Management

Wastewater generation in the low-income areas is mainly of two major sources; i) from the public standpipes and ii) from aqua-privies with small bore sewers, which are blocked. During the rain season, storm water is a source of major worry due to lack of drainage. Wastewater from communal taps is rarely safely disposed off away from the aprons, where these exist. Wastewater from communal water points collects into pools where domestic animals such as pigs, chickens and goats will go to drink. These pools are also a potential health hazard providing breeding space for mosquitoes and other pests.

In the few areas where NGOs and external support agencies are active, drainage and wastewater disposal facilities have been improved.

Zambia has been a pioneer in the region in the use of aqua privy and small bore-sewers mostly in old low-income settlements. A single structure of aqua privy would have four vaults serving four different households. These

have been in use in a number of towns in Zambia since the 1960s. The have the major advantage of being easy to maintain and the fact that the one structure can serve four families brings down the per capita cost considerably.

The experience in most councils have been that there is little understanding of how they function leading to poor maintenance and general neglect of the facilities. Until 1998 all the areas where the aqua privy with small bore-sewer system was used, the local authority and government owned the houses. With the limitation in finances and understanding of the system the tanks were never emptied over long periods of time and hence the solids started flowing in the small bore-sewers thereby blocking them.

Private companies operating in liquid waste management have not extended their services to low-income areas but confined to commercial and high income groups.

ORGANISATIONAL FRAMEWORK

The central government has enacted laws governing the management of solid and liquid waste. The key public institutions responsible for liquid and solid waste management are the Local Authorities, Ministry of Health and the Environmental Council of Zambia.

Besides the public organisations, private organisations, non-governmental and community based organisations participate in environmental sanitation at various levels.

Public Institutions

Local Authorities The management of solid and liquid waste in areas within the municipal boundaries of both the large and small towns is the responsibility of the local authorities, under the Local Government Act No. 22 of 1991. The Local government Act empowers the councils to allow private companies to participate in environmental sanitation management as long as they satisfy all the requirements regarding collection treatment and disposal. The local authorities have developed regulation for the private sector to abide by.

The local authorities have further powers under the Public Health Act Cap 535 to control the handling of waste and other services that have a bearing on the health of the people.

The **Ministry of Health** under the Public health Act, Cap 535, has the powers to intervene where the health of the people is compromised or at risk. The Ministry of Health works closely with the local authorities.

The **Environmental Council of Zambia** a regulatory body established by act of parliament under the Environmental Protection and Pollution Control Act No.12 of 1990 controls the handling and disposal of waste to prevent pollution. Any firm, private or public that is engaged in solid and liquid waste management has to get a permit from ECZ after meeting the requirements on the collection, transportation, treatment and disposal. The operator is issued with a license as per Environmental Protection and Pollution Control Act regulations.

Despite these well elaborated laws and the institutions, the reality is that these institutions are beset with such numerous problems that they are unable to offer an acceptable level of service to their residents nor enforce the regulations to promote safe environmental sanitation

Non-Governmental (NGOs) and Community Based Organisations (CBOs)

In view of the difficulties encountered by the local authorities to carry out liquid and solid waste management, especially in the peri-urban areas, the NGOs have come to fill the gap by working with the local communities on various social programmes that include water, solid and liquid waste management.

The NGO involvement in solid and liquid waste management has for a long time been confined to the large towns along the line of rail and only very recently has it started spreading to the small towns. Currently there are no regulations to guide an NGO where they can work and in what field. This tends to leave some areas without any help while others have a lot of NGOs such as Lusaka.

Community Based Organisations (CBO) have been another natural result of the inability of the local authorities to provide safe and adequate environmental sanitation in low-income areas. The most prominent CBO are the Residents Development Committees (RDC). The RDC are legal bodies registered with the Registrar of Societies and have a constitution that governs how they run the affairs of the committee. The community selects zone representatives from whom the committee members are picked. The approach of most of the CBOs has been to tackle the myriad of problems that are found in their areas including solid and liquid waste. Political interference in the operations of RDC affects their effective operations. In Lusaka an RDC is currently running a water supply scheme provided by Care International who funded infrastructure development investments and training.

Private Sector

Zambia has had no private sector involvement in municipal waste management prior to 1991. Policies and laws have since been formulated that encourage private companies and individuals to participate in waste collection, transportation and disposing at a fee. These companies have to obtain a license from the regulatory body, the Environmental Council of Zambia. The few companies and individuals that have gone into environmental sanitation service provision in the sector are concentrated in the low-density areas of cities where people can pay for the services.

In the recent past individual from the low-income areas have come together to make a team of three or four and use simple tools (bucket and chain) to empty septic tanks and unblock sewers. These individual are getting more and more popular as they charge as low as 30% (US$40-60) of what commercial firms with vacuum tankers charge (about US$150-250). The waste is disposed on sight by digging another pit. These individuals are not licensed and run the risk of being infected due to poor handling of waste.

FUTURE PERSPECTIVES FOR ENVIRONMENTAL SANITATION

Institutional/Organisational

GRZ has enacted various legislative pieces that give an enabling environment for various options to be pursued in as far as environmental sanitation development is concerned. Whilst these laws and policies give a general direction to the sector, the specifics of how this could be achieved has been left to the local authorities.

Both the public institutions and non-governmental organisations are beginning to work with the community based organisations such as the Residence Development Committee for sustainability. The water supplies to peri-urban areas that have been legally recognised are being improved. These CBOs should be strengthened and capacity enhanced to handle solid and liquid waste management.

It is therefore envisaged that it will be within the framework of these policies, which are mostly looking for community-private sector partnership in the sector, that the environmental sanitation will be developed and improved. The individual sanitary workers should be supported and their capacity enhanced to safely desludge septic tanks.

Infrastructure Development

The use of pit latrines in peri-urban areas in Zambia is not sustainable, besides, in areas where the water table is high they are a health hazard and costly to construct. In peri-urban areas with improving standard of living of the people judging from the size of the dwelling places, it will not be long before the demand for better service levels from the present communal taps is made. This will result in increased wastewater. The local authorities should exploit the changed government housing policy and build on the existing experience and technology of aqua privy with small bore sewers. Now that individuals own the houses in the low-income groups they will have to take care of the sanitary facilities. They will not only think of paying for water but the emptying of the septic tanks (where they exist) and collection of garbage. The use of aqua privy should alleviate the serious space problems for pit latrines.

The service providers should see the potential in the low-income areas and invest in aqua privy with small-bore sewers and reap the benefits of improved sanitary conditions. The small bore-sewers have the added advantage of being able to meander through the congested settlements and have lower investment costs. The investment costs can be recouped in the long run with the advantage of the economies of scale in these densely populated areas.

Public-Private Partnership

The change in policy and law in Zambia allows for individuals and private enterprises to engage in provision of sanitary services. The capacity for private sector involvement is very high judging from the number of successful private business ventures that have come up since the liberalised market policy.

The capacity to pay economic charges for solid waste collection by the people in the peri-urban areas may not be there now and hence the need to work with the community based organisations. Contributions in kind in addition to nominal monetary contributions should be encouraged. The community based organisations should be able to enter agreements with private firms for solid waste collection from a central place where community members would place them from localised dumping sites using wheelbarrows.

An integrated approach should be adopted where water, sanitation, roads and markets could be managed and marketed as a package. This would allow for a single payment as opposed to individual payments for each services provided and maximise the limited skilled manpower. The presence of NGOs is mostly in peri-urban areas should be focused at building capacity and providing public awareness and education to promote the concepts of private-community partnership.

Conclusions and Recommendations

The low-income urban environmental sanitation in Zambia has been very poorly managed over the past two decades. It is clear that the central government, through the local authorities have failed to develop this sector. In order to turn this around, there is need for a complete change in the approach to the development and management style. The technology used should be sustainable in the light of the development in the sector and within the low-income areas. Aqua privy with small bore sewers is a proven technology in Zambia and holds the much needed sustainable solution for liquid waste disposal in the low-income urban areas.

Promotion of community-private partnership will go a long way in helping solve the problems of solid waste in low-income areas. People have realised the business opportunities in environmental sanitation. This should be promoted through the legally recognised community based organisations that exist in these areas. The demand has to be created through awareness campaigns.

Opportunities for private sector participation exists on the premises that waste management continue to be a problem that is real and currently is not being addressed adequately primarily by the local authorities. The capacities of the councils are limited. A few individuals who have taken up the opportunity should be supported and directed at the low-income areas. The present targets of these individual sanitary workers are the more advantaged individuals and firms in the towns who are able to afford higher charges.

The involvement of NGO though successful while the support lasts should be redirected and focussed more at leaving more sustainable organisational structures. They should direct their efforts towards building the capacity of the individual sanitary workers.

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Water and Sanitation Programmes for Kampala Peri-Urban Areas: Have they really improved the quality of life?

William Lubulwa, Uganda

The persistent prevalence of diarrhoeal diseases, reported out-breaks of cholera and typhoid in the peri-urban areas of Kampala city generated an interest in investigating the cause by analyzing the quality of water from sources serving these communities. It is well known that human excreta is the cause of more than fifty diseases and nearly 80% of the sicknesses in low-income urban communities.

With proper disposal of human excreta by in-expensive methods and provision of adequate and safe water, these diseases can be brought under control and the entire sanitation situation of these areas can be improved. This paper is based on collected data in Kampala peri-urban areas and it discusses various options for improvement. It examines the sanitary status, the chemical and bacteriological quality of water from protected springs and wells which are the main source of water for these crowded slum areas.

PRESENT SITUATION

Service Provision

Like in any other peri-urban areas elsewhere these areas are characterised by a high rate of low income households and high rate of rural to urban migration has resulted into lack of basic services. One of the major services needed is safe water. The survey found that although a piped water network exists in some of these areas, it is inadequate and many households either fetch water from the springs, wells or rivers or buy from the private water vendors who fetch water from sources some of which are dangerously contaminated and this pose a health hazard.

Sanitation

Some of the peri-urban areas of Kampala are not equipped with a central sewer and most people either use septic tanks or pit latrines and not all households have latrines. Added to this problem is the presence of dumping sites in low-income neighbourhoods. It is not unusual to find overflowing septic tanks and latrines in peoples homes. These apart from being a health hazard, have very bad smells and offer breeding sites for flies and mosquitoes. No environmental protection measures have been taken to avoid possible underground pollution which could come from infiltration of substances from dumping sites. These sites constitute significant environmental risks. Due to the proximity of groundwater to the surface and the porosity of the soil, pathogens rapidly percolate and contaminate the fresh water lens below the surface. The drainage facilities are grossly inadequate and in most cases are combined with the sewerage systems. The result is that during the rainy months, the sewerage system often becomes overloaded with storm water and the sewerage over flows in the streets and buildings. The contents of open latrines float around openly. The effects of this on the protected springs can well be imagined. There is a sharp rise in the incidence of cholera, typhoid, other gastral-intestinal diseases and parasitic infections within the large section of the urban poor.

Most programmes of water supply and sanitation have been planned and executed separately with little or no co-ordination. This leads to poor environmental conditions where water supply component is separated from disposal component. Few areas are sewered and domestic wastes are handled in a variety of ways depending on local conditions, in some locations, on-site disposal is adopted in form of septic tanks or seepage pits, even where ground conditions are unsuitable and inevitably pollution of ground water results.

The presence of black-coloured odorous surface water is but one offensive manifestation of the absence of effective-Sanitation should not be taken as comprising of only toilets but also waste disposal, drainage and Public health (or hygienic measures).

Excreta disposal methods vary from place to place but one finds:-

- Absence of any facilities leading to use of open fields, polythene bags, water courses etc.
- Pit latrines: often simply a hole with an improvised platform on top.
- Aqua-Privies and some septic tanks: Effluent form these discharges into surface drains.

In the realisation that inadequate and unsafe water and the unavailability of or poor sanitation facilities accounted for over 80% of disease in low-income Urban areas, ensuring provision of adequate supply of safe water and basic sanitation forms the principle objective of this paper. What is being presented in this paper is therefore a contribution for discussion rather than a presentation of proven and tested solutions.

Source of Water Supply

The main source of water supply to Kampala peri-urban areas is from protected springs, wells and rivers. In defining the problems of sanitation in crowded low income areas, it is necessary to ask How widespread are such problems in these areas? What do they mean in terms of living conditions and human dignity? What disease hazards are posed and to what extent are the problems alleviated by the provision of safe water and hygienic excreta disposal. This paper throws light on some specific aspects of these questions. One approach I have used is to look at the chemical and most importantly, the bacteriological quality of the peri-urban spring water.

Sampling Rationale

All the springs in each of the local government division were marked, identified and samples of water collected from each zone into one litre plastic container and taken directly for lab chemical analysis. Samples for bacterio-

logical analysis were collected into previously sterilised borosilicate bottles and the sanitary status of the sources was recorded.

Sampling Areas

All the local government divisions in the city were chosen as case studies. Sampling was carried in the following Zone which lie at the city's peripheral. These include:- Kamokya-Mulango, Bwaise-Wandegeya, Namuwonge, Kibuli, Natete-Ndeba, Kitantale-Luzira, nakubabye-Rubega, Makerere-Kivule.

Physical and Chemical Analysis

The parameters analyzed for were, colour, turbidly, odour/ taste pH, conductivity, iron, Manganese, Ammonia, Phosphate, Nitrate, Sulphate, Chloride, total hardness, calcium hardness and total alkalinity using Drel 2000 spectrophotometer. It was found that certain test parameters were above W.H.O standards. Most especially Iron, Manganese, pH and Nitrate were high in 13 out of 20 sources. The Ammonia Conc. distribution measured by photometer 5000 palintest varied between 0.5mg/1to 0.15mg/1 which levels support the anaerobic condition prevailing in the springs and confirming its inability to self clean itself due to excessive organic load discharged from garbage sites and latrines. This hypothesis is also supported by the relatively high levels of Nitrates recorded. In the rainy season, the rainfall may be sufficient to flush from the ground, the accumulated Nitrate from latrines and leaching pits, resulting into feacal bacterial contamination and a buildup of Nitrate to dangerous levels especially in areas where pit latrines are unavoidably located near protected springs and wells. The chemical test results have not been published because of lack of space and also because there was no real chemical analysis. The general chemistry of the sources can be summarised as having average pH=6.56, low in dissolved solids and soft.

Bacteriological Analysis

The bacteriological quality of the springs was determined by the membrane filtration method using the Delaqua Water Testing Kit. The samples were analyzed for E.coli and it was found that 15 out of 20 was heavily feacally contaminated. I have attempted to use the level of contamination by faecal bacteria E. Coli in the spring waters as an indirect methods of measuring Health using incidence of diarrhoea and other gastro-intestinal diseases, which are the major cause of death in children in these low income communities.

Low Cost Water Purifier Unit: Water Supply Innovation to Serve the Urban Poor

Kampala peri-urban areas like any city in a developing country is not free from problems of water supply. With rapid increase in population, Urbanisation and environmental pollution such problems have become acute. Low cost water purifier is a method which can be developed t meet the above need it is a simple device; a filter cartridge, a way of pumping in water, a provision for chlorination and a tank to collect the treated water are what is needed.

How Does The System Work?

To make the system work the cylindrical filtering cartridge 10-12 inches long must be fixed outside a pipe at a desired place. At a place where it is fixed several small holes must be made on the pipe for the water to pass through easily. A length of a clean cloth can be used to wrap it in order to keep the cartridge fixed.

The impure water must be sent through the pipe, the most simple way to do so is to keep a tank of impure water at a higher elevation and join the pipe to it. Water running through the pipe then raindown through the cartridge:- filtered water pure can be collected to a public tap sand. It is estimated that 22 filtering cartridges can purify 500 litres of water. I am trying to look at a low cost water purifier thoroughly and objectively and more importantly, what works in practice, what stays working - what is sustainable. Despite the large initial capital expanded on such an undertaking and the cost of operation and maintenance, the benefits are enormous. The O&M cost can be borne by the government as part of its responsibility to provide social services and to ensure efficient management of water delivery to the Urban poor. The cost can be offset by way of beneficially contribution that is charge a service fee. This initial cost is little if one compares it to the cost the government incurs in treating patients suffering from water and sanitation related diseases.

RESEARCHABLE QUESTIONS

⇒ Is it more economical and technically feasible?

⇒ What are the benefits?

Secondly a feasible study of providing safe drinking/cooking water by in-home chlorination of household water containers can be investigated. This can be undertaken in peak contamination rainy seasons. Women who use and collect water should be taught how to dose their household water with a dilute bleach solution to give an organoleptically acceptable dose of 2.0mg/1 chlorine. This does can eliminate faecal coliform within 30 minuets and protected stored water for 24 hours, chlorination of household water is an appropriate strategy since household bleach is easily available and inexpensive, involves the community as active participants and insures the use of ingestion of safe water by the entire household.

Desired Improvements

Lack of safe water and basic sanitation facilities, coupled with poor housing result in high morbidity mortality among the urban poor. The children are the major target of this vulnerability. The plight of the urban poor calls for an urgent and unconvential solutions in terms of housing, water supply, excreta disposal and other services. Improve-

TABLE A: COMBINED RISKS OF CONTAMINATION AND BACTERIOLOCIAL ANALYSIS FOR SPRINGS IN KAMPALA

Source of Ref. No.	Location/Name	Parish/Zone	Distance(m) from pollution source Latrines/Dump Site	E.coli colony Count/100ml
52/KLA	Abdul Spring	Katoogo Zone Bwaise	5M	128
54/KLA	Kigundu Spring	Kigundu Zone Bwaise	27M	134
57/KLA	Natete Central	Church Zone	8M	86
68/KLA	Nava Spring	Natete Town	15M	32
69/KLA	Mulindwa Springs	Mosque Zone Natete	7M	15
44/KLA	Katanga I Spring	Katanga Wandegeya	3M	>200
45/KLA	Katanga II Spring	Kimwanyi Zone	>100M	10
35/KLA	Musoke Spring	Katwe I	9M	49
36/KLA	Kizungu Spring	Katwe II	13M	48
22/KLA	Kinyankoko Spring	Kitintale Zone 9	5M	>200
23/KLA	Namuwongo Spring	Namuwongo Central	12M	58
26/KLA	Nsambya Police	Nsambya Barracks	15M	10
12/KLA	Banda Market Spring	Banda Zone B4	8M	56
13/KLA	Nabuzze Spring	Kireka	>100M	20
17/KLA	Kimera Spring	Ntinda	>100M	19
08/KLA	Kyoya Spring	Kiwatule	7M	28
09/KLA	Nakilanda Spring	Buye Ntinda	20M	7
10/KLA	Nankanja Spring	Kyambogo Polytechnic	>100M	28
13/KLA	Kisenyi Spring	Kamwokya II	4M	76

ment programmes should aim to provide the following facilities:-

- Safe water supply through water taps:- Introduction of low cost water purifier units.
- Surface drainage facilities through conduits connected to the underground sewer system
- Garbage sites put at suitable locations.
- Improved sanitation to beat environmental pollution:- Conversion of existing service latrines to sanitary latrines working on the aqua-privy principle in unsewered areas and introduction of septic tanks with provision for biogas production.
- Why don't we use human excreta to produce biogas. This not only offers safe disposal, environmental cleanliness and pathogen destruction but also a valuable energy source of cooking fuel rather than firewood or charcoal.
- Water and sanitation projects should have a comprehensive hygiene education component.

Field Experience from a Micro-enterprise for latrine exhaustion:
The UNCHS(Habitat) Vacutug Initiative

Prepared for

The 10th ITN Africa Conference: Water and Environmental Sanitation, in Low-income Areas
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Introduction

It is well-know worldwide that the lack of water and sanitation has a devastating effect on the health of the poor. It has been estimated that 80% of all morbidity in developing countries is due to water and excreta related diseases (WHO 1996). Nowhere is the situation as desperate as in peri-urban areas, where the residents are not recognized by city authorities. Until more efforts are made to improve the access of the urban poor to basic services the heavy toll on health will continue with productive sectors also suffering on account of the water and waste related disease.

With regard to sanitation services in low-income urban areas, it is likely that on-site sanitation will continue to be the most widely utilized and low-cost option. In most cases this will comprise a simple unimproved pit-latrine. Such latrines do require periodic emptying however or can be abandoned. In rural areas the construction of a new pit, utilising the existing latrine "superstructure" is possible but in high-density low-income settlements, this is out of the question. The only option is pit-emptying. This is however a hazardous occupation and in most cases incurs significant cost.

The concept of pit exhaustion technologies is not new and there have been many studies. A rigorous study (Schertenleib and Hawkins, 1983), though not undertaken recently highlighted the principal problems as:

- access in dense low-income urban settlements;

- high capital and operational costs;
- provision of an affordable service ; and
- ineffective management at the community level

A more recent option developed by UNCHS(Habitat) in association with Manus Coffey Associates has been undergoing field trials over the past two and a half years in Nairobi's largest low-income settlement, Kibera. The project has been implemented by a Kenyan NGO, The Kenya Water for Health Organisation (KWAHO), assistance was also been provided by IRC of the Netherlands.

This paper presents a summary of operating experience and outlines the future strategy for further expansion of the programme.

Criteria for design

The following criteria were used in the development of the technology and the associated management system (after Alabaster and Coffey, 1996):

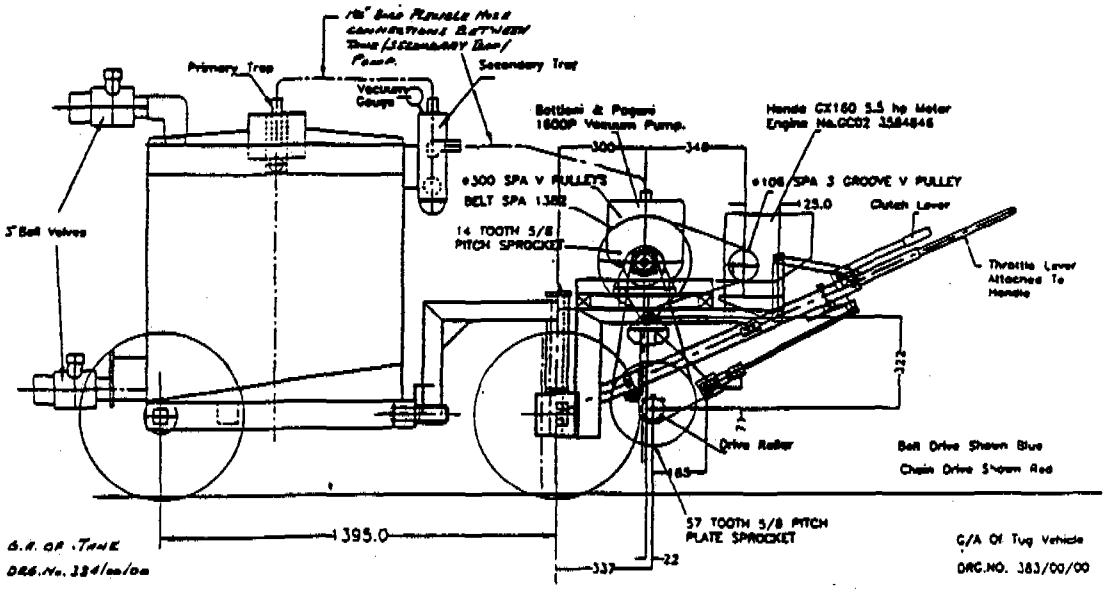
- The system should have access to high-density settlements and be manouverable
- The capital cost of the technology should be affordable to small-scale entrepreneurs
- The machine should be designed for local manufacture, operation and maintenance
- Operating costs of the service should be covered by revenue generated
- The system should be capable of transporting the waste to an appropriate disposal point
- The system should be able to Evacuate compacted sludge from latrines

Tenders were called for and MCA were successful. The system selected is shown in Figure 1 and comprises a 0.5m3 steel vacuum tank connected to a sliding vane vacuum pump capable of a 0.8 bar vacuum. A 4.1 kW petrol engine can be connected to either the vacuum pump or a friction roller to drive the front wheels. On level ground the vehicle is capable of around 5km/hr. The whole assembly is mounted on a steel chassis with a car axle and wheel assembly to the rear. The overall dimensions of the machine are around 1.5m long by 1m wide by 1m high.. The vacuum tank is fitted with 3 in diameter valves at the top and bottom of the tank and the waste is evacuated from the latrine via a 3in diameter PVC vacuum hose. The waste sludge can be discharged under gravity or by slight pressurisation from the pump. The machine is equipped with a throttle, clutch and two brakes.

Location of the field trials and the management system

The site chosen for the trials, Kibera is the largest low-income settlement in Nairobi with an estimated population of between 500,000- 750,000 people. If Kibera were a city in it's own right it would be the third largest city in Kenya. The settlement

Figure 1 Vacu-tug pit latrine exhauster



occupies an area one hundredth of the cities residential area and population density is around 2,000 per hectare. The settlement is composed of 10 villages each with its own ethnic and religious background. The government owns the land and residents have temporary occupation licences but no real security of tenure. Most of the houses are mud and wattle with corrugated steel roofs. Limited public water supplies were provided in 1972 after a cholera outbreak but currently there are around 1,000 water connections in Kibera, about 2/3 of which are water kiosks. Sanitation is principally by simple unimproved pit latrines and some use the "flying toilet" Often as many as 100 people share each latrine. There are some examples of VIP latrines. There are especially severe conditions during the rainy season when flooding causes excreta to run through the streets. The city council does offer a latrine emptying service but it uses 10m3 tankers which cannot gain access and are however to expensive.

A study of the health situation in Kibera in 1990 indicated that for three quarters of the households; at least one member of the family had visited a clinic in the previous two months; 90% of the households reported having a sick child within the family during the last month with diarrhoea and vomiting being the most common ailment amongst

children. The study found that 40% of the children under five had intestinal parasitic infections, with 31% carrying eggs of ***Ascaris Lumbricoides***

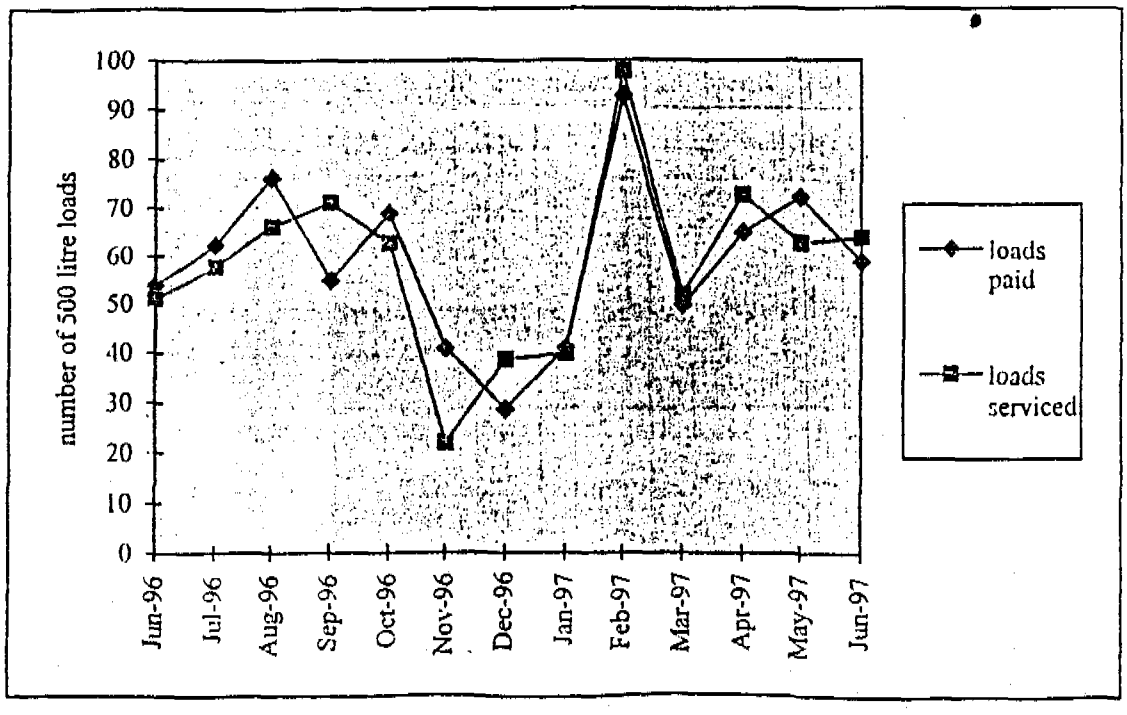
The Vacutug was and still is operated by a team of two operators and one administrator. There was an initial problem with theft of the engine and pump and after replacement it was found necessary to find a more secure storage location. Residents who required a service went to an office established by KWAHO paid a fee, which was based on an initial willingness to pay study, of Ksh 250.

Results

The Vacutug has been operating in Kibera for the past two years since May 1996. During this time the project has proved to be financially sustainable in that it has been operating independent of outside financial assistance for over two years.

The intended method of operation was as follows. A customer visits the office and requests that a certain number of 500 litre loads be removed, paying the fee and receiving a receipt. The cost of 250Ksh was maintained from January 1996 to January 1998 when it was increased to Ksh 400. A tentative date was then set and the customers were to direct the operators to the latrine if it's location was not known. After exhaustion the operators would transfer the sludge to the nearest manhole which discharged directly in to the city authorities trunk sewer. At the beginning of each week the project manager's plan the weeks operation. The Vacutug was stored at the District Officers compound nightly. When the job is satisfactorily completed the customers receipt is given to the operators who then proceed to the next job. The Vacutug is used Monday to Friday with Saturday being reserved for routine maintenance. The project manager is supposed to fill out performance monitoring sheets with all details of operation.

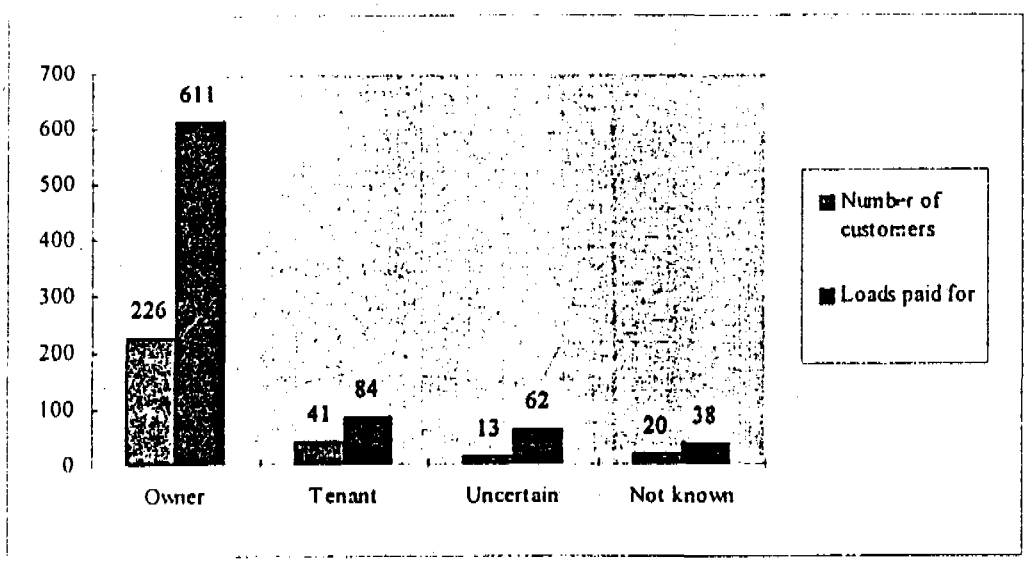
Figure 2 Variation of number of loads with time



During the period January 1996 to June 1997 when the most reliable operating results are available, the Vacutug operated a maximum of 98 loads (defined as 500 litres) per month and a minimum of 22 loads per month Figure 2. This was dependent on the weather which greatly affected operation or occasional breakdowns. The machine was operational for about 70% of the total working days.

About half the loads were carried out within 3 days of payment while about 10% experienced a delay of over two weeks. Most of the customers of the service were owners of the latrine (75% of all customers) with a very small proportion being tenants (14%). This is illustrated in Figure 3. A disproportionate number of customers were serviced in the area closest to the KWAHO office, principally on account of the reduced travel time. From discussions with city health officials, latrine owners did not offer to have their latrines emptied on their own violation, often pressure was brought to bear by city health officials.

Figure 3 Status of Customers utilising service



During the period July 1997 to May 1998, the record keeping became erratic, from December 1997 no record sheets were filled at all. Financial records also indicate that a substantial sum of money (Ksh 140,000) went missing during the second half of 1997. The responsible staff member was discovered and subsequently sacked. This result highlights the need for close financial control of the management system. Other problems have included the non-payment of the mechanic who carries out routine maintenance. Extremely poor weather conditions during El Nino, also contributed to the lack of service.

It was very clear that currently the management system is experiencing problems and the increase in the proposed cost of providing the service may be too high a market price. Obviously, the monopoly situation, which exists, is rather artificial, resulting in demand vastly outstripping supply. The operators are currently operating somewhat independently of the project managers and there is possible some "unofficial" service being provided. Some customers are paying operators directly, especially when the Vacutug is in their locality. There are also incidences of higher prices being charged. This greatly reduces the revenue, which is returned to the project managers and consequently reduces morale.

There is also little effort on the optimisation of the operation and in the operators adhering to strict working hours. There would need to be some form of incentive payment to counter this occurrence. Money for oil and petrol for the Vacutug was also being misappropriated. Other short cuts were taken including discharging the sludge to the nearest convenient water course rather that to the sewer. In some cases the operators take a considerable amount of time to locate the actual latrine resulting in further delays.

Conclusions and Recommendations

The Vacutug is still operating in Kibera after more that two tears without financial support providing a service that was not possible before. The fact that it is still operating indicates that it is technically and operationally sustainable. Full financial sustainability has not bee achieved as there are no funds to buy future machines or to overhaul the current machine. There was however a severe misappropriation of funds which must be off set against this.

Overall there are few mechanical problems with the machine but there is nethetheless a need for some minor design changes.

There is clearly a need to optimise the use of the machine from the point of view of revenue generation and maximising the number of latrines emptied. The major reasons are not technical but rather managerial and operational. The current operators are acting somewhat independently. It would seem there are two choices which need to be considered: (i) to ensure proper management is adopted or; (ii) to allow the operators to run the enterprise themselves. Optimisation should be carried out in the following areas:

- Strict preventative maintenance
- Strict adherence to record keeping procedures
- Optimisation of most effective vehicle routing
- Careful siting of storage depot

It is difficult to evaluate the full potential of the system without a more competitive environment. It would seem that the Vacutug can realistically empty 8 loads a day in the dry season and 4 per day in the wet season. This would give an average monthly total of around 100-150 loads. At Ksh 400 per load this represents an income of Ksh 40,000 - 60,000 per month. Overheads could be estimates from current rates of pay at between Ksh 20-30,000 per month, leaving Ksh 20-30,000 to cover maintenance and set up a fund for equipment replacement.

There is clearly a need to provide more that one machine to service the whole of Kibera but in a way that provides competition. The possibility of several organisations competing in an open market should be evaluated. It must also be evaluated if one organisation could greatly improve revenue generation by operating more than one machine using a common overall management system. Competitive pressure would also lead to improved efficiency. It is however unclear at this stage how many Vacutugs would be needed.

The current disposal system is not ideal and with a larger fleet of Vacutugs operational alternative methods of disposal would need to be evaluated. The city authorities may charge a levy.

Current efforts to assess the impact of the Vacutug system need the use of clear indicators of health and environment. Future phases of the study need to address this most urgently.

Areas for future research and the proposed follow-up project

There is clearly a need to undertake further field trials of a pre-production machine in a much wider variety of situations. For example other cultures etc. and to evaluate the following (Wesley 1998):

- The numbers of private enterprises that would be viable for a given population;
- The optimum size of the micro-enterprise and how many machines should it utilise;
- The best way of optimising vehicle routing to maximise revenue generation; and
- How can the micro-enterprise be effectively managed

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MODE OF INTERVENTION

Implementation of Phase II:

In November 1997, Kenera Women Water Project entered into an agreement with Swedish Embassy on the implementation of Phase II. This was as a result of change of staff at Muranga Catholic Diocese Development Office which caused much delays in the compiling of the projects proposal document for Phase II.

The Swedish Embassy agreed to pay for the supply of pipes, fittings and building materials directly to the supplier who would then deliver them to Kenera Women Water Project. The women undertook the tasks of paying for the skilled labour and the other implementation activities.

We are happy to report that Kenera project has received pipes and fittings for Phase II all valued at a total cost of Kshs.1,316,495.00.

All the supply lines meant to serve KENERA members have been supplied with the relevant pipes and 185 members have been connected with clean Nyamindi water.

Public Institutions:

Apart from supplying individual members with water, KENERA has readily supplied water to the following Public Institutions.

- Defathas A.C.K Parish
- Difathas Catholic Parish
- Difathas Primary School
- Difathas Cattle Dip.
- Difathas Dispensary
- Togonye Primary School
- A.I.P.C Church Kamugunda
- A.C.K Church Kamugunda

Very soon, Kanjonji Secondary School is going to be connected with water.

Committee members training:

Again we are especially thankful for the initiative the Catholic Diocese Muranga took to organise for the training of our committee members from 21st August 1995 to 25st August 1995, at Thuchi River Lodge. The training was funded by S.I.D.A through the Catholic Diocese Muranga.

Conclusion:

Our guest of Honour, Kenera Women Water Project lays alot of emphasis on proper maintenance and control of project's resources.

In this regard, we supply water to our members through metres. We charge each member Kshs.50 for the first 30 CU.M of water used every month and Kshs.1.00 for every extra CU.M. used. This is far too much allocation and we are planning to lower it when we supply water to majority of our members.

New Challenges for Training and Facilitation in the Water and Sanitation Sector in South Africa

Ilse Wilson, South Africa

Background

South Africa held their first democratic elections in 1994. Before that no national institution was responsible for ensuring equitable and sustainable access to water supply or sanitation services, and no structured national legislation existed regulating the provision of these services. They were dealt with in a fragmented and inconsistent manner. The majority of the people lived in the so-called former homelands, and rural water supply and sanitation was left to the homeland governments to provide. These governments were largely puppet structures which were under resourced, often corrupt and provided a very inadequate service. On the other hand white farmers tc \l 1 "South Africa held their first democratic elections in 1994. Before that no national institution was responsible for ensuring equitable and sustainable access to water supply or sanitation services and no structured national legislation existed regulating the provision of these services. They were dealt with in a fragmented and inconsistent manner and rural water supply and sanitation was left to the former homeland governments to provide. These governments were largely puppet structures which were under resourced, often corrupt and provided a very inadequate service." were extremely well catered for, with unlimited use of river and ground water.

The Mvula Trust

The Mvula Trust was established in 1993 and is dedicated to improving water and sanitation services to disadvantaged and marginalised communities. It was conceived as a rapid delivery vehicle to provide these services during the transitional phase in South Africa. In 1996 the Trust entered into a formal agreement with the new government's Department of Water Affairs and Forestry (DWAF), through which the Trust receives funding from the national budget. To date the Trust has implemented 306 water projects of which 152 are complete.

The Trust's operational procedure is based on a demand responsive approach involving community management at village level. This approach means that the consumers are treated as clients with rights and responsibilities. Their willingness to accept these responsibilities is key and is shown through their managing project funds, making up front cash contributions, and making key decisions regarding project design and technology options. Their responsibilities include employing labour, procuring goods and disbursing funds to consultants and contractors. The village water committees own both the process and the product of their water and sanitation projects.

The cost of water is determined by the availability of reliable water sources, the choice of technology and the management costs of operating the scheme. The Trust therefore promotes schemes that are technically simple, robust and easy to maintain. Community management of schemes also keeps overhead costs down.

Willingness of consumers to pay for water is a complex issue, affected by many subjective factors. Some of these are trust in the water committee, belief in the justice of having to pay, perceptions around whether government will assist in the event of scheme failure caused by non-payment, and satisfaction with the level of service provided. The Trust is doing major work around the issue of level of service.

Constitutional Developments

New constitutional developments emphasise co-operative governance between the three levels of government. These are the national government, 9 provincial legislatures and 800 interim local councils, which are to be reduced to 500 in the near future. The White Paper on Local Government stresses the need to promote national development, make the best use of resources and ensure good governance and a high standard of public service.

The Water Services Act of 1997 provides a developmental regulatory framework for the provision of water services, which clearly defines the roles and responsibilities of the different spheres of government. It also aims to ensure that equitable access to basic services is achieved in an effective and efficient manner.

In terms of this Act local government structures have the duty to provide access to water services in a sustainable manner. However they do not have to provide all these services on their own but can co-operate with other stakeholders. Local government can form partnerships with other public sector organisations, the private sector, non-government organisations or community based organisations to ensure effective delivery of services.

The local government structure that has the duty to provide access to water services in a specific area is designated the water services authority. A water services provider is the structure that actually provides the services to the consumers. This may be the authority itself or the authority may delegate this responsibility to another body.

What is ultimately important is that these services are delivered and are sustainable. It is within this framework that the challenge to the Mvula Trust and other organisations is situated.

Pilot Project

The Trust initially faced this task through a pilot project funded by DANIDA to develop a support package for DWAF based on previous work done with village water committees. This package was to be developed and piloted with 5 communities identified by the DWAF steering committee. They are located in different provinces and are mostly fairly remote.

The outcomes of the project were intended to enable the water services authority to effectively delegate the service provider role to community structures. This in-

volved the facilitation of drawing up of service provision contracts between the water service authorities and the community-based organisations designated by the authority as the water service providers. The exciting element of this project was that DWAF accepted the principle that the provider should be the local village water committee.

After the draft documentation simplifying the Act and clarifying the process was drawn up, workshops were held in each of the communities. It was initially thought that one or two workshops with each group would be sufficient but this proved wholly inadequate. The representation from the local council, which is the authority, in all instances was initially very low. The Department of Constitutional Development, which is responsible for local government, and the regional DWAF offices were not involved in the project which was a great failing. It was realised that much more groundwork was necessary before a contract could be signed. Mvula staff continue to travel to these remote communities to ensure that the process will be successful.

Lessons Learnt

Many valuable lessons have been learnt from this pilot project and the Trust is now embarking on a second phase of working with local government and community structures. The aim of this phase is to further the process of enabling local government to develop a strategy for ensuring the provision of water in a developmental and equitable manner.

The Trust usual demand driven approach was not followed in the pilot project, which meant that all the stakeholders were not committed to the process. It will now concentrate on either working with communities with which it has already established a relationship or with local government structures that request its assistance.

The pilot project tried to provide a standard approach to be used between the various councils and the communities. It is clear that each case has to be treated on its own merits and that facilitators must be very adaptable and flexible. For example in one community the de facto water provider was the local tribal authority. This issue had to be dealt with very sensitively.

Working with 5 different councils in 5 remote areas in 5 different provinces was not a good use of limited resources. Also by concentrating on only one service agreement with a water service provider per council the broader picture was sometimes lost.

In KwaZulu Natal, a province fraught with violent political tensions for the past 10 years the pilot project ran into problems. The regional councils in this province have many functionaries who operated under the apartheid regime and in this area transformation still has to take place. This province was the only one in the pilot where the councillors were fearful of their authority being undermined if they were to devolve responsibility to community structures. Mvula staff were told by the council not to deal with the committee directly but to work through a specially appointed council official.

The regional offices of DWAF and both the regional and national offices of the Department of Constitutional Development were not party to the pilot project. The regional offices of both these relevant government departments will be involved with all future projects both to get them to understand the process and to ensure support from them for the projects.

Working with Councils

The Trust has now embarked on a further two projects, where it will work only with the council (the water authority). These councils wish to work with Mvula so that they may strengthen their ability to assess their current capacity and develop strategies to manage water and sanitation schemes within their jurisdiction in a sustainable manner. They will also increase their understanding of the various developmental choices available. These projects are being run with motivated local councillors, who want to promote the principle of integrated development and to be able to support community water schemes.

There is considerable co-operation in the new project in KwaZulu Natal, where Mvula is working only with the council (not the same one as in the pilot), and not with community structures. Regular meetings have been held to develop the principles on which to constitute water service providers, and a joint exercise has been done to establish the criteria for a successful water project. It is hoped that by empowering the council, it will take the initiative to appoint local level water services providers.

Working with Village Water Committees

Another Mvula initiative is working from village level. It intends to develop a replicable and cost effective approach to facilitating water service agreements between local councils and village water committees. 32 Mvula Trust water projects currently at completion phase have been identified. These are communities in which the water schemes were implemented in a demand responsive way and the committees have shown that they are capable of managing as service providers. Many of these committees already have good relationships with their local councillors and if they demonstrate their ability and willingness to manage their schemes, it is hoped that the councils will understand the benefit of appointing them as service providers.

Participatory methodologies will be used to interact with various stakeholders to improve the understanding between local councillors and the water committees. The Trust has initiated the use of the PHAST (Participatory Hygiene and Sanitation Transformation) methodology in South Africa. This is based on the SARAR approach and Mvula is adapting it to be used in its work with potential water service providers.

Conclusion

South Africa is a very new democracy and there is a need for building confidence in new members of local government. Up to now most effort has gone into building na-

tional and provincial structures. Under the previous government, while there was functional local government in white urban areas, there was no effective local government in rural areas. Interim local government has now been established in all regions but it has little capacity to fulfil all its responsibilities. There is a need to strengthen its capacity for service delivery including delivery of sustainable water supplies. There is insecurity in doing things for the first time. Creative ways of managing must be found, and a flexible approach must be maintained.

Each local council has jurisdiction over a large area with many villages. It will not be possible for a council to act as the water services provider in each village and this responsibility will have to be devolved to another organisation. The Mvula Trust believes that water schemes will be sustained if they are managed at the most local level. The Trust therefore will continue to promote community-based organisations as water service providers.

Ilse Wilson, Mvula Trust, South Africa

Modelling Internet based communication for Water and sanitation: Information needs

N. Kibata, F. A. O. Otieno and C. A. Buckley

ABSTRACT

The study aimed at modeling the communication continuum in water and sanitation sectors of developing countries. It had an objective of optimising on the inclusion of the Internet as a tool for enhancing the communication and hence improving on the delivery of services.

In or to model the continuum, the latent Internet based information demand for water and sanitation was quantified through an information demand survey for water and sanitation. This paper report on the results of the information needs survey.

The survey reveals that whereas the players in water and sanitation are aware of their information needs, the information is currently not available on the Internet. The paper makes proposals for fast tracking of evolution of Internet based information dissemination culture. The paper also makes recommendations on various ways of optimising on the flow of information by using the Internet.

INTRODUCTION

Water and sanitation is generally associated with the underserved of the developing communities. Associated with it is the accompanying practice, where the levels of service to those communities are usually the lowest available. The RDP policy on water and sanitation is one such example as is the subsequent government policy on water and sanitation (ANC, 1994 and Department of Water Affairs, 1994). Assuming that the level of service is proportional to the capital outlay necessary to address the backlog in the services, question arises as to why despite the low capital requirement, backlogs in water and sanitation services continue to increase throughout developing countries. A partial answer to this question is simply the sheer numbers of people without access to adequate water and sanitation services. **Table 1** gives the backlog of the services in water and sanitation in developing countries

Table 1: Estimated number of people without access to adequate water and sanitation services in developing countries, 1994 (Seregeldin, 1995)

Service	*Number of unserved*
Water	*830 Million*
Sanitation	*1200 Million*

The number of people without the services represents 52 % of the rural population and 25 % of the urban population in developing countries. Coupled with the high number of the underserved population in developing countries, a high population growth outstrips the marginal gains in coverage achieved through various efforts. Seemingly, it is paradoxical to consider Information technology in a sector where bottom end of technology is necessary in order to achieve useful results. However, this study asserts that there is a scope for application of Information technology in the sector and more so the Internet. The big numbers involved require an integrated management at national and international level with efficient co-ordination in order to consolidate any gains in the coverage. Information Technology has been successfully applied in integrated management of resources in other sectors and there is no reason why the same should not apply to water and sanitation.

A research was formulated with among others, an objective of optimising on the use of the Internet in the water and sanitation sectors of developing countries. One aspect that was investigated was the information needs of the users of water and sanitation information. A survey was conducted against a background of the available information on the subject on the Internet. This paper covers this information needs aspect of the research.

DEMAND SIDE SURVEY

Demand side within the context of the research was used to refer to the information needs of the users. This was in contrast to the supply side, which referred to the available information on the Internet on water and sanitation. In order to conduct the survey, a review of previous survey by Kibata (1996) was conducted and an appropriate approach designed.

Previous Surveys

A survey by Kibata (1996) was conducted to get industry wide feel of the Internet information needs of the sector. The survey was not focussed in any way towards Internet service delivery channel. The survey only interviewed single participants from each of the categories of organisations in water and sanitation. Thus, the sample selection was biassed towards the needs of the organisations that were selected. Kibata (1996) concluded that the general information needs of the industry were similar to those Internet information needs.

Demand Side Survey Methodology

Questionnaires were circulated to 360 individuals in the water and sanitation industry throughout the world. Some questionnaires were mailed directly to the interviewees while others were faxed. A website containing the same questionnaire was set up. Email messages were then sent to interviewees giving the URL of the website and inviting them to respond to the questionnaire.

The objective of the survey was to record the inherent perception among the Engineers working in water and sanitation about the relative importance of documents used in their day to day work. The respondents were asked to give a usage frequency rating of the various documents that were thought to be used in their work. A rating of 1 was given to documents that were most frequently used and 4 for the ones that were least frequently used. The documents mentioned included previous design reports, community surveys, climatic data, policy data, economic data, GIS data, legislation and policy documents, standards, bibliographic databases, and industrial trends as represented by journals, bulletins etc. These documents were thought to be representative of tools of technology transfer in water and sanitation.

SUPPLY SIDE SURVEY

The survey on the demand side aimed at investigating the level to which the technical information need by professionals in water and sanitation is met. At the same time, the extent of availability of information on the Internet was surveyed. The survey covered two levels of information availability: -

- ~~horizontal~~ vertical availability:- quality of information available on the individual Internet site.
- ~~vertical~~ horizontal availability – this refers to the mere presence of useful information on the Internet on water and sanitation.

Previous Surveys on the Supply Side

A qualitative survey carried out by IMC and Mvula Trust (1997) concluded that there exists some useful information on water and sanitation on the Internet. However, the report did not point out to specific information that is more useful to the study. The survey contacted 40 organisations that had an established presence on the Internet.

Supply Side Survey Methodology

Determining the quality of information is subjective and not directly measurable. Therefore, the first challenge was to come up with satisfactory criteria for determining the quality of information that is held by the individual sites that were surveyed. Three options for conducting the rating were available: -

- direct method
- semi-direct method, and
- indirect method using shadow rating indicators

Taking cognisance of the various factors, the shadow rating method was adopted as the choice method. The method involved using the level of Internet usage development cycle as an indirect measure of the quality of information held on a particular site.

A expert system (SHADOWRATING) was developed in Visual BASIC to help in the rating of the sites. For the purposes of the study, 100 sites were rated in this way.

RESULTS

- Results from the demand side survey suggest that professionals in water and sanitation are interested in receiving information which is directly related to their line of work over the Internet.
- However, information peripheral to their primary duties is not considered important although it significantly affects their professional development.
- Results from the supply side survey suggest that none of the information that the water and sanitation professionals desired availed on the net was available in substantive form. Any reference was usually in passing with an inherent assumption that the users would somehow be able to look up for the information outside the Internet

CONCLUSIONS

From the demand side needs survey, it can be discerned that the sector professionals are interested in using the Internet for their routine work as traditionally practised. Whereas this has the potential to improve on the sector productivity, it has the inherent danger of stifling innovative use of the Internet in the sector.

The needs survey on the supply side suggest that there is no substantive / quality information on the Internet on water and sanitation. This poses a threat to the development of Internet usage in the sector.

RECOMMENDATIONS

In order to encourage innovative use of the Internet in water and sanitation sector, the study recommends identification and encouragement of champions in the sector to lead in growth of Internet usage. The effort of the champions would then be replicated and disseminated across board.

The study further recommends an integrated approach towards provision of Information on water and sanitation over the Internet. This of necessity would require a clear definition of standards to be used in the industry.

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The community factor in sustainability of water and sanitation programmes for Low income urban areas

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Abstract

The absence or inadequacy of effective operation and maintenance systems has been identified as a major cause of failure of established water and sanitation programmes. In view of this, sustainability has become the central concern of all water and sanitation activities.

It is postulated that, well organised communities with sufficient levels of interest and commitment, based upon the recognition of the people that, they are a community that owns and manages their own facilities is the key to sustainability.

In low –income urban areas of most of Africa, the nature of the community itself and its socio-cultural milieu form the bases of the challenges water and sanitation educators face in promoting effective operation and management.

The purpose of this paper therefore is to stimulate trainers, training managers, community animators and NGOs engaged in community mobilisation and orgaisation for water and sanitation projects to take one step backwards in the project cycle and reexamine their starting point in the process of preparing communities for participation in water and sanitation programme activities in low income urban areas.

The principal aim is to explore the possible ways of creating an enabling environment in which dwellers in low-income urban areas could establish and operate the required Operation and Maintenance System to guarantee sustainability.

The key issues are:

- development of a classification of the low income urban areas – the traditional low income urban area, the periphery workers residential low Income urban area; and the settler low-income urban area
- identification of the major characteristics of the low-income urban areas and the challenges posed to sustainable management of water and sanitation ; and
- development of a strategy of rediscovering and empowering the community in the low-income urban society.

The final thrust is the development of a focus for an awareness education activity geared towards enabling community members to rediscover the sense of community in them, and work towards rebuilding their commitment to community ownership and management, the critical factor in sustainability.

Introduction

The establishment of viable water and sanitation systems has become one of the key concerns in the economic and social development programme of local and national governments throughout Africa.

In establishing these systems in both urban and rural areas various steps are taken to ensure effective operation and maintenance with the hope that, the services such systems provide could be rendered on sustainable basis. But the dynamic nature of society and its evolving changing circumstances poses great challenges to efforts of user groups in the achievement of the level of sustainability required in the operation and management of such water and sanitation services.

It is however postulated that, well organised communities with sufficient levels of interest and commitment, based upon the recognition of the people that they are a community that possesses and manages their own water and sanitation facilities, hold the key to sustainability. Without a community, sustainability is difficult to achieve, except people are able and willing to pay for every level of service provided in the water and sanitation sector.

Admittedly in preparing the people to accept, use and manage these facilities various forms of educational activities are carried out. One critical area that requires a more fundamental assessment in the provision of education for operation and maintenance is the issue of "Community" in community ownership and management particularly in low-income urban areas.

The purpose of this paper therefore, is to stimulate trainers, training managers, community animators and NGOs engaged in community mobilisation and organisation for water and sanitation projects, to take one step backwards in the project cycle and re-examine their starting point in the process of preparing communities for effective participation in water and satiation projects.

The Community

Samson Raus and Vittachi (1985) have poetically observed :*Before the city there was the hamlet and the shrine and the village*

> *Before the village, the camp, the cache, the cave, clan, and before all these there was the disposition to social life that man shared with many other animals. (DVV 1985:47)*

This description typifies the continuing evolving process human settlements have been passing through, thus indicating that we have always lived our lives in communities. We may therefore describe a community as a group of people in communication with one another, people who have common interests and ties with a locality based membership. You are a member of Kawangware community because that is where your residence is located, a place where you have lived your life on day to day basis and where you experienced the events of the larger world.

In a classical description by Tonnies (1955) he concluded that;

"there existed an inextricable linkage of all their mores, taboos, feelings, emotions and attachments, they were all part and parcel of one another; their relationships were inclusive and individuals respected one another as ends and not only as means" (Morrish 1972: 216)

In a typical rural community, elements of such characteristics of community life are still observable even though adulterated through modern migration, industrialisation and new patterns of employment and lifestyle. These characteristics provide fertile grounds for easy breeding of the practice of community management and its attendant merits since populations in such face to face relations, due to cultural commitment are more ready to support each other in the procurement of the needed social services.

On the other hand however, the dynamism of societal development, as mentioned earlier, has taken its toll. The growth of urban societies have eroded the merits of communal living.

Urbanism

Mabogunje a Nigerian writing for the World Bank in 1992 stated that, irrespective of the economic outcome, the regimes of structural adjustment being adopted in most developing countries is likely to spur urbanization. He argued that;

"if structural adjustment actually succeeds in turning around economic performance, the enhanced gross domestic product is bound to attract more migrants to the cities; if it fails, the deepening misery of the rural areas would push more migrants to the city" (World Bank 1992: 192)

Thus the performance of a nations economy and its impact on the population at large, coupled with rapid population growth could continue to lead to the conversion of villages into towns and then into cities – the urban societies.

World Bank records further indicate that, in 1990 more than 33 percent of the population of Africa was urban and by 2025 this would rise to over 47 percent. Within this urban environment majority of which could be found in the low-income bracket, three forms of low income urban settlements could be discerned.

The Traditional Low Income Urban Settlement

This pattern of settlements is found in situations where old towns and villages through fast population growth have assumed large structural expansion and increased human activity. Some of the factors responsible for this are; (i) growth in economic activity and the development of traditional market centres, and (ii) growth and expansion in public institutions such as schools hospitals etc. and their ancillary attractions. Examples of such towns in Ghana are Winniba, Somanya, Tamale etc.

The "Periphery" Workers Residential Low Income Urban Settlement

This form of low-income urban settlement results from situations in which industries and other modern economic activities have attracted large numbers of workers to the city, workers who have no dwellings in the city and therefore have to withdraw to the suburbs leading to the development of shanty towns and large tenements. Examples are Ashaiman and Anloga-Kumasi in Ghana.

The Settler Low Income Urban Settlement

This type of settlement has developed as a result of large segments of populations moving out of their original homes into new environments as a result of economic hardships. These economic hardships may be created by ecological disasters, wars etc. which have totally destroyed the economic base of the people. Akatsi, Damanko and Kpasa in Ghana are examples.

The Major Characteristics of Low Income Urban Areas and the Challenge to Sustainable Management

In all the three types of low-income urban settlements the basic characteristic feature is that a mixed bowl of cultures and a variety of both structured and informal economic activities is created. The observable feature of these towns is the "mass society" in which there is a general sense of lacking in roots, aims or goals. They also lack the community nature in which people have grown and developed in a close sense of harmony and personal relations. In these settlements the real community is revived perhaps only in times of conceivable social danger and stress, in times of crises or cataclysm, and when the society as a whole is in total conflict with another society.

It is further noted that, increased size and density of the population of these towns and its accompanying heterogeneity diminishes the power of informal society control which is effected largely through the play of folk ways and mores. Increased formal control; control of law, police, courts, jails and regulations then become the most reliable ways of managing the society.

In view of the characteristics of urban society described so far, particularly, the diminishing community nature, the only alternative one would presume suitable for sustainable water and sanitation delivery and management would be a centralised management system. This would involve strict commercialisation of the system in which external agents such water corporations operate and manage the system and their services fully paid for by members of the society.

This might work well in high and medium income urban areas where most dwellers belong to the middle class. In low-income urban areas however, where poverty predominates and people had to struggle to maintain a basic livelihood, the ability to pay for social services such as

water and sanitation provision is a critical issue. The people may just not be able to afford, and this is the basis of the challenge that community mobilisation and training for sustainability in water and sanitation delivery in low-income urban areas faces.

Strategy for Promoting Community Management in Low-Income Urban Areas

Most settlers in the low –income urban areas admittedly belong to the lower economic class of society. While some use and invest all their earnings in their present settlement adopted as their new home, others have to share their meager income between this and their original communities. Their low-level economic status we may note does not however preclude them from benefiting from essential social services such as water and sanitation.

A World Bank study in 1988 has revealed that;

> *"despite heavy subsidies, many urban services 'remain' under provided". Most resent estimates indicate that 23 percent of the urban population in developing countries has no potable water within 200 meters; the figure rises to 35 percent in sub-Saharan Africa .... The problem is aggravated because spending in many cities is not directed towards the appropriate services..... (which) serve a small percentage of the urban population, place a considerable and continuous burden on the cities' financial resources, and displace improvement s elsewhere". (World Bank 1992: 191)*

If the main urban areas are found in such depressing conditions one could easily conjecture what the picture would be in the low-income urban areas.

Surely, various governments and international agencies have initiated numerous programmes and projects towards the provision of critical social services such as water and sanitation to urban dwellers, most of which do not adequately meet the needs of the people.

In the low-income urban areas in particular while such services continue to dwindle the demand for them on the other hand continues to rise as more people continue to migrate to these areas. The issues of sustainability of the provision of such services therefore hinges on the availability of funds and the appropriate management systems. As donor agencies can not continue to provide such services forever and free, the people no matter their economic and social status, must become active participants in the provision, operation and management of such services to themselves.

In view of this, a strategy of RE-DISCOVERING AND EMPOWERING THE COMMUNITY IN THE SOCIETY is therefore a prerequisite to sustainable project implementation in low-income urban areas. In operationalising this strategy the following components are noted:

- Identification of the community in the society
- Mobilisation/organisation of the community
- Training the community for community management.
- Enabling the community to function for sustainability

Among these components the last three are to a great extent quite well developed and are in use on all water and sanitation projects.

The first, which should be considered as the foundation – 'Identifying the community in the society, is however the concern of this presentation. It is argued that most feasibility studies do not go far enough in addressing this issue. A typical feasibility study in reviewing a community's Socio-Economic status often highlights the following: location of community (town), settlement pattern, population size, sources of income, experience in self help projects fund generation and performance on past projects. Admittedly the issue of the community as a coherent unit and its social relations and structure is often played down; but considering the nature of the low-income urban areas, this should be the bedrock upon which any meaningful strategies for sustainability could be formulated.

In a study conducted in Dec. 1996 by the VRCWS Programme titled "Ability to pay – a crucial signal in feasibility studies", it was established that the ability of community members to contribute money, labour or any other form of support within the framework of community life and purpose are vital in guaranteeing sustainability of programmes. It was further found that some of the factors that highly hindered this element of community contribution for sustainable management are:

- Lack of commitment to communal living and low performance in communal activities
- High level of heterogeneity in community structure, ie high diversity in ethnic backgrounds.
- The existence of standing conflicts between/among communities and families.
- The absence of established social organisations such as youth/men and women's associations etc.
- Culture of looking forward to government and donor agencies for support for every development; over dependence on philantrophists and external donors.
- Leadership struggle in the society at large.
- Lack of trust/respect in the leadership, its behaviour and intentions.
- The absence of an established structure for the enforcement of local regulations on the use of water and sanitation facilities.
- Mistrust resulting from past projects that failed to deliver after community's commitment to it
- Provision of entirely free facilities to communities without any level of commitment from the community.
- Poor execution of work by contractors and NGOs due to lack of community's hand in monitoring and supervision.
- Misappropriation and embezzlement of project funds in the past by community and project leadership

- Lack of understanding of projects resulting from ineffective education.
- Low income levels among community members due to:
  - absence of reliable income generating activities among the people particularly the females;
  - absence of reliable avenues for marketing of produce by the people; and
  - inability to identify and exploit other sources of income than the traditional ones.

Re-discovering and Recreating the Community

The attempt to rediscover and recreate the community in the low-income urban areas therefore involves identifying the possible ways in which people could be drawn into seeing themselves as a community (group) with shared responsibilities, needs and goals in order to overcome the adverse factors that keep them apart and hinder community management for sustainability.

In the traditional low income urban towns the community could be identified along the existing original lines or divisions in the society. In practical terms family groupings or clans, divisions in terms of religion, employment etc. are useful segments in which communities could be recognised and mobilised for sustainable management. In the settler and periphery low income urban towns other forms of segmenting the society should be explored. These include the following:

The Solidarity Community

This is one pattern of community in which segments of the population could be recognised. In this community, people are seen to be living in a common territory because of common heritage such as nationality ethnicity, religion or language. Since they often define themselves as belonging to that group and feel emotionally loyal to it, the possibility of their working as a community in managing their facilities sustainably are high. Examples of these communities are the Ewe community in Kumasi, the Mosi or Hausa community in Nima, Accra etc.

The Neighborhood Community

Another territorially bound conception of community which could be recognised and used for effective community management for sustainability is the neighborhood community. This develops as people live in areas together for a period of time and in the process develop familiarity out of which a strong loyalty may grow. As Rubin and Rubin (1986: 39)) argued, neighborhood integration may not be totally based on loyalty and personalities but also on shared interests and common problems which may bring them together.

If therefore good water and sanitation are viewed as important factors for achieving healthy living, then neighborhood communities when properly identified and recognised could effectively serve as focus for organising the people for effective and sustainable management.

Education for Community Commitment Building for Community Management

The task of community commitment building begins with the identification of a community or series of communities within the entire low –income urban township and the existing social systems and institutions within it.

The identified community may be a group of family or clan units, solidarity units of a set of households or entire neighborhoods in which a certain number of water points, communal or institutional, family or household latrines may be established requiring community concern in effective management to cut down cost.

Education for this purpose should begin with an active awareness creation programme aimed at various target groups. These targets should include the community at large, sections or divisions within the community, identifiable groups – artisans, market women, youth associations. etc. The final goal of such awareness creation educational efforts should be the development of a strong sense and feeling of oneness among the people and their belonging to the locality. Critical issues for discussion should include the following:

- Who we are as a people;
- Where we are as a community;
- Our identity as a people;
- Our common problems;
- Our solution to these problems;
- Our achievements of the past;
- Our challenges for the future;
- Common strategies to meet the challenges;
- The role of the community regarding self help; and
- Formation and operation of self help institutions in the community. etc.

These issues and others when properly discussed would lead to the achievement of the goal of encouraging community commitment to group need, as well as preparing the people for effective community participation in the development and management of future social facilities such as in the area of water and sanitation.

Meetings, group discussions, study cycles, workshops, visits to similar groups or communities etc. should provide suitable fora a for this community awareness campaign which should be facilitated by professional extension educators and community organisers.

Conclusion

As earlier stated, the characteristics of a community might certainly affect the way the community could be organised, how it defines its common problems and accepts the strategies for addressing these problems. An effective conduct of the community rediscovery and commitment development exercise would serve as a useful tool in enabling people to overcome the differences among them, develop the linkages required to hold them together

and guide the creation of the degree of original trust, the bootstrapping process that would enable them to work together.

This would create the appropriate foundations upon which the project cycle and its various phases – Mobilisation, Planning, Construction and Follow-up could be built for sustainable water and sanitation delivery. It is believed that, no matter the level of poverty in the low-income urban areas, the will to work together as a community, the desire to support each other, the concern for each others social needs especially health is the bedrock for the creation of a sustainable system of operating and managing their water and sanitation systems.

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Why is Effective Community Management Difficult to Achieve in Nairobi Slums?

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Brief Outline to Peripheral Factors affecting Nairobi Slums

The Nairobi slum population is estimated at around 2.5m inhabitants, well over half of the total population of the city.

At the moment most slums have no legal status, very few have title deeds for the land, and where those title deeds exist, very few are held by bonafide slum dwellers.

Cities cannot survive without slums as they provide plentiful cheap labour to keep the machinery of a large city and its various Industries running.

There is ambivalence on policies guiding the provision of water and sanitation infrastructure to the slums, currently this falls between the City Council and the Ministries of Water and Local Government.

The sheer number of voters in the small areas of the slums means that around election time the slums attract much attention from the Politicians and in the interim between elections very little attention.

At the moment the urban middle and upper classes seem to be reneging on their social responsibility to the urban poor.

Nairobi slum dwellers pay up to twenty times more than their middle income counterparts for the same quantity of water. When water is scarce a slum family may spend up to one quarter of its income on water, though total water volume consumed is infinitesimal compared to the higher income family.

Factors Obstructing Genuine Community Cohesion and Collaboration

A rapid turnover of the population, up to 40% per annum in some slums, is a common feature.

The 'community' members in the slums have no social cohesion; they are of mixed ethnic groups, different religions and have no joint history apart from fate, which has thrown them into the same environment mostly because of poverty. It is a harsh environment whose motto seems to be "Survival of the Fittest". Slum dwellers most closely resemble displaced people or refugees.

Survival becomes a key element and with it the loss of hope and lack of vision caused by the reality of a harsh life are an ever-present reality.

Experience of previous disappointment with development has taught the people to be cautious about any 'development' initiative. A development worker should expect to hear "are you going to be like the rest who came before you, you talk and ask us questions, then you go away and never come back again?"

Many people live at very close quarters, often 6-8 people in a small 10 feet by 10 feet room, combined with a low self-esteem due to the disappointments in their lives, renders many people 'faceless'. This facelessness robs the individual of the will and conviction to act to improve the environment unless something happens to make that individual value their knowledge, skill or contribution to a group through which status a 'face' is attained.

When a whole mass of people live under difficult conditions, some will emerge as more powerful than others because of some advantage which places that person above others. Power, which is used to gain status over others, often by disempowering the less able, is common in slums where the natural cultural checks to the misuse of power, which are found in balanced societies, do not exist.

Most of the poor in the slums do not own the shelter they live in, let alone the land the house is built on. The lack of ownership leads also to an under-valuing of the self and a weakened will to fight for collective rights and assets.

The NGOs and other development agencies are often not genuinely interested in working together and learning from each other's successes and failures. The eventual result is competitiveness between development bodies if more than one Agency is working in any given slum community. This drives the community members further apart rather than uniting them.

Non-accountability is a common feature and non-transparent practice is by far the norm, making it difficult for a group of slum people to adhere to accountable practice.

Key Lessons drawn over the last four years

Prior to any Infrastructure project being brought, the people first need an environment where they can organize democratically, be formally recognized, and reduce their 'faceless' status in order to gain access to outside support. Outside support that comes to the people before they have had an opportunity to organize fully will usually not be fully successful as the people will not have put in place the democratic processes to gain from the new input as a collective and individual tycoons are likely to emerge.

Innovative Participatory Methods need to be used which cause a group to grow and mature progressively, while challenging non-accountable/non democratic modes of community governance, planning and management. We have found useful CO (Community Organizing) methodologies evolved from Paulo Freire's work in Latin America, Participatory Urban Appraisal (PUA) and Community Action plans (evolved from the Rural PRA) as well as Theatre for Development and frequent Participatory Action Learning.

Time is scarce, and so, for people to contribute their time it in effect means a loss of part of that day's earnings and may directly reduce the amount and quality of food which that family eats that day. For people who are poor, time to organize to be in meetings or trainings is a luxury. For people who are used to engaging most of their intel-

lect on daily survival, the opportunity to think, map, plan and discuss is very empowering. Initially the planning will only be for the short-term but as a group see that they have been able to carry out their short-term plans, they will become more able and sure of themselves to do more long-term planning.

Community priorities can shift, even while working on a community water project, if a neighbouring area has an eviction ongoing, the water project will stop while the community resolve the pressing eviction problem of their neighbours.

The people usually only want to concentrate on one task at a time, for example Operation and Maintenance training cannot be done parallel to trenching and pipe laying. People live today for today, it is essential to keep their attention focussed on one issue at a time.

Volunteering versus paid unskilled labour is complex. The urban poor need to earn something every day to feed the family, but paid labour leads to loss of ownership of the project. Where a first community project already generates income, unskilled labour can be paid for by the community from that project's profit. If one development agency pays for such labour, this brings hot debate to any other community project in the area and again challenges that concept of volunteerism.

The main issue of successful operation and maintenance of a community water supply or toilet block is the safekeeping of funds generated by the facility (i.e. sale of water). However difficult it is, (one might say even painful) for a community which is making a profit on water sales to actually use some of those funds on maintenance, the habit of 'wait until it breaks' which is the modus operandi of surviving from day to day needs to be challenged to instill the concept of prevention for longevity of the project's benefits.

The genuine grass-roots organizations are likely to be CBOs (Community Based Organizations) which are usually small and informal. Their capacity is often much less than that of the NGOs and so more time and resources are needed to support CBOs than NGOs. The length of interaction is likely to be long, 3 years or more.

There are as yet few effective CBOs, so the few are overloaded by development agencies needing a 'ready-made group' to work with – this over willingness of larger agencies to support young CBOs in effect often pulls them off-track and makes them less effective than they would have been with less external "support". In some cases the premature influence of Larger Agencies leads to a group's disintegration.

Working in slums is not a cheap option, the funds needed for Capacity Building, Training, Social Mobilization and Planning are much higher proportionally than in the rural areas where community cohesion is strong.

The Rural Development Models do not necessarily work in the slums, as they assume that the people have an identity with the land and are mostly self-reliant whereas the slum reality is of a Displaced People with no strong cohesion to any assets such as land or each other.

The lack of Land Tenure is a major cause of apathy in the people when faced with evictions, for how do you fight for what you don't own? Small infrastructure projects, if prioritized and built by the community, assists the people to resist evictions and to fight for their rights of title deeds in the long term.

Leadership cannot be developed without the concept of followership. Leadership training in an anarchic vacuum will produce dictators not leaders. Leaders need followers, effective groups need both effective leaders and effective followers. These need to be formed together, not in isolation from each other.

There is a vital need for all 'actors' including the people, Development Agencies, Donors, and Government bodies to reflect together during and following an intervention to draw out key learnings, to build on the successes but also learn how any mistakes have obstructed the community.

The Opportunities

The opportunity now exists to build an emergent 'civil society' at the 'bottom' of the pile, to acknowledge the potential of small key initiatives which build more cohesive community groups who strive for improved living conditions and reduction of conflict through democratic processes.

Ten percent of the total population of Kenya lives in Nairobi's slums, if small key initiatives are replicated in neighbouring communities, much of Nairobi's urban poor can be reached using proven methodologies and approaches which lead to genuine peoples' organizations.

Communities who have gained 'face' and hope and created their own accountable structures will in turn be very aware, demand a genuine process of engagement from any person or organization wishing to work with that community.

In Kibera, a Divisional Development Committee (DDC) has been formed to act as a DDC does in the rural areas, i.e. coordinate the development activities in its area to ensure a coherence of development approaches. This DDC could set a precedent for future slums development if adequately supported to carry out its coordination role.

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PAPERS FOR DOCUMENTATION

The principles and value of dry feet: Some technical, non-structural and financial aspects of urban drainage and flood protection

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When it rains in a city, there is a major chance that rainwater will fall on a paved area, that is on roofs, streets, parking areas, sidewalks and markets. These areas are paved for specific purposes which do not combine well with ankle high pools of rainwater. Because of the paving the rainwater will not infiltrate in the subsoil and so the logical thing to do is to include in the construction of this paved areas a special system which guides the rain to its natural outlet, the river, without causing minimal disturbance to the movements and activities in this urban centre. Once this system is completely or even partially absent or when this system is not working properly, a problem will arise: flooding.

The problem of flooding of urban centres has several causes. In fact these causes can be divided in two main causes:

The discharge system, also called the drainage system or storm-water discharge system, is not working properly and flooding occur because of obstructions in the system itself. The underlying causes are the absence of part of the system or lack of maintenance. This in fact is the problem which can be solved the easiest. The places of obstruction are well known and interference in the infrastructure will have no negative influences on the other aspects of this same infrastructure, only benefits. Flooding of this type are characterised by very local appearances of short duration. The damage caused is the obstruction of traffic flow, the destruction of poorly constructed roads and increased cost of public health care. Nairobi is experiencing mainly these kinds of flooding. When the problem would be taken more serious, the solutions could be implemented rapidly without tremendous high capital investments, e.g. regular maintenance.

a.

The discharge system works fine but the obstruction is caused by high levels of the receiving water: river, lake or sea. High river and lake levels are caused by increased run-off and siltation in the upstream area. This again is caused by increased urbanisation, thus increased paved area, or by deforestation. In general, the cause is the reduction of water retaining capacity in the upstream area. High sea levels are caused by tidal surges but also by the subsidence of the land itself. When the whole city subsides, the sea level will increase relative to the land level. This land subsidence occurs in cities built in deltaic areas on relatively young sediments. The effects of the natural settlement of these sediments are aggravated by groundwater extraction. These kinds of problems are much harder to solve since the causes are very complex and interference at a certain place or stage will definitely have negative impacts somewhere else. For example, limiting urban development upstream is hard to achieve especially when it occurs across national boundaries, or limiting groundwater extraction will require the exploration of other water sources. These kinds of flooding are long lasting and can affect wide spread areas. Often not only the drainage system is obstructed but also overbank flooding occur. Damages caused are the complete paralysation of all activities is the affected areas, damage to roads and other infrastructure, buildings, resettlement of residents and increased costs in public health care. These kinds of problems occur in the more developed cities over the world. Examples are Western Europe and even Singapore.

The worst kinds of problems occur in big cities in the developing world where flooding are based on the combination of all mentioned causes: e.g. Bangkok, Jakarta, Manila, Dhaka. These are big cities with well over 10 million inhabitants, with a tremendous growth in population. This urban development not only requires impossible high investments in infrastructure but also cuts of any possible expansion of this infrastructure. Deforestation is rampant, the cities are situated on young deltaic areas and alternative sources for water are lacking. On top of this, the cities are frequently visited by typhoons with enormous high rainfall intensities.

Although the impacts might be clear from the text above, one can still wonder why we experience it as an increasing problem. There have always been flooding and the duration of the problem is normally just a few weeks per year. So

why is it a problem and why try to solve a problem which people get upset about for a couple of weeks and then forget? Because:

the problem is getting worse and is affecting more and more people.
the economic and financial costs are mounting as the cities get wealthier, forming a major obstruction to the economic development of a nation.
the people disproportionately affected are the poor.

The first step in solving the problems of flooding is to accept that a **comprehensive approach** is required. One should know what is happening upstream of the relevant area, what is happening downstream of it, and what is happening in the urban drainage systems. First the urban area has to be placed in the context of the surrounding area, then the flood protection and drainage sector can be placed in its urban setting. This urban setting is divided into various sectors. The major ones, other than flood protection and drainage, are housing, roads, solid waste, sanitation, water supply, industry and commerce (e.g. markets). Interaction is unavoidable and should be considered when investing in one of the sectors.

The technical, or structural, solutions are very much aimed at eliminating the various causes as indicated earlier.
The absence of the whole or a part of the storm water system will require the construction of one. In designing the system one should be conscious of the social and environmental acceptability of it, the affordability and it should be directed to an optimum use of local available skills and materials. The drains can be constructed as closed pipes or as open channels, both with their advantages and disadvantages. Closed systems do not allow for obstructions caused by the dumping of solid wastes, it permits the use of space on top of the drain and it is preferred for hygienic and aesthetic reasons. The disadvantage is that inspection and maintenance can be a problem because of restricted accessibility. The open systems lack all the advantages of closed systems but have a strong advantage in the easy inspection and maintenance possibilities. Also the construction is much easier and cheaper, but it is strongly recommended to line the channels and to make them big. The lining will fix the profile so when the drains are cleaned it is obvious whether they are really clean. Small open drain are easily ignored, trampled on and forgotten. Soon after that they will have disappeared. Idealistically, drainage channels should be so big that even experienced swimmers are afraid to go near them.
Flow should preferably be under gravitational forces and ample storage volume should be available in the system itself. It is even possible to allow for controlled overflows into low-lying undeveloped areas.
Accessibility should be guaranteed by access and maintenance roads, so proper inspection and maintenance can take place.

Other structural measures include the control of river discharges by upstream reservoirs, diversion channels around the relevant urban area, construction of levees, dikes and floodwalls around the relevant areas or along the river, improvement of the river by deepening and widening of the profile, construction of tidal surge barriers. All of these technical measures require elaborate studies and designs. One can imagine that the implementation will have far reaching impacts on the urban centre, not to mention the financial consequences.

Other measures, which do not constitute technical or structural aspects, need to be implemented to guarantee sustainability of the system. These so-called ***non-structural measures*** are complementing the structural measures. They are as follows:

Setting up of an institutional framework to co-ordinate and guarantee a comprehensive approach. Urban drainage should be given the same status as other infrastructural works, such as transportation. Inspection and maintenance of the drainage system becomes the responsibility of a clearly defined and identifiable government agency.

Land use should be planned and monitored. A master plan has to be set up, including all projected land uses, and any significant deviation from this plan should be controlled and monitored.
Individual flood proofing measures should be encouraged. Rapid land development and urbanisation is a significant contributing factor to the factor of flooding. Developers, legal and illegal, should be made aware of this fact and participate in reducing flood discharges and facilitate proper connections to municipal system.
Solid waste should be collected and disposed of in a controlled way, preventing the uncontrolled dumping, which is often done in the drainage channels, resulting to clogging and overflowing of the system.
Soil erosion and sedimentation caused by development activities involving earthwork, such as building activities, mining and also deforestation, should be controlled legislative actions, aimed at reducing erosion, and the provision of silt detention ponds.

Flood forecasting and warning system need to be set up to provide the residents in flood prone areas an opportunity to minimise the extent of damage to property in the event of flooding. This system can consist of meteorological predictions of rainfall and expected impacts and of water level measurements in the upstream areas, combined with flood routing calculations.

The main reason for not implementing flood control and drainage works, is the absence of a clear idea on the financial implications. The project will often include a major capital investment. However, the benefits for the agency making this investment are very uncertain. In contrast, the individuals will benefit immediately from drainage works but do not posses enough capital to make the investment. This leads to a situation where a complex system has to be created where money flows from one group to another and back to the source. When the system fails, the project fails too.

From an economic point of view, considering the benefits to the whole society over time, it is easily concluded that the absence of flooding have the benefits of less traffic jams, higher land prices and less public health care expenses. But from a financial point of view, considering only the implementing agency, it is much less clear what the benefits are, how these benefits are returning to the relevant organisation and, not less important, when.

In contrast, the supply of water, electricity, telephone, and another modern basic commodity in urban centres: cable television, can be classified as projects which are easy to implement. The demand for those commodities is present and the provision can be done by one organisation, public or private. The benefits are quantifiable and immediately available through user charges. No payment, then disconnection, so no costs, will follow.

This approach can not be used for projects as drainage, sewerage and road construction, although for the latter, road levies through fuel and toll payments are somewhat more accepted constructions.

So, the main question is: who takes responsibility, what are the benefits and how and when do they return? The following will not answer this question but will merely give some insight in the principles in finding the answer, which can be different for every single project.

In general four parties involved in drainage and flood control works can be distinguished:

Community groups, particularly low-income groups, which experience the flooding as a major problem. Most often these groups locate on cheap land which is often cheap because it is flood prone. The problem for these groups is that they can not afford to pay much for protection. They can contribute in labour to small-scale drainage works, but in larger scale works it is generally not feasible to incorporate such works. Maintenance of projects is however of a much lower order of cost and contribution of labour is feasible if it can be organised on a continuing basis. Involvement of these groups in the planning of funding strategies and construction of the drainage works is essential.

The local private sector will be reluctant to invest unless there is a direct and substantial benefit. Even then, in countries with no history of private/public sector co-operation or, indeed, of effective local taxation for needed infrastructure, extracting such contribution is difficult. However, when favourable conditions are set, such co-operation can be achieved. An example is the private development of cheap lands, under the condition that the developers provide all local infrastructures, including drainage.

The local government is generally in a difficult position with regards to funding drainage works. With the capital costs of comprehensive works being expensive in terms of its budget and monitoring resources, and the benefits unpredictable, it has traditionally left such works to the central government. However, in the case of drainage works without major mechanical equipment, such as pumping stations, the operation and maintenance costs are limited and may not cause a burden to local authorities, as these expenditures are minor compared to the total cashflow.

The responsibility of the funding, and implementation, of flood control and drainage works, lies often with the central government because (1) it may be too expensive for other organisations and agencies, but also because (2) flood problems do not confirm themselves to the local boundaries, (3) choice of measures is available and skills are required to assess them, (4) "ownership" of offending water lies often with central agency.

The financial benefit of a project is, conventionally, a stream of revenue. Thus a property project has a stream of rent following an initial capital investment. In addition, the value of the property is often expected to increase above the level of inflation, providing capital gains. Drainage and flood control works do not usually have such direct benefits to the implementing agency. The reason for this is that it is very difficult to identify the direct beneficiaries of the drain or channel, and thus to charge a direct fee. People do not "use" a drain in the same way they "use" a shop or a water supply system. Drains are only useful when it rains, and big drains and levies are only useful when it rains a lot. The only way to quantify the benefits of flood control is to weigh them at the costs of flooding, or with other words, against the damages incurred because of flooding. The direct benefit of a drainage project is the cost of damage avoided. Assessing these damages is usually very difficult because of the lack of data. Attempts should be made to estimate the cost of repair of property and infrastructure. Additionally, estimates of disruption of economic activities can be attempted.

Where such methods require heroic assumptions, a proxy for these benefits can be found in the increase of the value of the land protected by the works. This is, in turn, indicated by the difference in price between comparable pieces of flood-prone and flood-free land. This difference should be used with caution as the increase in price, and thus the benefits derived, can be expected over time, as development occurs in areas now flood free.

Before the financial appraisal can be made, the mode in which the benefits will be returned to the funding agent to cover for the costs, will have to be determined. This is the principle of "user pays". Basically there are two options to recover the costs: (1) the government can divert funds from, or increase, taxes already levied, or (2) use a tax or user charge aimed specifically at the beneficiaries of a project.

The first category, also called general taxes, are income taxes, business or turnover or value added taxes, property taxes, or special fees for services such as water supply, waste collection, parking fees, etc.

The second category is the user specific taxes and charges. These are taxes and charges aimed and recovering the benefits of a specific project. The principles of these schemes are to (1) recover the costs, (2) reflect the benefit to users and (3) be practical and enforceable. The benefits of the various users differ and, hence, the charges should differ in relation to the benefits. A person with a house twice as valuable as his neighbour should not pay the same for flood protection.

An exemption should be made when there is a social need to ensure that low-income earners will benefit from the project. These low-income earners can not provide the required charges and therefore should be exempted. The costs should be covered by principles of cross subsidies or international grants.

This last approach requires the government to embrace the policy of equitable development. This policy recognises that the urban poor, despite higher money incomes, in many respects are worse off than rural poor. Next to the simple humanitarian need to alleviate this condition, these people are potential consumers of the products of economic development. Sustained and balanced growth requires that as broad a cross-section of the community as possible should participate in the benefits of economic growth.

The adoption of this policy is a political matter. Therefore the problem of implementing drainage and flood protection works is often not only complicated because of logistic and financial matters, but also it becomes a political question. The initiative is with the beneficiaries who should push this item high on the political agenda.

SOLID WASTE TRANSPORT IN URBAN SLUMS IN KENYA: NON MOTORIZED VEHICLES.

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Introduction

The towns of the developing countries and Kenya in particular are currently being transformed into garbage heaps by uncollected solid wastes that residents are dumping in every available open space. The environmental consequences and the associated health risks to the environment and residents respectively are enormous. One of the biggest constraints to solid waste management in Kenya is lack of a sustainable transport technology. Currently it is dominated by the use of sophisticated imported trucks which are expensive to buy and maintain. They drain the scarce foreign exchange resources from a fragile economy with a weak urban economic base. Powering the fleet relies on imported fossil fuels whose exhaust emissions especially the residues from diesel combustion engines is one of the most significant atmospheric pollutants in the towns. While the imported trucks are expensive to buy and maintain, they cannot access the narrow poor earth roads where over 65% of the town residents live in the sprawling slums and squatter settlements in the Kenyan towns. Since those settlements are informal, they are therefore unplanned, overcrowded structures built of rudimentary materials with no service provision as they are illegal in the eyes of the local authorities. The inaccessibility of these dwellings by the collections trucks denies the most needy, weak, vulnerable members of a society a very basic need _"a clean environment".

The failure of the present solid waste collection and transport systems necessitates invention or adoption of new ideas of reaching the majority of the urban residents in Kenya who live in the slums. Use of technologies that the ordinary Kenyan appreciates holds big promise to solving the problems of solid waste in the towns.

The paper focuses on the merits of introducing non-motorized transport systems for meeting the challenges of slum solid waste transport in Kenyan towns in the next century.

Slums physical Characteristics

As a result of rapid urbanization in Kenya, urban housing has not been able to match the rapid population increase. The decentralization policies and programs seem to have had very little impact in stemming rural urban migration, the biggest contributor to urbanisation in Kenya so far.

With inadequate formal housing, majority of town residents have resulted to living in houses of very poor structures built of mud, papers, timber, old iron sheets and all sorts of rudimentary building materials. They are illegal unplanned settlements with very high population density. The structures are very squeezed to maximize on space, leaving very narrow paths for the pedestrians only. There are no planned vehicular roads and where they exist, they are impassable most of the times because of their poor physical condition, or are permanently blocked by dumped garbage, or are waterlogged during the rainy seasons.

Mostly the informal settlements locate in land not suitable for human settlement. Such areas include river valleys, abandoned quarries,waste dump sites,road reserves,and other areas with a constraint to habitation.The location sites are exposed to environmental hazards such as flooding, landslides, and fires.Modern transport is greatly hampered by the normaly rugged terrain.

Since the areas are not planned they lack faciilities such as pit latrines and solid waste management services.

Socio-economic characteristics

The slum dwellers consist of the very poor urban dwellers in the developing countries. They have no formal education or training, making their chances of employment very limited .To earn a living, they engage in all sorts of miscellaneous economic activities. A few are employed in the formal sector as casual labourers, cleaners and other low jobs where the pay is very poor to afford them decent housing. The majority of residents are self employed in the informal sector. This is dominated by very small scale businesses such as maize roasting, hawking, prostitution, drug peddling and brewing of cheap illicit brews which are very common in those areas. For others, crime and other social vices are the order of the day

The families are very loosely associated with high prevalence of single motherhood. Child labour and abuse are very high and on the increase.Children access to education, health and other social services is very limited .Generally, there is very high consumption of drugs such as marijuana, alcoholism, crimes and social degeneration in the slums.

Security of tenure

Most of the informal settlers live on land they do not own. They are therefore squatters who can be evicted any moment. A lot of times they are subjected to brutal evictions and demolitions of their structures which many a time results to massive loss of property and life(e.g. Muoroto evictions in Nairobi in the late 1980's).

Since the squatters are illegal settlers, the local authorities do not provide services to them lest they are seen to legitimise them.Because of their economic hopelesness they are politicaly manipulated by the rich who buy their political support during the election time only to forget them thereafter till the next election when the cycle is repeated.This leaves the squatters with no political power to lobby for their security of tenure on the land they occupy.

Solid Waste Management in Slum and Squatter Settlements

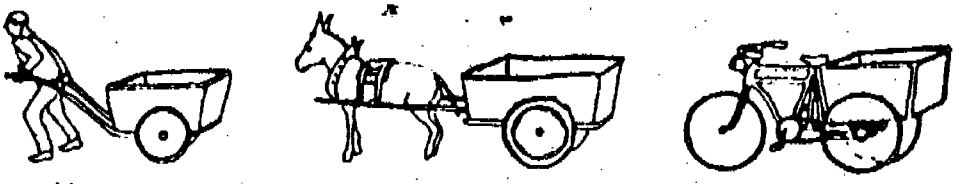
Every human encampment produces solid wastes. Slums are a major generator of solid wastes in urban settlements. The largest portion of the waste produced are organic components mainly from the food remains. Other significant proportions are paper, plastics, textiles, shells and bones. Human and animal feacal wastes are often in large quantities and lay uncollected. These pause a lot of health hazards to the immediate population.

More often than not the wastes are thrown in the open spaces where the organic decomposes producing an unbearable stench. They form the breeding grounds for micro-organisms and disease carrying vectors. Animals such as goats and dogs feed on the waste irrespective of the health implication.

There is a lot of reuse of materials dumped in the slums such as textiles for clothing, paper for house building and all manner of use and reuse. The uncollected waste finally find its way into water bodies or the open spaces around the neighbourhood.This results to water contamination and environmental pollution of the soils and other natural resources which come into contact with this waste.

Why non-motorised transport

Given the above physical and socio-economic characteristics of the slums and squatter settlements, the mordern transport technologies have failed to access those areas. Therefore appropriate transport technologies suitable for those areas physical characteristics must be adapted. Non-motorised vehicles hold good promise for the characteristic terrain and settlements types. The collection vehicles selected must be



Human handcart | Animal cart | Human pedal-cart

These muscle-powered micro-collection vehicles are especially well suited to narrow streets and other areas that are inaccessible to larger vehicles. (credit: UNCHS (Habitat))

appropriate for the terrain, the type and density of generation, the roads and ways it must travel, the type of waste or the kinds of materials it will be used to collect, the strength, stature and capability of the crew that will work with it and the point and manner of discharge of its load.

Muscle powered carts or wagons (mkokoteni) and relatively small rickshaws pulled, pushed or pedalled by people, bicycles or animals should be adapted as a viable technology of municipal soild waste collection and transport in the slums and squatter settlelemts,as well as in the densley populated peri urban and rural areas. Such vehicles are inexpensive and easy to build and maintain compared with other vehicles. They represent the right mix of capital, labour intensiveness and available resources for waste or material collection and transport. They are very manouerverable in the narrow paths and cause no atmospheric pollution since they are non-motorised, figure 1 . These types of vehicles are very suitable for the densely populated areas with narrow street access or unpaved paths, hilly, rough or wet terrain , and where there is relatively large number of densely settled units typical of the slums and squatter settlements in the urban areas of Kenya and developing world towns.

They contrasts favourably with the imported transport technologies consisting mainly of trucks. These trucks are very expensive to buy run and maintain making them unaffordable to most local authorities in Kenya, which are normaly cash strapped. Despite their high costs,they are inappropriate for the high density waste characteristic of the developing world,as they are suited for low density waste found in the developed countries towns.They are inappropriate for the earthroads,usualy in very poor state and cannot access the narrow paths in the densely populated settlements.Environmentaly they are a major source of atmospheric pollution from the engine exhaust gases especily with poor maintenance and as they get older.

Since non motorised vehicles are suitable for short distances transport, transfer stations or communal storage facilties should be set up in the neighbouhood of the operational areas where they can temporarily receive the waste transported from the slums.The transfer stations should serve as material recovery,sorting,separating and recycling centres for the relevant waste types.This will ensure insitu waste recycling which is very cost effective as it does not require further transportation to distant recycling points.The transfer centres should be accesible by motorised trucks for centralised collection of the non valuable waste which must be disposed of elsewhere, and therefore requires further tranport.The retrieved materials ,as well as the recycled products will need to be collected and transported mostly by mechanised vehicles, to the consumption points.Therefore access by motorable roads to the transfer stations are important.

Those against use of non motorised vehicles argues that the use of animals or human power is old fashioned or shameful and the fact that animals pulling such vehicles leave waste, which must be cleaned up.Weather exposure sometimes has a greater effect

on humans and animals which leads to the probbems of unpredictable temperament and health problems.The fact that the vehicles have limited traveling range and are generally slower than fuel powered vehicles has been pointed at.

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GENDER IN WATER, ENVIRONMENT AND SANITATION

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OVERVIEW

"Women play a central part in the provision, management and safeguarding of water: This pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address womens specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them" (Principle No. 3 Dublin statement).

INTRODUCTION

Whenever one speaks of gender, it is very common (mis)conception for others to interpret the word to mean women. When women advocate for equal opportunities, it is (mis) interpreted that they want to assume roles played by men in the societal set-up. English dictionary simply defines gender as grammatical grouping of nouns and pronouns into classes, masculine, feminine and neuter, according to how they are regarded as male, female or without sex.

Gender describes the relationship between men and women arising from the roles and responsibilities assigned to them by society. Gender recognises that women and men are socialized into culture specific roles which are reinforced by peers, religion, traditions and culture. These roles are influenced by various factors such as class, literacy and ethnicity.

Social dynamics are often gender-neutral, while reality is not. Men and women have different responsibilities, needs, interests and obligations. These differences are not static, but change through internal processess and external influences. However, the existing gender relationships are biased with women lacking in participation and control over resources opportunities, as do men.

These gender bias are common across sectoral development including water and sanitation sector (WES) where women are the major users. The gender issues in WES are therefore related to women's workload and their participation in water resource management.

In many communities the tradition of women fetching water begins at an early age when accompanying their mothers on the daily routine walk to the water points. In a study in Kenya, it was found that 70 per cent of all the trips to collect water are made by women over the age of 15 years. On the average they carry loads of 20-25 kg, cover distances of about 3 to 5 kms five times a day.

The carrying of heavy loads of water is not only an ardous task for women, but also exposes them to health hazards such as skeleton problems which can lead to deformity and disability. Malnutrition is another problem, as the carrying of heavy loads over long distances require a large amount of energy, food and therefore adequate food supply which is not there due to lack of time for production.

2.0 EXPERIENCE TO DATE

The traditional role of women in water resource management was a subject of a study carried out by Prof. Joseph Ouma of Kenya in the region of the inner basin of Lake Victoria. The study observed that in this region the water forms a component of a group of natural resources needed in the everyday life for agriculture, fishing, hunting and in the manufacture of salt and handicrafts as well as in various local commercial venture. The study further found that the passing down of traditional knowledge of water resources such as the location of a supply of water for drinking, general domestic uses and suitable sites for refuse disposal, is vital.

Clearly, there is a need for more research on the whole issue of gender awareness, such as the differences in women's and men's field of knowledge and expertise and the different attitude in relations to interests, motivation and the perception of benefits in their totality.

Women are viewed as mothers, caretakers and homemakers. However, the emphasis should be on gender equality and empowerment of women and girls. The strategic goals should be reducing gender disparities in all stages of the life cycle, eliminating the causes of gender discrimination that led to such disparities, and enabling and empowering women to participate in the development process.

3.0 STRATEGIC DIRECTION

The strategic point of intervention to correct the prevailing scenario is change of attitude, approach and methodology. Open participation, demonstration of commitment to obligation, development of project mechanisms and identification of priority impact areas forms the corner stone to link and correct gender disparities in WES sector. The achievement of these huddles will bring out accessibility to development activities, facilitate realization of objectives based on sound principles and gender balanced management approach, which in turn contribute to sustainable development.

3.1 Gender Issues

Gender issues form and enrich the other three principles in the WES sector: water as an economic good, water management at the lowest appropriate level and water as a finite and vulnerable resource. These principles determine what consumers want and will contribute toward; facilitate their participation in project decision making on the types and levels of service and operation and maintenance.

The role women play in the water sector is in many cases to collect and manage water at household level. This gives them inherent intense preference than men to seek new, more convenient systems that can reduce the time spent collecting water.

These preference potentials if properly motivated and democratically used will ensure the tapping of local incentives, facilities that translate to the provision of services addressing community needs. In short, the potentials are lying out there, the benefits are well urgued; it is for the player's to adopt an efficient and effective ways to incorporate gender issues and operationalize them.

3.2 WES Principles

a) Water as a social good

Analysis of water as a social good gives pronounced different impacts on gender differentials. The availability of better quality and greater quantity in closer proximity benefits women and girls. This is because girls can now have time to go to school, women will be making shorter trips, and incidents of water-borne diseases will be reduced creating ample time for income-generating and social activities.

b) Water as an economic good

As an economic good, water services should be demand-based; that is taking into account what users want and are willing to contribute toward. This need will only be assessed from a sample group which are the principle users of water and which will suffer adversely from its lack both in quality and quantity.

Women as primary users and beneficiaries of improved water systems may be more likely to contribute to facilities that have been designed, based on their participatory input and preferences. If a water system breaks down, it is women not men who will most likely have to travel further to get water. Women thus have a greater incentive to keep systems functioning; hence involving them in operation and maintenance activities is very instrumental in attaching economic value to water.

c) Water is finite and vulnerable

Fresh water is a finite and vulnerable resources, essential for sustaining life. It must be used judiciously; it must be protected from contamination (pollution). Both men and women have same responsibilities relating to water resources but sometime different responsibilities relating to water uses. These varying roles need to be recognised and harmonized to give projects a holistic participatory involvement.

Incorporating both men and women into project management and decision making will ensure systems meet consumer demand and will be used and maintained. Participatory approach will also create and instill sense of responsibility and ownership, which consequently translate into resource management and protection for future generation.

4.0 WAY FORWARD

4.1 Policies

"Policy is about what to do. Policy-making is the process of social and political decision-making about how to allocate resources for the needs and interests of society, concluding in the formation of a policy strategy" (Muser 1993, 6). Policies must state goals and identify strategies of achieving them. Hence, policy for gender issues in WES sector concerns what should be done about gender issues in the sector. The policy goals therefore should incooperate:-

- Improving women's productivity to contribute in growth, efficiency, and poverty reduction.
- Social analysis to help clarify the gender, socio-cultural and demographic dimensions that may significantly influence the outcome of programmes.

The implementation of these two major policy goals should have five-dimenstion strategy approach:-

- The welfare approach
- The equity approach
- The anti-poverty approaches
- The efficiency approach and
- The empowerment approach.

4.2 Operationalizing policy

Policy is what to do and planning is about how to do it. Once an agency has a policy, what should be done to put it into operation? Which instruments should be used? Let us address these questions.

a) Linking objectives and implementation

Objectives should dictate implementation mechanisms. Thus it is important to see that instruments for implementation match the goals. It is also important to make distinction between process-focusses objectives such as integration and mainstreaming and substantive objectives such as gender equality and women's empowerment. Also, a clear distinction should be made between ends and means.

When trying to devise efficient, specific methods to match policy goals, it can be useful to look at constraints that may impede the fulfillment of objectives; to know what has workded and what has not worked in the past.

Tools to effectively address these constraints can then be developed basind assessment on such perimeters as:-

- What barriers inhibit putting into operation a policy?
- What measures could help overcome these barriers?
- Are these technical or political barriers?

b) Promoting gender policies

Agencies have come up with very good gender policies with sound and clear objectives but, at the implementation stages they are treated with lukewarm and indifferent interests. The policy papers must be popularised and people sensitized for them to be working documents. Some of the tools to be used in promoting gender policies are:-

- Training
- Seminars
- Workshops
- Information dissemination
- Research
- Procedures

5.0 CONCLUSION

The continued sidelining of women in WES projects/programmes will definately remain the missing link to the realization of their objectives. It is also very important to note that it is not the number of women involved in a project but the level of their participation and the powers governing the management of such projects. While it may be easy to draw up policy frameworks which foster and address gender issues in WES, it is the attitude, dying fossilised traditions and conservative dictatorship, which impede their usage and implementation. To permeate this brickwall across the stages of a project life cycle, such policies must be popularised, players sensitized and appropriate tools and methodologies engaged to operationalize them.

In short, the policy changes that are advocated for will only bear fruits if they are accompanied by a radical and revolutionized overhaul of the status quo.

COMMUNITY RESPONSES TO WATER SCARCITY IN NG'ARUA, LAIKIPIA DISTRICT: LESSONS FOR LOW INCOME URBAN AREAS

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ABSTRACT

The paper highlights community responses to water scarcity in a semi-arid environment with limited water resources, and lessons that may be useful for low income urban areas. Ng'arua division, in particular Supili location, in Laikipia district of Kenya does not have any permanent water sources. Previously, people depended on distant and highly polluted earthdams for their water supply. The same water sources was used for livestock and wildlife. Water pollution was especially rampant during the persistent dry spells. However, recently the people have come together with assistance from various external support agencies (ESA), to address the water scarcity problems and ensuing health impacts. Community responses in Ng'arua brings about a number of lessons for low income urban areas prone to inadequate water supply and sanitation. The comparison was prompted by similarities in the two cases *inter alia*: low income culminating into rampant poverty; poor sanitary conditions; and inadequate quality and quantity water supply.

Nevertheless, there are also a number of divergent socio-economic conditions which will also be addressed in attempting to capture adoptable lessons from a rural community for the low income urban settlements. The main different is their livelihood. Whilst most people in the rural areas are subsistence farmers, their counterpart in the urban areas rely mainly on small scale enterprises and low earning informal employment for a living. The composition of the urban communities is also not homogenous ethnically like most rural communities. Land tenure is also another concern for the low income urban residents. Unlike in rural areas where land is owned privately, in most low income urban areas, land is not owned by the communities. More often than not, people live as squatters or tenants of other squatters on municipal or city council land. This adversely hinders provision of basic services such as water and sanitation.

The paper further focus on the transition scenario of the two extreme social structures. The transition here refers to town centres (semi-urban) in the rural areas which transcend both the rural and low income urban set ups. In the rural towns, most of the residents are tenants, and although they may have the same ethnic backgrounds, are diverse in their livelihood. Most of these towns are similar, in terms of basic facilities, such as water and sanitation services. It is evident that these different social structures respond differently to water scarcity. The paper present some research output carried out in the Department of Agricultural Engineering, University of Nairobi. The paper examine the responses of a rural and semi-urban settlements to water scarcity and how lessons learnt may be adopted for low income urban settlements. The role of other actors is also evaluated with the view of highlighting how ESA can contribute towards alleviating water scarcity in low income urban areas. In conclusions, the paper points out some hindrances towards achieving sustainable adoption of lessons learnt from rural areas and suggests way forward to turn things around. Finally, the challenge is put on the government to review its approach and role in the next millennium, to facilitate the activities of all the stakeholders, by providing an enabling environment but not as principal provider of basic services.

INTRODUCTION

Ng'arua division is located within the semi-arid parts of Laikipia district on the eastern side of the great Rift Valley. Despite the area being on the windward side of the Rift Valley, its rainfall characteristics are affected by Mt. Kenya to the south east. This gives the area a predominant cool semi-arid climate despite its altitude which ranges between 1980-2100 m a.s.l. The mean annual rainfall is 600mm and temperature ranges between 17-21°C (Kiggundu et al., 1998). The topography is characterised by flat plateau surrounded by adjacent highlands except on the eastern side which is mainly flat plains. The area has no permanent surface water sources such as rivers or streams and hence the residents rely entirely on rainwater for domestic and livestock water supply. Low rainfall amount and reliability thus drastically affect water availability throughout the year. The water supply alternatives include different technologies of rainwater harvesting systems such as ground and roof catchments, subsurface and surface storage tanks, earthdams and water pans, etc. These water sources are supplemented by windmill pumped boreholes especially around shopping centres. Notably, there is one borehole in Kinamba, the divisional headquarters and one in Supili shopping centre.

The area is newly inhabited by settlers from Central Province and the pastoral community from the neighbouring Baringo and Samburu districts in Rift Valley Province. Previously, the area was under ranches for the white settlers. This explains the existence of scattered earthdams and boreholes. The earthdams were mainly used for livestock water supply and borehole for both domestic and livestock. However, the ranches were bought communally and subdivided into individual plots between 1.2-8 ha. The main occupation is subsistence farming with limited commercial farming, especially in humid years. The main crops grown are maize, wheat, beans and potatoes. In addition, a number of farmers are adopting horticulture and orchards under kitchen gardening using rainwater for supplemental irrigation. Farmers also keep improved cattle breeds, shoats and traditional poultry.

Due to high frequency of drought occurrence, most of the farmers are low income earners and sometimes live under extreme poverty. This situation is aggravated by lack of good quality water. This is understandable because such conditions coincide with extremely dry periods when agricultural production is very low and water sources are depleted. In some years, 1 in every 5 years, there is even no harvest at all. Life becomes unbearable, women spend more than 6 hours a day in search of water from distant earthdams which are normally polluted. Relief food becomes the only source of food especially poorer families. Food for work programme is common in the area mainly involving de-silting and/or construction of earthdams and rehabilitation of rural access roads.

The above scenario is not different in low income urban areas, except that there is no "rainy day" in the latter case, where the situation is constantly pathetic in terms of food and water supply. Further, poor sanitary conditions are worsen during the wet seasons as most of these areas are prone to flooding associated with rampant water related health problems. Therefore, whilst the rural communities are affected by drought, their urban counterparts are hit hard by flooding. But the repercussions are the same. In urban areas is "water, water everywhere but nothing to drink", and in the rural areas there is literally no water during the extreme dry spells. In addition, while the urban residents have no alternatives for water supply--they rely solely on unreliable municipal water serving neighbouring estates or at worst highly polluted stream water--the rural folks have many alternatives depending on rainfall patterns.

The following are alternative water sources and their related shortcomings in Supili, Ng'arua division, Laikipia district.

Earthdams: The dams within the region were initially constructed by the white settlers. After independence, the dams were left under the care of the local authority, which did very little towards their maintenance. This prompted the local community to organize themselves to manage this vital water supply. In recent years some NGOs like NCCK and Catholic Diocese of Nyeri have come up to assist the community in de-siltation and conservation of dams through food for work programmes. However, despite the assistance, some limitations still exist. The major problems associated with this water supply are low quality water associated with pollution, and water losses through evaporation and seepage.

Groundwater: The borehole, next to Supili shopping centre, which the community use was constructed during colonial period. After independent, the borehole management taken over by the government and then informally handed over to the community. Initially, the borehole was using a diesel engine for pumping water. The community was supposed to meet operation and maintenance cost. Unfortunately, the pump was, after some time stolen leading to abandonment of the borehole. Later, the Catholic Diocese of Nyeri rescued the projet by installing a windmill pump which is in operation to date. The project is self-sustaining in that O&M costs are raised through sale of water. Project members and non-members pay for water at different rates. Rationing is also practised during the dry period when water yields are low. In addition to periodic low water yields, this water supply experiences other related problems. The source of pumping energy is wind which has a high degree of variations. This leads to continuous variations in water yields, and at times the pumping operation is totally curtailed. Also the shortage of water is aggravated by inadequate storage facility. Another problem that is not being taken seriously by the community is water quality. However, the residents reported that the water is not suitable for cooking tea with milk, which like porridge turns yellow or brown. This problem could be attributed to chemical composition of the aquifer geology. Finally, like many similar water supply system, there is a problem of mechanical breakdown which is aggravated by lack of local skills to service the pump. In case of breakdown, the Catholic Diocese normally sent their expert. This means that the water supply is adversely interrupted. Hence this source is not reliable.

Rainwater: Due to the problems associated with alternative sources of water outlined above, rainwater harvesting technology has gone along way in addressing the water scarcity in this area. Rainwater harvesting has been tremendously adopted by the community thanks to the interventions of a number of ESA and local initiatives. Rainwater has been used not only for domestic use but also for irrigating kitchen gardens for vegetables and orchards. The major problem associated with this water supply option is lack of adequate storage facilities and catchments--most of the roofs are not fully guttered. Further, not all the residents have been lucky to construct adequate storage tanks. The community have organised themselves into various self-help groups so as to communally construct storage facilities on a merry-go-round basis. To date, they have not succeeded to construct tanks for all the members. Besides inadequate storage facilities, there is the problem of leakage attributed to poor workmanship. In addition, unpredictability of rainfall makes this water supply unreliable, especially during extreme dry spells. However, with design improvements, this water supply seem very promising in alleviating water scarcity in many arid environments (Ngigi, 1995). The Ng'arua people have realized this leading to its high adoption with the help of various ESA as their response to persistence water scarcity. What is lacking is adequate technical advice on the selection of optimal storage capacities and catchment areas (Ngigi, 1997).

RESPONSES TO WATER SCARCITY

In addressing water scarcity problems, promotion of rainwater harvesting technologies has proved to be the long awaited solution for all water needs; domestic, livestock and even agriculture. The success of this technology in Ng'arua can be attributed to lack of reliable alternatives. Surface water only exist in form of highly polluted and distant earthdams, shared with livestock and wildlife. The community have no control over the management of most of these dams and hence their unabated pollution and siltation. The average distance is about 3km depending on the season. During extreme drought, most of the dams dry up, and people especially women and children have to walk for more than 6km to fetch water from two almost permanent dams in the area. On the other hand, groundwater exploitation through borehole has been hindered by high investment costs. Further, groundwater quality is not very appealing. However, for those people without rainwater harvesting facilities, it remains the only available source of water. On average, people walk for 6km to reach the borehole whose operation is hampered by unreliable source of power, fluctuating water yields and mechanical breakdown. Under such circumstances, it is understandable why limited water sources have brought the people together in the spirit of harambee to respond to their common problem--water scarcity.

The people have organised themselves and formed community self-help groups to undertake rainwater harvesting activities with assistance from ESA, in particular the Anglican Church of Kenya (ACK) Diocese of Nakuru and Sida through the Ministry of Health. Whilst the Sida assistance focused only on domestic water supply, the ACK Diocese incorporated water harvesting for micro-irrigation for kitchen gardening and development of tree nurseries. Domestic water supply mainly use roof harvesting using surface tanks and water jars while livestock and irrigation use ground catchments with $50m^3$ cone-shaped sub-surface rubble lined tanks. According to Kiggundu et al. (1998), there are different types and sizes of storage structures for roof water harvesting; water jars ($2\text{-}2.8m^3$), ferrocement tanks ($10\text{-}23m^3$), quarry stone tanks ($20\text{-}45m^3$) and galvanised corrugated iron tanks ($5\text{-}10m^3$). People adopt different types and sizes depending on economic capability, and individual group's objectives. Some groups started with water jars and later ventured into bigger tanks after realizing the storage jars capacity was not adequate. It is a common practise to find one family with different types and sizes of tanks. This could also be attributed to families joining different groups. A man and wife could also be in different groups and hence benefit from the two groups. Sons and daughters above 18 years are also eligible for membership in any group. Formation of groups facilitated attracting donor support. The group members benefit on a first-come-first-served basis for tank construction, where priority is given to those members who have completed raising their contributions as agreed by the group.

To monitor and harmonise the activities of the mushrooming self-help groups, the government through the Ministry of "Social Services" periodically inspect their operations. To keep track of the groups, it is mandatory for all the groups to register and submit monthly financial and management reports. Registration is renewable on annual basis. This arrangement, though in legal terms is not biding, has its pros and cons. Besides streamlining the management of group affairs, sometimes it delays commencement of group activities and may also encourage patronage from the government. Community Development Assistants (CDA) may also influence the running of a group affairs because for example, any bank transaction and expenditure must be approved by CDA's office. Further, groups are also supposed to register and account to the ESA assisting its activities. This is tantamount to double registration which has sometimes brought conflicts and at worst halted the activities of the community.

The policy of cost-sharing is being promoted by ESA to enhance project ownership and sustainability. The donor funding has been demand-driven where a registered group seek assistance from ESA. Then depending on merit and group commitment, the ESA may agree to support a project. In most cases, the community contributions include labour, local materials and sometimes hardware material depending on the cost of the project. The community contribution are decided by the community themselves depending on the assistance they have received and the total cost of the project to be carried out. However, the members who are unable to contribute due to poverty are allowed to provide only unskilled labour and local materials. Despite their support, ESA have not involved themselves in community water management activities. The only interference may be dictating the type of activities to be carried out with their support. But in rare cases conflicts do arise where the committees are not transparent and accountable. This has led to untimely withdrawal of assistance.

Government bureaucracy, especially provincial administration, have drastically affected some projects activities. Nevertheless, in Ng'arua, local administration has been very supportive to water activities. In fact as the Supili chief commented, the water officers of ESA are more respected than the chiefs, and hence for chief's baraza to be effective, they are normally integrated into water projects meetings. This is possible because after the 1991/2 tribal animosities, the chief ordered that all the water projects meetings should be held on the same day outside the chief's camp. This was found necessary after water meetings were mistaken for illegal gathering with political implications. It is worth noting that the area has a volatile political atmosphere due to tribal inclinations to various political parties. This has led to renewed ethnic clashes early this year after the results of the 1997 general elections. This has adversely affected water management activities in the area. Consequently, political differences have made water management very unique. Water scarcity cut across political divide where despite the ensuing differences, water development and management activities are undertaken collectively. The membership of the self-help groups have no ethnic inclinations. Nevertheless, one ethnic group has benefited more than the others from ESA due to their numerical and financial strength, and aggressiveness in addressing water scarcity. This has made others envious aggravating tribal animosity.

To sustain water projects, each group activities are directed by a water committee elected democratically after every 2 years or until members loose confidence in their leadership. The committee--the decision making organ of the project--is composed of both men and women, but women are the majority in most cases. This can be attributed to the role of women in water management. Further, most self-help groups are composed of women who bear the burden of fetching water, besides other domestic chores. The women also decide on the water uses. Since women seem to outweigh men in water management, they take most executive positions such as chairperson, secretary and treasurer. In particular, treasurers are generally women since they are regarded as trustworthy. However, decision-making process is collective and involve all the stakeholders.

Despite the marvellous community responses, realization of optimal dividends is hindered by a number of shortcomings. First, is economic hardship evidenced by rampant poverty. Fortunately, diminishing donor support is forcing most of these groups to venture into income generating activities, and introducing monthly contributions, to sustain their water projects. Second, technical constraints are also taking its toll. This can be attributed to inadequate hydrological design considerations. Economic considerations were initially the driving force and adequacy of the systems in terms of supplying water at required reliability has not been given prior considerations. The community is paying dearly for this, as most of them have been forced to construct extra storage tanks at high costs whilst they could have constructed one bigger tank of required capacity.

In addition, catchment areas are not adequately being utilized; roofs are not completely guttered resulting into low water yields. Generally, this problem is aggravated by mis-match between catchment areas, both for ground and roof catchments, and respective storage capacities. The delivery systems also lacked foul flash devices leading to water pollution from dust and debris which accumulate in the roofs and gutters over long dry spells. Thirdly, poor workmanship has led to cracking of most storage structures, especially the water jars, and hence water losses through leakage. Water losses also occur through evaporation for uncovered sub-surface tanks and seepage due to inadequate lining.

Ironically, despite the progress in the rural communities, responses to water scarcity in rural township is not taking the same path. Why is this so? Experiences in Ng'arua, in particular Kinamba and Supili centres, may shed some light. The residents of these two towns have not been spared by persistent water scarcity. They depend on unreliable windmill driven boreholes within their locality. The two settlements could be attributed to presence of the two boreholes inherited from the white settlers. But with time, these water supplies have been surpassed by ever increasing water demand. Hence the residents have also developed survival mechanisms, but different from their rural counterparts. To supplement limited water from the boreholes, they depend on water vendors using donkey and hand carts or pick-ups, which are having a booming business ferrying water from distant sources or limited amount from the boreholes. This alternative, however, compromise the water quality as the customers have no control over the source of water. In addition, those who owns the business premises have adopted rainwater for their water supply. It is clear that land tenure influence the type of response to water scarcity. While the tenants have limited options, the land owners have better alternatives and control over their water supply. Drilling of private borehole is also another open option for land owners.

ROLE OF EXTERNAL SUPPORT AGENCIES

The major actors in the development and management of water resources, besides the community who are the beneficiary, include the ACK Diocese of Nakuru, Catholic Diocese of Nyeri, NCCK, Sida and ASAL programme among others. The ESA have not been assisting water projects in isolation, but most of them integrate all the services required to improve the standards of living. For instance, ACK whose presence has been dominance, has integrated water projects with health education, agriculture and livestock development. Training has also been integrated as a major component to enhance project sustainability. As mentioned earlier, the assistance has been demand-driven on a cost-sharing basis. Another distinct feature with most of the donor supported projects is that they are standing on their own long after donors have withdrawn their support. This could be attributed to the manner in which the donor support has been administered--demand-driven and cost-sharing--which has instilled a strong sense of project ownership and responsibility.

Clear and achievable objectives have also been instrumental. The beneficiaries objectives were given precedence by the ESA. Technical assistance were in most cases in line with the local skills and prevailing conditions. The case of implementation of water projects in Ng'arua emphasized more on participatory and bottom-up approach where the communities were partners and not just recipient of technology and financial assistance. Community mobilisation by the initial ESA has also played a major role in attracting other donors. Cases of double funding also exist. This is attributed to limited donor coordination and community secrecy. The communities are known to keep previous donor support a secret. While communities cannot solely be blamed, the ESA also did not seem to have undertaken adequate reconnaissance survey. This notwithstanding, the objectives of water projects were, with some degree of success, achieved. The major objectives, especially for rainwater harvesting projects were *inter alia* to: provide enough clean and safe water for domestic

purposes; avoid time wastage and reduce the energy in covering long distances in search of water; minimise and/or alleviate water related diseases; use and manage kitchen gardens for vegetable production; assist the aged and disabled to access water easily; and to alleviate poverty through use of rainwater for supplemental irrigation.

In realizing these objectives, KRA (1998) highlighted the following challenges and constraints: inability to raise funds; lack of sufficient water for consumption; poor management leading to collapse of some groups; lack of skills coupled with inadequate training; political and provincial administration interference; diminishing donor support; and lack of information and documentation on supported groups. According to KRA (1998), a critical analysis of the role of the actors, community-based organisations (CBO) and ESA, reveals some weaknesses and strengths in addressing the challenges associated with water scarcity. The strengths of ESA include: capacity to mobilise and train CBO on technical and management skills; capacity to attract donor funding; good follow-up abilities ensuring proper utilization; and flexibility and ability to reach the CBO. Some weaknesses include: corruption and interference by the administration; lack of transparency and accountability; imposition of alien technology; some are not flexible enough to reach the CBO; and poor or lack of collaboration, networking and coordination. On the other hand, the strengths of CBO include: willingness to learn and adoption of new technology; problem-oriented solutions; high flexibility; and local knowledge and skills. Their weaknesses include: tendency to over-depend on ESA; lack of information and skills to mobilise resources; and low literacy level leading to poor communication and record keeping.

LESSONS FOR LOW INCOME URBAN AREAS

The living standards in semi-arid rural areas, to some extent, are similar to low income urban areas. Notwithstanding the similarity, their responses to various basic needs may differ. The main reasons could be socio-cultural stratification of the residents. The rural communities may have a lot of similarities in socio-cultural context. Despite different backgrounds, the low income urban residents also have a lot in common; way of life compounded by inadequate supply of basic needs such as water, health, education, sanitation, infrastructure, housing, etc. The situation is aggravated by informal land tenure system. Most low income urban settlements are temporary, and hence the tenancy, both for landlords and tenants, is also temporary. This is an unpleasant situations because the city or municipal councils does not provide basic services to temporary settlements. In fact in some cases they are referred to as illegal settlements on council land awaiting relocation or eviction to give room for priority development activities. Hence nobody will be interested in investing in such unpredictable environment. The temporary landlords are only interested in making profits out of their makeshift houses without provision of basic services--water and sanitation. This happens despite well elaborate housing laws which demand that residential houses be provided with these services. Ironically, these settlements are not under the law; they are illegal according to councils development plans and hence the municipal/city council inspectorate have no authority to enforce compliance. This marginalizes the poor inhabitants aggravating their miseries.

The situation seem unbearable, the truth of the matter is more than half of urban residents live under such settlements. But all is not lost. The residents, with assistance from ESA, are emulating their rural counterparts, after all they also come from these rural areas, in attempting to improve their living conditions. The socio-cultural differences aside, they have a common enemy; lack of basic services. The evolvement of self-help groups to address the socio-economic problems is fast spreading in the low income urban areas. Increasing ESA involvement is also evidence. Majority of water supply and sanitation projects, in particular shallow wells and public latrines, have been developed by the residents with the help of ESA. The scenario is similar in rural areas. What may

be lacking is full commitment and sense of ownership. The tendency of urban residents to expect the government to take a leading role is higher than in rural areas. The rural residents take full responsibilities of their projects because they feel more attached to their area. Unlike urban residents whose tenancy is temporary. This attitude should be changed and replaced with that of common property for all the beneficiaries. The residents should see the project being there to benefit them and any other Kenyan. We should cultivate collective responsibility among the urban residents with regard to any project developed to assist them. This is well articulated in the rural communities.

With regard to rural town centres, it is clear we do not expect individual efforts in the low income urban areas, as majority of the "temporary" landlords live outside such areas, and only visit them to collect the rents or evict defaulters. In addition, for those who live there, alternatives for individual efforts are limited; the land sizes are small for the case of shallow well, and rainwater water harvesting is prohibited by law. Owing to health reasons, rainwater harvesting is not allowed in industrial urban centres. Ironically, the alternative water sources could be more hazardous. This law does not consider other factors or use of water. It is evident that rainwater harvesting could be a viable option for alleviating water problems in most low income urban areas. Further, in rural town settlements, the tenancy is more secure and hence the tenants could also come together to initiate self-help projects. This may not be viable in the low income areas where tenancy is not secure. Residents keep on moving from one area to another for various reasons.

One of the major learning lessons from the rural areas that could bear fruits in the low income urban areas is the spirit of working together to address a common problem. The Ng'arua experience have shown that different ethnic background is not a hinderance when people are brought together for a common good. The approaches of the ESA in assisting the community is another positive attribute. The cost-sharing policy being adopted by most ESA seem to be instilling a sense of ownership and responsibility. This coupled with demand-driven assistance has been very instrumental. Further, insisting that the community raise their contributions before dispatching donor assistance has enhanced community mobilisation. Capacity building in terms of improving technical and management skills has contributed to sustainability of the community projects. Another important aspect is the integration of related problems; looking not only at one need, but at all the socio-economic well being of the community. This may be difficult as a number of ESA may be sector-oriented e.g. water, health, education, sanitation, etc. In this regard, collaboration and networking comes in handy. This can be enhanced by central coordination, especially by the municipal or city council, for all the activities of the ESA within their jurisdiction. However, such coordination should be handled carefully to avoid unnecessary bureaucracy which may be counter productive.

CONCLUSION

It is becoming clear that the pre-colonial period, when the government was seen as a provide of services, is long gone. It is the high time citizens start taking the lead in addressing problems related to provision of basic services. It is no longer fashionable to expect the government to be provider of all the services. It was wrong in the first place that the government policies has been provider-oriented. This explains why none of the past policies such as "free education to all" and "water to all by the year 2000" cannot be realized. We have learnt the hard way, but experience being the best teacher, the situation is slowly improving. At first the citizens seemed to resist the change due to ensuing risks and uncertainty. But if history is anything to go by, a change will be more promising. Take a look at all the pre-independence government projects, in particular water projects, they are all in the "museum". The government emphasised more on project development

with limited management considerations. The citizens were only recipient and had nothing to do with the management. The result is unforgivable--wasted resources. Now, this is a thing of the past. The next millennium is different, the citizen will have to take charge of providing basic services. The big question is, are they prepared? Indications are that they may be, but the government seem not to be.

In striving to improve the provision of basic services in the low income urban areas, the current trend need to be supported. The government, which like in the rural areas seem to absent, need to come out and support the other actors. The best the government should do is to create an enabling environment for all the actors. Probably the government fear loosing credibility and political support, but it could be worse if the past trend is to be repeated. Currently, the government is talking of liberalization and privatization, but on the ground, nothing seem to be forthcoming. More action is needed to translate the good intended government policies into action. Otherwise, the other actors are daring to go--taking the lead. It is time to reverse the roles if the new blueprint--industrialization by year 2020--will not be another actionless propaganda, just like the past government policies. Neither the government nor any other actor, is hoping for this. Lets emulate the efforts by the communities and ESA and strive forward for a better next millennium.

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DETERMINATION OF SANITATION AND HYGIENE PRACTICES IN THE RURAL AREAS OF THE NORTHERN PROVINCE, SOUTH AFRICA.

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Abstract

The main objective of this study was to identify local environmental conditions, practices and household defensive behaviour and routes of water-related diseases while the primary purpose was to find out how to achieve an effective and sustainable improvement of the community environment mainly by increasing awareness in hygiene, environmental health and sanitation to the rural communities. This was aimed at identifying the existing gaps in the water supply and sanitation sector in the Northern Province, South Africa.

In order to achieve these objectives, questionnaires were distributed to193 households, 30 schools and government departments. Workshops were also held during the survey. The research findings indicate the following shortfalls: Poor household socio-economic status, water scarcity with 14% relying on rivers and 12.1% using unprotected wells without handpumps while no house connections were found. Hygiene practices were found to be bad in terms of water collection to storage. Sanitation facilities and practices were also poor with 88,3% of the study population still relying on unimproved pit latrines with children less than 5 years defaecating outside the latrines and 10,7% of the population defaecating in the bush. Poor waste management (wastewater from the houses and solid waste generated in the homes) was also found to be a recurring problem.

Generally, a lack of adequate knowledge on most of the factors that could pose risks to health was also identified. Based on the research findings, the last objective was set to fill up the gaps by customising the training manuals that will be used to train the water committees in this sector. Long-term benefits will only come about, however if people change some of their water-use and hygiene-related habits. To maintain reasonable health standards within rapidly growing population, governmental and non-governmental organisations must undertake more activities in this area.

1.1 Introduction

Despite the investments of money, time, and effort in control programmes, over three million children still die of intestinal infections in developing countries each year and, a third of the world's population is still infected with parasitic worms. Our failure to defeat these diseases suggests that it is time to re-examine our standard approaches. It is increasingly clear that our main control strategies, the development of sanitary infrastructure, education about health and hygiene, and the promotion of oral rehydration therapy have limits. Focusing on people's hygiene-related behaviour may offer a key to increasing their effectiveness.

Improvements of water and sanitation infrastructure are excellent methods for controlling intestinal infections in the long term, but only if they are used as intended; they need to be locally needed, acceptable, and affordable. Similarly, health- and hygiene education efforts are effective only if they are designed on the basis of sound socio-cultural knowledge of the target population (Almedom A. and Curtis V., 1995; Unicef, 1992). Hygiene improvements often depend on having an adequate quantity of water for washing, regardless of its quality. Water quality, though is not the only factor affecting health. The absence of continuously available safe water supplies in sufficient quantities is a serious constraint to a healthy living (Kerr, 1990).

The provision of water is not in itself sufficient to guarantee an improvement in the health

of the community. Improvement in health will only be achieved by an integrated approach, which includes, in addition to safe water supplies, effective sanitation and emphasis on good hygiene practices through complementary hygiene promotion activities. Health benefits cannot be achieved to any extend through water supplies alone improved sanitation must be implemented simultaneously. Even then, health benefits will only results with proper hygiene, and this demand education. This equation follows:

Health = Water + Sanitation + Hygiene Education (Kerr, 1990, 1)

Therefore, we have to think of many things when we want to help the individuals, families and communities prevent diseases and promote health. Spreading the word about what people should do to be healthy is important. But this is not enough, we should understand that, in many situations it is not only the individual who needs to change. There are other things that influence the way people behave: the place in which they live, the people around them, the work they do, whether they are able to earn enough money. All these things have a great influence, and we must take them into consideration in planning the improvement of hygiene practices (Kerr, 1990; Curtis V., Sinha P., Sigh S, 1997).

1.2 Motivation

There has been a history of disregard for the views of communities in the field of sanitation provision. Lack of understanding of the issues facing poor households is also reflected in a lack of understanding of what people can afford (Palmer I., 1993). " First, the problem is at present overwhelming by a rural rather than an urban one. The situation has developed over years not only of distinct bias on the planners but also as a result of prevalent political and institutional pressures. The elite who hold power are urban biased; their policies, in spite of the rhetoric, clearly favour the areas where their power centres normally lie. Rural people tend to be poor (or are unable to exercise it effectively), illiterate and malnourished, and thus have very little political power, and the bureaucracies are often not familiar with rural problems and constraints (MacMillan N. and McGallery M., 1986).

1.3 Objectives

The main objective of the study was to identify the local environmental conditions, practices and household defensive behaviour and the routes of water-related diseases while the primary purpose was to find out how to achieve an effective and sustainable improvement of the community environment mainly by increasing awareness in hygiene, environmental health and sanitation to the rural communities. This was aimed at identifying the existing gaps in the water and sanitation sector in the Northern Province, South Africa.

1.4 Fieldwork

In short, to meet the objectives the following points were summarised to form part of the approach to be used in the research:

- What practices are putting people at risk of infectious diseases?
- What safer practices are acceptable - and feasible?
- What could make people want to adopt safer hygiene practices?
- Who should we be trying to reach?
- What is the best way to reach them?

The only way to get the useful answers was to work with the target communities. So the decision was to plan a collaborative investigation, to find out what people do by using structured observation and workshops and ask them what they thought with some simple questionnaires. Different questionnaires were distributed at the schools(30) and the villages (193 households).

Direct interviews were also conducted to the respective government departments (Health, Education, Environment Affairs and Water Affairs and Forestry).

1.5 Study site description and selection

Northern Province represents one of the provinces in the country, South Africa, with large number of rural areas and the worst case of provision of water and sanitation and generally a poor record of environmental health and hygiene practices (CSS, 1995). All these as a result of deficiencies in water and sanitation services. Infrastructure in most areas is poor and access to the various communities is difficult, particularly communities resident in remote areas distant from the centres such as Pietersburg, Louis Trichardt, Potgietersrus, Phalaborwa and Tzaneen. Settlements are in general located around the sources of water mainly springs, streams or rivers, boreholes, wells (without handpumps) Reservoirs - Communal taps. The unimproved pit latrines and bush/veld are the main sanitation facilities for all the rural areas. The following criteria were used in the selection of the study area: Current status of water supply, a large number of rural areas, access to the communities and the current status of sanitation.

1.6 Analysis and discussion of results

Through this investigation, the following factors were found to be the main shortfalls in the target communities:

- Socio-economic status

Their familiarity with environmental damages due to poor practices is related to a set of interactions that include socio-economic factors, political administrative factors, informational and socio-cultural factors, be they obstacles or advantages. The research showed that most of the households are not aware of the existing measures and possibilities for preventing diseases and other negative impacts of the environmental problems due to poor practices hence the factors stated being the obstacles. Although this perception of the problems exists, households generally accept living with these different problems. All the schools are aware of the situation and they are to live with till the department of education does supply them with the proper facilities.

- Water supply and sanitation

The whole area is faced with the problem of water scarcity both at the schools and the households. The communities are still relying on communal water points(41,2%), wells without hand-pumps (12.1%), private boreholes (13%), rivers (14%) and no house connections were found. Both the schools and the households rely on unimproved pit latrines. Sanitation facilities and practices were also poor with 88,3% of the study population still relying on unimproved pit latrines with children less than 5 years defaecating outside the latrines and 10,7% of the population defaecating in the bush. During the survey, most of the participants were women because men felt not to be the right candidates on most of the matters of water supply and sanitation. Men responded mostly on the technical issues of the water sources. No one of the communities was found to involve women on the technical matters concerning either sanitation or water supply, except the fund raising part prior to the fixing of the water source. All hygiene practices were women's job as also stated by the traditional rules.

- Hygiene practices and the observational results

With regard to the problems some were linked to the performance of the public. The problems were identified as overwhelming the whole community, not as per individual/household. Households give much emphasis to those aspects that are directly linked to their daily lives. Interviewees stress the immediate impact of the environmental problems. The perceptions are

generally oriented towards the constraints and discomforts that these problems in their daily lives. These can be seen when analysing the importance given to the problems of water availability. Similarly, with regard to the effects of outside defaecation (bush), households pointed to the fact that they do not perceive them as having a direct impact on their family's daily lives. The observations done at the water points and sanitation facilities showed to be very poor in terms of water collection, storage, cleaning of both the latrines and containers used to store/collect water. All these as a result of water scarcity and lack of hygiene education.

1.7 Conclusions

To date, the extent of awareness with regard to environmental improvements, particularly the protection and optimal utilisation of the natural resources and natural systems, has been highly variable in development programmes. Conversely, development aspects, especially human development aspects, are not always taken into consideration in many programmes of environmental protection and improvement. Integration of two aspects is therefore necessary in order to arrive at sustainability:

- Problems pertaining to the prevailing situation, such as the lack of safe water, adequate sanitation and other basic amenities, need to be urgently addressed.
- Awareness raising of the environmental and sustainable development issues is crucial for both developing and industrialised countries.

1.8 Recommendations

- To strengthen the institutional setting, it is necessary to ensure people have information on the availability, access and cost of scarce resources that enable them to establish links their own perception of the environmental problems in their neighbourhood and region.
- There is also a need for at least as big an effort to further the environment awareness and understanding among all levels of government officials.
- Appropriate training is essential if fieldworkers are to become effective catalysts in helping communities to make informed decisions about their water supply and sanitation systems. Hygiene education should be redesigned to make it more understanding to the people. Similarly, health education and hygiene education efforts are effective only if they are designed on the basis of sound socio-cultural knowledge of the target population.
- Women should be involved fully in the water supply and sanitation projects (i.e. Pre-phase - end phase).

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RF-SSF in Low Income Urban Areas

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In most developing countries, the problem of the use of inappropriate surface water treatment technologies in producing potable water is widespread. Although this problem is particularly evident in rural and low-income urban areas, even large cities experience the inappropriateness of some of their water treatment technologies. Conventional water treatment methods (rapid mixing, coagulation, flocculation, sedimentation, filtration, chlorination) are widely used although they are associated with stringent operation and maintenance requirements, especially in the pre-treatment stage, which most rural and low-income urban areas cannot sustain.

Research and development in drinking water treatment has revealed that a combination of roughing filtration (rf) and slow sand filtration (ssf) is an appropriate alternative to conventional methods. The combination is associated with manageable and cheap operation and maintenance requirements. No chemical costs are involved, no expert supervision is required. The design and technical levels of rf and ssf are both simple, thus compatible. Locals can easily be trained to run rf-ssf plants.

This paper presents a literature review on rf and ssf systems, and results of a pilot plant study conducted in zambia on one of the rf types [up-flow roughing filtration in layers (urfl)] and ssf. The results have been overwhelming. Urfl showed their capability to pre-treat dirty surface water to quality suitable for ssf. The final ssf filtrates of the pilot plant were physically and microbiologically acceptable. The operation and maintenance was easier and simpler compared to those reported for conventional systems. The use of local materials and labour in the construction, operation and maintenance of the pilot plant, and the absence of chemical applications are clear indicators of the potentials of rf-ssf in low income urban areas.

Rf-ssf literature review

Background

The treatment of surface water to potable quality is a world-wide problem. Conventional water treatment methods (coagulation, rapid mixing, flocculation and sedimentation) and rapid sand filtration (rsf) are widely used [schulz and okun, 1984]. these systems have disadvantages (high capital and operating costs, need for expert manpower) which have rendered them inappropriate in most developing countries, especially in small water supply systems [visscher et al., 1987; wegelin et al., 1991]. in most developing countries, equipment, spare parts, and chemicals have to be imported, in addition to the inability to attract skilled manpower and adequate funding. Ssf alone is an effective, cheap, and easy to operate and maintain option. It has been widely recommended in low-income areas. The early mistakes in the sole use of ssf was to subject it to highly turbid surface raw water [graham et al., 1994]. in an attempt to pre-treat such raw water prior to ssf, chemical pre-treatment has been widely applied. Where reliable chemical supplies, equipment and expert supervision were lacking, inadequately pre-treated raw water clogged ssf leading to frequent cleaning. Intermittent operation of ssf reduces the removal of pathogens [visscher et al., 1987].

Slow sand filtration

Ssf is the process of slowly (filtration rates ~ 0.10-0.30m/h) passing dirty water, meant for human drinking, through a bed of fine sand [effective diameter (d_{10}) 0.15 - 0.35 mm; uniformity coefficient (uc) < 5)] to purify it to potable quality. The sand is supported on graded gravel, placed on a system of under-drains that collect filtered water. The filtration rate can be controlled either on the inlet or outlet sides.

Water treatment by ssf is brought about by screening, sedimentation, adsorption, bio-chemical and micro-biological processes. Particles to be removed are first transported to the sand grain surface. Here, they should remain attached before being transformed by bio-chemical and micro-biological processes [wegelin, 1996]. therefore, transport, attachment and transformation mechanisms play a role in ssf. In nature no such partition of these mechanisms is present, and their interaction is still not fully understood [huisman, 1989]. the process of attachment is responsible for the removal of colloidal particles [huisman, 1989]. unless attachment occurs, particle removal cannot be effective. Transformation mechanisms (bio-chemical and micro-biological processes) are responsible for bio-degrading organic matter. They play a role in removing colour and dissolved solids. As filtration progresses, a thin dirty layer (called "schmutzdecke", german word meaning dirty skin) of retained impurities is developed on top of the sand. This layer is reported to be biologically active and responsible for the removal of pathogens. Predatory organisms in this layer eliminate pathogenic organisms.

The design of a slow sand filter depends on local conditions and usually maximises the use of local materials to lower construction costs. Visscher et al. (1994) suggest that it is more important to understand the rationale

behind given criteria. The main task of a ssf plant is to ensure uninterrupted supply of potable water. A plant caretaker should be knowledgeable and adequately trained for the various tasks involved. To assist the operator, a detailed schedule of his tasks should be drawn clearly

Raw water contamination and pollution levels may limit the sole use of ssf. Other factors that limit the use of ssf, cited by huisman (1989), include (1) high construction costs per unit capacity; (2) large area of land required; (3) labour intensive. These setbacks are pronounced in larger installations. In developing countries, land and cheap labour are abundant, making ssf appropriate. Cost comparisons made in india between ssf and rsf showed that capital costs for ssf are much lower than those of rsf for systems up to 3000m^3/day capacity [visscher et al., 1987]. nevertheless, good ssf performances need adequate pre-treatment. The world-wide needs for raw water pre-treatment prior to ssf are reported to be enormous [collins et al., 1994]. the pre-treatment method paired with ssf has to have similar levels of simplicity in design [visscher et al. 1987]

Ssf pre-treatment methods

Possible pre-treatment methods prior to ssf can generally be classified into two categories: chemical and non-chemical.

Chemical pre-treatment (coagulation, rapid mixing, flocculation and sedimentation in that order) has widely been taken as the conventional choice. Chemicals are used to aid the removal of impurities by sedimentation and filtration. Although chemical pre-treatment is reported to be applied prior to ssf, it is generally not suitable for low-income areas because of the stringent and costly operation and maintenance requirements [galvis et al., 1993; wegelin et al., 1991]. it also requires expert supervision, and is highly mechanical and electrical, normally unaffordable in such areas. Reliable and sufficient stocks of chemicals are vital for consistent performance, otherwise the efficiency of the sedimentation is greatly reduced. Improper operation leads to the formation of light flocs, which are easily carried over to ssf. Schulz and okun (1984) report of a case in mharashtra-india where chemical pre-treatment was used prior to ssf to treat raw water with turbidity ranging from 50-500 ntu. Light flocs were carried over to ssf and caused rapid clogging of the entire filter-bed. This shows that the use of inappropriate pre-treatment can lead to premature and rapid clogging of ssf. Consequently, operation costs increase due to the accompanying need for frequent cleaning. These disadvantages of chemical pre-treatment have rendered them inapplicable in most low-income areas, especially in developing countries [wegelin et al., 1991]. most water supply utilities in developing countries lack funding, and are therefore unable to afford chemicals, spare parts, and skilled manpower. Moreover, the operation and maintenance of chemical pre-treatment systems is not as simple as that of ssf, making the combination incompatible. Galvis et al. (1993) suggest that the pre-treatment technology prior to ssf should be as simple as ssf for compatibility purposes. The consideration of non-chemical methods has therefore become inevitable.

Non-conventional pre-treatment methods don't use chemicals and are less complex, easy to operate and maintain. These methods include: (1) riverbank filtration, which consists of infiltration wells along riverbanks, capable of producing filtrates which may only need disinfecting [engels and poggenburg, 1989]. major problems are maintenance (difficult since the wells are underground) and the limitation to permeable soil formations. (2) riverbed filtration: river water is filtered through a natural or artificial riverbed and collected in perforated pipes placed in the riverbed. Construction is difficult in water bearing aquifers, and periodic blockage of the infiltration zone (located under water) makes either practical cleaning or repositioning of the pipes and filter material difficult. (3) plain sedimentation removes suspended solids by gravitation settling without the aid of chemicals. It is only effective if raw water has high content of easily settled suspended solids. Colloidal particles are difficult to settle because they are too light. (4) roughing filtration (rf) improves the quality of raw water by filtering it through gravel layers. The size of gravel reduces in the direction of flow. This prevents rapid clogging which would occur if fine gravel were first brought in contact with raw water. Greatly reduced settling distances enhance the efficiency of rf compared plain sedimentation. The significant advantage of rf over chemical pre-treatment is that no chemical is necessary to achieve similar results of well-operated chemical pre-treatment. Rf is more effective than plain sedimentation and much easier to operate and maintain than riverbed or riverbank filtration, hence is most appropriate as a pre-treatment step for ssf.

Roughing filters are classified according to the location, main purpose, flow direction, filter design and cleaning method (see figure -1). Intake and dynamic filters are located at the raw water intake site and are applied to abstract raw water, and pre-filter it to protect the main treatment plant against heavy suspended solids common after heavy rains. Their filter media size increases in the direction of downward flow. Therefore, most of the solids are retained on top of the filter bed, and cleaning is simply achieved by manually scouring the top fine filter media with a rake or shovel. Roughing filters proper are located within the main treatment plant, prior to ssf, to improve raw water quality. These are operated as either as up-flow roughing filters in layers (urfl), down flow roughing filters in series (drfs), up-flow roughing filters in series (urfs or horizontal-flow filters (hrf) (see figure -1). In hrf, urfs and drfs, each gravel layer is installed in separate compartments arranged in series. In urfl all the gravel layers are placed in one compartment. These filters are deep bed filters that allow deep penetration of suspended solids. Hence, only hydraulic cleaning by periodic draining of the filter unit can achieve effective flushing out of retained impurities [wegelin, 1996]. however, with time (3-5 years), the gravel may require excavation and manual to impurities that have adhered to gravel grains and washed out by hydraulic cleaning. Usually, after such a time hydraulic cleaning is unable to restore the filter efficiency.

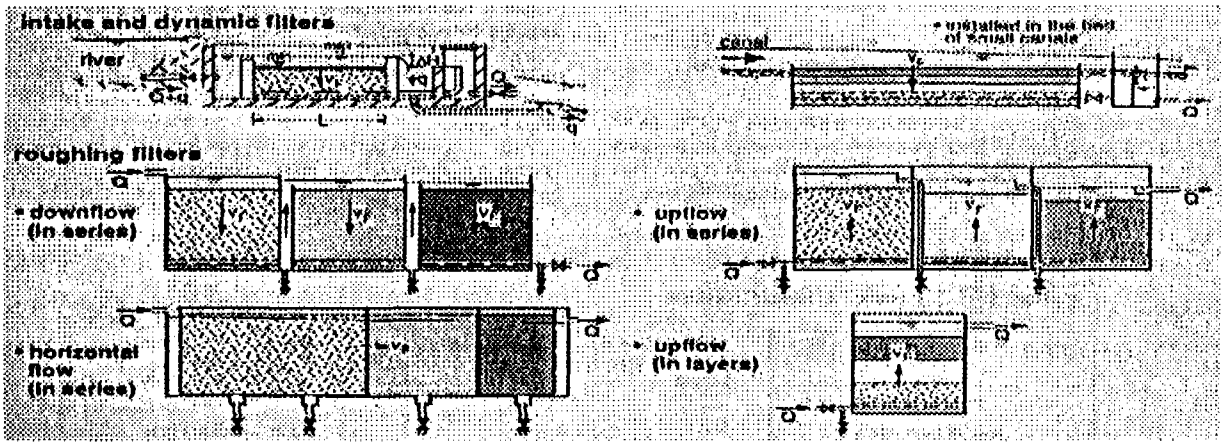

Figure -1: types of roughing filters [source: wegelin 1996]

The combination of rf and ssf processes

Water treatment by rf and ssf has emerged to be competitive. It is currently regarded as an appropriate alternative to conventional methods in small and medium water supplies (generally low-income areas) [wegelin, 1996,; wegelin et al., 1991;, galvis et al., 1996;, clarke et al., 1996; shenkut, 1996]. it has particularly become more attractive in developing countries because of the simplicity in design, and the easy operation and maintenance. Operating costs are low since the pre-treatment by rf does not need chemicals and it is also less likely to go wrong under less experienced operators. The main treatment by ssf is effective in producing potable filtrates that are free from pathogens. Construction of rf-ssf systems is reported to utilise local materials and labour, thus providing economic benefits [wegelin 1996]. practical studies in colombia have shown that running costs are reduced by a factor of more than five where the systems are applied instead of conventional methods [galvis et al., 1993; wegelin, 1996]. roughing filters and slow sand filters are of equal technical level, and their operation is characterised by a high process stability which permits treating raw water of fluctuating quality by making full use of natural purification. In combination with terminal disinfection, the systems provide multi-barriers to water borne diseases [clarke, 1996].

The pilot plant study

Objective

The overall objective of the rf-ssf pilot plant study was to investigate the viability of using a combination of urfl and ssf as an alternative to conventional water treatment methods.

Methodology

A pilot plant comprising two identical production lines of urfl - ssf was, designed, constructed, and studied by the author (see table 1 and figure 2). The pilot plant is located adjacent to a conventional water treatment plant that supplies water to the city of lusaka, capital city of zambia. The supernatant water depth and freeboards of both urfl and ssf were shaded by course gravel and roofing respectively. This was necessary to prevent excessive algae in the supernatant.

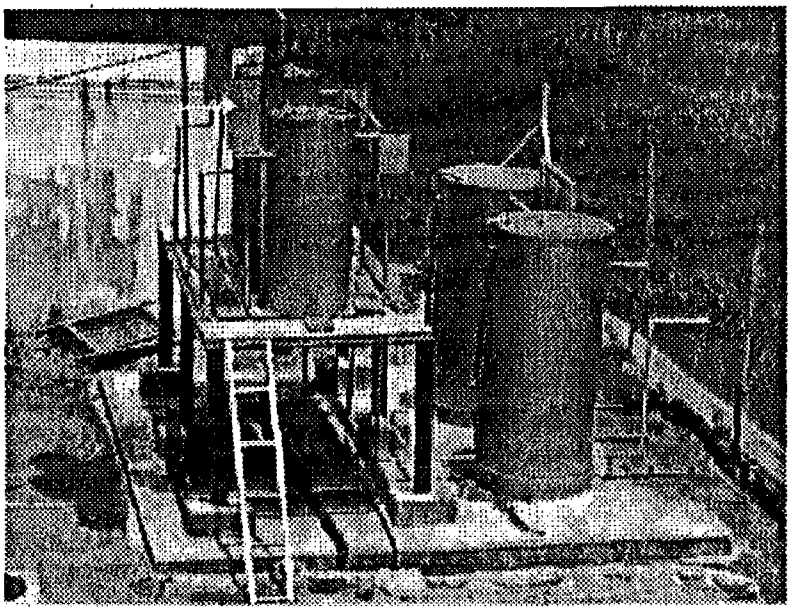

Figure 1: picture of the complete pilot plant (taken by the author)

Urfl were chosen because of its notable advantages over the other types: (1) capital costs are lower; (2) requires less land area; (3) hydraulic cleaning is much effective and requires less down-time (4) reconstruction of existing chemical pre-treatment structures (sedimentation and flocculation basins) to urfl is usually more feasible (4) reported to handle raw water of comparatively low turbidity (<250 ntu). Surface water sources in zambia exhibit low turbidity levels (monthly averages < 30 ntu, and 30 -250 ntu during rain seasons [holzhaus and versteeg, 1993].

Influent and effluent water samples were analysed for turbidity, total suspended solids (tss) and faecal coliforms (fc). Filter-runs, performance of each urfl gravel layer and the hydraulic cleaning of urfl were also studied. The study was not done in the rain season, hence simulation of rain season raw water was inevitable (actual raw water quality: daily average turbidity 1-5 ntu, tss < 5 mg/l, fc 14 - 200 fc/100 ml; simulated raw water: daily average turbidity 15-300 ntu, tss 17-2000 mg/l and fc 67-4000 fc/100 ml). Urfl filtration rates were varied from 0.30-1.25 m/h. Each filtration rate was studied for at least two weeks.

Results and discussions

Urfl reduced turbidity, tss and fc levels by 84-98%, 83-100% and 27-100%, respectively. Daily average urfl effluent turbidity was less than 10 ntu through the study period. Such effluent turbidities are suitable for ssf. Each gravel layer was able to reduce the turbidity load to subsequent layer. Filtration rates from 0.30-1.25 m/h did not show significant differences in performance with respect to turbidity and tss removal. However, fc

removal slightly lower at 1.25 m/h. Urfl hydraulic cleaning showed significant removal of tss. Urfl filter-runs were not determined due time limitation. However, since each filtration rate was tested for at least 2 weeks without showing signs of the end of a filter-run, it is possible that filter-runs in full-scale plants can be greater than 2 weeks.

Ssf reduced turbidity levels to less than 1 ntu. Fc in ssf filtrates averaged 1/100 ml and 1.6/100 ml on the two production lines. Filter runs of ssf (27-122 days) were much longer than those reported in zambia (<14 days) and elsewhere where chemical pre-treatment is used. This can be attributed to the adequate pre-treatment provided by urfl.

The operation and maintenance of the pilot plant was managed by a local who was adequately trained, and was easy, simpler and economical, compared to reported operation and maintenance of conventional systems. This aspect indicates the absence of the need for costly expert and skilled manpower. The use of local materials in the study is another economical benefit that can be realised when rf-ssf systems are chosen.

Conclusions and recommendations

From the literature review done and the subsequent pilot plant study conducted, it can be concluded that the use of rf-ssf systems is appropriate in low-income areas. These systems are much cheaper than conventional systems, and can easily be constructed from local materials, and managed, by local communities. They are able to treat raw water of high turbidity to potable quality without the aid of pre-treatment chemicals. However, ssf filtrates should still be disinfected to guarantee potable water supply, because it is not always possible for ssf to completely remove contamination.

When adopting rf-ssf systems, attention has to be paid to the use local materials and labour, and the training of the operators to be. Run-down and neglected conventional water treatment systems in most developing countries, particularly in low income areas, is a result of the failure to consider sustainability aspects. With the use of local materials and labour during construction, and the adequate training of the plant operators, rf-ssf can still remain to be the best surface water treatment option for low-income areas, which cannot afford conventional systems. Last but the least, it should be realised that safe water supply definitely means improved hygiene sanitation.

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IMPROVEMENT ENVIRONMENTAL HEALTH HYGIENE PRACTICES - CASE STUDY OF NORTHERN PROVINCE, SOUTH AFRICA.

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Abstract: The primary purpose of an improved water supply and sanitation, is the achievement of acceptable health and hygiene standards as well as the sustainable improvement of the environment. Different deficiency gaps in environmental health and hygiene practices were investigated with the aim of coming up with ways of improving this bad situation in the Northern Province, of South Africa. 213 household and 30 school questionnaires were distributed in order to accomplish this task. Workshops were also conducted as well as visitations to different government departments.

The schools' situation was not any better than the households', with more than 90% of the villagers still dependant on unimproved pit latrines and 56,6% relying on standpipes which are (70% of the time) out of order. Even though the government is trying to get involved in this whole process, with the necessary policies already in place, the main problem seems to be implementation and maintenance. The water committees should come in at this point to help the government to achieve this final step. With proper training of the water committees and their active involvement with the government and relevant NGO's, there will be significant improvements in environmental health and hygiene.

1.1 INTRODUCTION

1.1.1 Background

The primary purpose of an improved water supply and sanitation, is the achievement of acceptable health and hygiene standards as well as the sustainable improvement of the environment. Providing water supply and sanitation facilities in cities is recognised as one of the most important goals of the 1990's. It is obvious that to maintain reasonable health standards within rapidly growing cities, governmental and non-governmental organisations must undertake more activities in this area (Hoque B.A., 1994).

1.2.2 Motivation

Lack of access to safe sanitation facilities is a significant cause of ill health in South Africa. Water supply and sanitation are essential elements of Primary health care, as recognised at Alma Ata, USSR in September 1978, and jointly sponsored by WHO findings. 80% of all diseases in developing countries are water-related, of which a significant amount is attributed to inadequate drinking water supplies and sanitation installations, and to the absence of hygiene education (Fresenius, 1989).

The Northern Province, in South Africa was chosen for this study because it is amongst one of the

provinces that has got large rural populations that this normally the ones display signs of poor sanitation and water supply. These provinces normally lag behind in terms of service provision and thereby leading to poor hygiene and health practices. The health and economic benefits that are envisaged are two main driving factors in conducting this study.

1.1.3 Objectives

The main objective of this study can be summarised as follows:

- The investigation of the health and hygiene practices in the Northern Province, and to determine the various deficiency gaps, and also the identification of ways of reduction of diseases related to poor hygiene and directly improve the quality of health education by looking at the role of schools and teachers in the whole process of improvement.

1.2 FIELDWORK

1.2.1 Background

A large percentage of the population in South Africa has inadequate domestic water supplies and experience water shortages. The inadequacies are mainly in terms of the water delivered, inappropriateness of water quality distribution facilities, excessive walking distance, long queues at water points, poor maintenance and inadequate bulk water development (Van Schalkwyk, 1996). This coupled with poor sanitation present great challenges in improving environmental health.

1.2.2 Study site description and selection

The Northern Province is one of nine provinces in South Africa. It has got a population density of 33,31 persons per square kilometre and it is the fourth highest in the country. This province is basically one of the poorest in terms of water supply and sanitation. Only 12.3% of the black population has got access to a flush toilet, 56.9% still relies on the pit latrine, whereas 12.5% does not even have access to a latrine. The water supply situation is also as bad, with only 12.9% of the black population (who are mostly located in the rural areas), with access to running tap water in dwelling. Even though 32,2% have got access to a public tap/kiosk, it can usually go for weeks if not months without functioning and this is as good as nothing because people will then resort to other water resources that may not be very safe to use. Waste disposal facilities are also non-existent in many areas.

1.2.3 Data collection methods and analysis of results

Information on sanitation, water supply and hygiene was collected from different government departments (Water Affairs and Forestry, Education, Health and the Premier's office), educational institutions and some Non-Governmental Organisations within the province. Population statistics and maps of the province were also

obtained from relevant government departments.

Two different questionnaires for the schools and households were prepared and distributed. The questionnaires sought for information on the following: household demographics, water supply information, sanitation and hygiene practices. Workshops were run and self-observations were also made. All the results were then analysed using a statistical package (SIMSTAT).

1.3 ANALYSIS AND DISCUSSION OF RESULTS

Results that were obtained from the distribution of questionnaires, personal observations, conducting of workshops and also results from different government departments were analysed. Some of the important findings of this study can be summarised as follows:

1.3.1 Households

1.3.1.1 Water supplies

- The poverty levels in the study area were very high with 20% of the villagers being unemployed and having an average income of *R2 569. During the times when the pumps are broken this becomes a problem because water has to be bought from nearby shops or neighbours at anything from *50c per 25l up to *R1,50c per 25l. Such high prices in a poor populace contributed to their resorting to use untreated water.
- 56,,9% of the villagers were dependant on the standpipes (which were 71,8% of the time broken), and 8,9% relied on rivers which may pose danger to the water collectors and users.
- The average distance to the water points was found to 630,8m in comparison to the 100m as recommended by the government. This placed a strain on the population.

*R2 569 ≈ $457.93, 50c ≈ $0,1 and R1,50c ≈ $0,3 (on the 16th October 1998).

1.3.1.2 Sanitation

- 90,1% of the villagers were dependant on the unimproved pit latrines and 66,7% of them were very dirty. 8,0% of the population did not even have any latrines.
- Handwashing facilities at sanitation areas were available to only 13.1% of the people surveyed.

1.3.2 Schools - sanitation and water supplies

The schools' situation was not very different from that of households:

- Unimproved pit latrines - 93,3%
- Public pumps - 60% and school connections - 26,7%
- The importance of health education was stressed by 80% of the teachers even though only 27,6% of them received formal training in health education. There may be need to empower these teachers in aspects of health education.

1.3.3 Government

Different government departments like (health, education, environment and water affairs) have been working together in some of the health and hygiene awareness programmes. Water Affairs has been highly involved with the construction of water supply facilities even though implementation and maintenance seem to be a problem at the moment.

1.4 CONCLUSION

There seems to be lack of co-ordination between the government, communities and other Non-governmental organisations. These should work hand in hand in order to achieve the fast implementation and smooth running of projects. Implementing organisations can be contracted by the government for quick and smooth completion and implementation of projects. Schools can also play an important role towards educating the community because of the knowledge they would have obtained from their teachers. This can be a sure and sustainable way of imparting knowledge on improving environmental health in the province.

1.5 REFERENCES

Central Statistical Services, (1995), Provincial Statistics (Northern Province). Part 9, RSA, pages 1-50.

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Hoque B.A., Hoque M.M., Ali N. and Coghlan S.E., (1994), Sanitation in a poor settlement in Bangaladesh: a challenge for the 1990s, *Environment and Urbanisation*, **Vol. 6**, No.2, page 79.

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1.6 ACKNOWLEDGEMENTS

The Authors would like to thank the Foundation for Research Development of South Africa for supporting this work and attendance of this Conference.

10TH ITN AFRICA CONFERENCE PROGRAMME

DAY 1: SUNDAY 29TH NOVEMBER 1998

10.30am-6.00pm Arrival and Registration of delegates.

DAY 2: MONDAY 30TH NOVEMBER 1998

7.30-9.00am Registration of delegates

9.00am OFFICIAL OPENING

SESSIONAL CHAIR: TORE LIUM

10.10-10.50am Tea/Coffee Break

10.50am SESSION ONE: INSTITUTIONAL ISSUES

SESSIONAL CHAIR: EUGENE LARBI

10.50-11.10am Sanitation promotion in Uganda (Tom Mwebesa)
11.10-11.30am Commercialisation of urban water and sanitation services(Eng. M. Milgo)
11.50-12.10pm The influence of the land tenure system on the provision of residential environmental services in the low income urban areas (Dr. W.H.A. Olima)
11.30-11.50am Collaboration & institutional capacity building (Mahamadou Tounkara)

12.10-12.50pm Questions and Responses

12.45-2.00 pm Lunch Break

2.00 p.m. SESSION TWO: FINANCING AND FUNDING MECHANISMS

SESSIONAL CHAIR: Ms. MUKAMI KARIUKI

2.00-2.20pm Private sector involvement: a case study of Kisumu town (Wangari Mwai)
2.20-2.40pm Microprojects financing for water supply and sanitation in Zambia (P. Chola)
2.40-3.00pm Declining urban sanitation inZimbabwe - is demand responsive approach the answer?(Paul Taylor)
3.00-3.20pm xxxxxxxxxxxxxxxxxxxxxxxxx

3.20-3.30pm Questions and Responses

3.30-3.40pm Groups Formation

3.40-4.00pm Tea/Coffee Break

4.00-5.20pm Groups Discussion

5.20-6.00pm Groups Presentation

DAY 3: TUESDAY 1ST DECEMBER 1998

8.30-9.00am Presentation of Emerging Issues: Sub-Themes 1 & 2

9.00 a.m. SESSION THREE: SERVICE OPTIONS

SESSIONAL CHAIR: DR. A. SHAKER

9.00-9.20am Solid waste management in low income urban areas (Dr. M. Ndege)
9.20-9.40am Environmental sanitation in low-income urban areas in Zambia (Osward M. Chanda)
9.40-10.00am Excreta disposal and potable water in peri-urban areas of Kampala(W. Lubulwa)
10.00-10.20am Community sanitation initiatives in Kibera, Nairobi (Dr. Graham Alabaster & Mrs. Margret Mwangola)

10.20-10.30am	**Questions and Responses**
10.30-11.00am	**Tea/Coffee Break**
11.00am	**SESSION FOUR : MODE OF INTERVENTION**
	SESSIONAL CHAIR: MR. NGONI MUDEGE
11.00-11.20am	New challenges in training in the water and sanitation sector in South Africa (Ilse Wilson)
11.20-11.40am	Community factor in sustainability of water and sanitation programmes for low income urban areas (E.D.K. Flagbey)
11.40-12.00pm	Implementing the Rio Policy in urban water and sanitation, Jinja Town case study, Uganda (Corrine Wacker)
12.00-12.20pm	Modelling Internet based communication for water supply and sanitation (Ndirangu Kibata)
12.20-12.30pm	Why is effective community management difficult to achieve in Nairobi slums (Sue Cavanna & John Nyachieo)
12.30-12.45pm	**Questions and Responses**
12.45-1.00pm	**Group formation**
1.00-2.00pm	**Lunch Break**
2.00-3.20pm	**Groups Discussion**
3.20-3.50pm	**Tea/Coffee Break**
3.50-4.30pm	**Groups Presentation**
3.30-4.45pm	**Field visits brief**
DAY 4:	**WEDNESDAY 2ND DECEMBER 1998**
7.30.-5.30pm	**FIELD VISITS**
DAY 5:	**THURSDAY 3RD DECEMBER 1998**
9.00am	**CLOSING SESSION**
	SESSIONAL CHAIR: MR. MATTHEW N. KARIUKI
9.00-10.30am	Presentation of emerging issues: Sub-Themes 3 & 4 Presentation of Work Plan/Draft Conference Recommendations
10.30-11.00am	**Tea/Coffee Break**
11.00-12.00pm	**BRIEFINGS** ▸ World Health Organisation (WHO) ▸ Habitat ▸ UNICEF ▸ ITN Centres
12.00-12.30am	**CONFERENCE RECOMMENDATIONS & CLOSING REMARKS**
12.30 p.m.	**Lunch and Departure**

SESSION 4: MODE OF INTERVENTIONS

Group Discussion Report

A. MODES OF APPROACHES/INTERVENTIONS

1. **Demand Responsive Approaches (DRA)**
   - Community mobilization and management
   - Gender approaches
   - Participatory Hygiene and Sanitation
   - Prioritization of needs
   - Religious/Sectoral/Cultural

2. **Supply Driven Approaches (SDA)**
   - Donor/Government/Individual/NGO's initiatives
   - Integrated approaches
   - Religious/Sectoral/Cultural

B1. DEMAND RESPONSIVE APPROACHES (DRA)

Facilitative

- Community participation
- Ensures ownership
- Willingness to pay (Cost recovery and sustainability)
- Empwerement
- Prevents waste of resources
- Mobilises and uses local resources

Hinderances

- Inability to respond
- Inability to differentiate needs
- Excludes certain communities
- Slow implementation pace
- Neglect of sanitation

B2. SUPPLY DRIVEN APPROACHES

Facilitative

- Quick implementation
- Allows "targeting"
- Macro-planing
- Coordination will trunk systems

Hinderances

- Discourages community management
- Imposes technology
- Disempowers communities
- Dependency on donors
- Wasteful of resources

C. IMPLEMENTATION STRATEGY FOR DRA

- Community mobilization
- Gender responsiveness
- Direct access to resources
- Community defination
- Strengthening of community capacity
- Community communication and understanding
- Provision of information and education
- Coordination of service providers
- Use of participatory methods

D. **CONTRIBUTION OF KNOWLEDGE INSTITUTIONS**

- Appropriate Researches and Development
- Exchange of experiences
- Capacity building
- Promotion of best practices

SESSION 4

MODES OF INTERVENTION

Issues/challenges

- Policy to provide broad framework for the provision of WES services
- Understanding private sector involvement in the WES
- Testing of policies through pilot projects
- Classification of low income urban areas
- Rapid increase of low income urban settlements
- Cultural values are being eroded by rapid urbanization
- Lack of local and regional partnership
- Attitudes and /or costs in using electronic communication

Lessons learnt

- The need for Demand Responsive Approaches.
- Standard approaches for all communities is not feasible.
- Need to use limited resources indiciously
- Need to involve all stakeholders at all levels in WES services
- There is need for synergy of the social and political organisation
- Electronic communication is still under development worldwide
- There is need to set up and train community management committees in technical and project management skills.

Way Forward

- Develop replicable and cost effective approaches for specific areas
- Strengthening capacity of local governments
- Raise the profile of sanitation at all levels
- Need to understand and redefine low income urban communities
- Building partnerships in WES services
- Privatization of telecommunication services to facilitate wider use of electronic communication in WES
- Demystification of computers in Africa
- ITN African Network in partnership with other stakeholders should take a leading role in the standardization and factoring of WES information in the internet.
- Encourage contributions from communities, local authority and ESA's towards the project.
- Communities should be encouraged to form into community based organizations (CBOs) recognized by the local authorities.
- Use Participatory Urban Appraisal (PUA) to assess needs to priorities of low income urban communities.

INFORMAL LAND TENURE AND ENVIRONMENTAL SERVICES.

- The question of urban land

- broad and complex
- economically and politically sensitive
- important means of livelihood (shelter, food, work)

- Land tenure - influences investments of labour and capital in various process (water supply and sanitation included)

- In low income areas - the non-formal defacto land tenure is predominant i.e land acquired, occupied and used without permission from its owner.

- Quasi legal tenure through TOLs or letters from chiefs or verbal agreements.

- Public land (Kibera and Korogocho) - central government/NCC

- Individual freehold land (Kangemi, Kawangware and Githurai)

- low income areas - 5% of total land area in Nairobi with over ½ total population.

RESIDENTIAL ENVIRONMENTAL SERVICES IN LOW INCOME AREAS.

- Environmental degradation
- High congestion
- poor sanitary conditions
- Inadequate water supply

- Individual freehold tenure

- Landlords have more incentives to invest and to work jointly with others to improve services
- Limited absentee landlords
- Medium densities

- Better conditions

- Being "private" settlements they have tenure security.

Financing and Funding on the Challenges and Options for Increasing Sustainable WSS in Low Income Urban Areas:-

- Proximity to sanitation facilities alongside shallow wells addressed.
- Private sector provision promoted
- Environmentally sustainable waste disposal practices advanced.
- Role of Trade Unions in promoting private sector practice encouraged.
- Priority setting and streamlinig of operations encouraged/advanced.
- Proper utilisation of resources called for.
- Linkages with various actors strengthened.
- Bottom up planning encouraged.

HINDRANCES.

- Political interference
- Lack of legal enforcement
- Inadequate knowledge or commitment of people involved
- Sector not coordinated
- Resource limitation
- Attitude problems
- Demotivation of professionals
- Insufficient/well skilled human resources
- Absence of policies
- Inappropriate technology
- Inadequate community involvement
- Inadequate involvement of private sector
- Inconsistent policies
- Lack of land tenure

ISSUES THAT PROMOTE.

- Existence of policy
- Awareness of policy makers
- Existence of relevant institutions
- Promotion of appropriate technology/standardisation
- Allocation of adequate resources (funding)
- Involvement of stakeholders
- Promotion of practical policies

CONTRIBUTION OF INSTITUTIONS.

- Advocacy
- Educating policy makers, communities, etc
- Networking of good workable/bad practices
- Undertaking research
- Human resources development
- Assisting government in policy formulation

THINGS TO LEARN.

- Address all hindrances

GROUP DISCUSSIONS: SERVICE OPTIONS (WES)

1. Available options

a. Community based organisation
b. Private sector
c. Local authorities and utilities
d. Religious Organisations
e. NGOs
f. External agencies

2. SUCCESSES & FAILURES

a. **Community Based Org.**

- Community ownership
- Cohesiveness
- Limited management capacities
- Easily exploited
- Limited funds

b. **Private sector**

- Efficient
- Not attracted
- No sense of ownership
- Costly and exploitative
- Not responsive to community needs

c. **Local Authorities & utilities**

- Bureaucratic
- Inefficient
- Political interferences
- Misallocation of funds
- Access to communities
- Opportunities for social tariffs

3. Service options

ISSUES & CHALLENGES

- Lifestyles vary
- Health impacts not seriously taken
- Low priority - WES
- Uncontrolled dumping
- Inadequate research
- Inadequate dissemination of information
- Too many uncoordinated actors
- Inadequate funding.

SUGGESTIONS

- More education and information dissemination
- Various actors should collaborate
- Commercialisation of services and ~~imported~~
- Research on: Local technologies.

INSTITUTION ISSUES

The purpose of the session was to address/deliberate institutional issues that hinder and promote the provision of WES services in the low income urban area. Three presentations were made and the following are some of the issues raised:-

- Status of sanitation is on the decline in some countries.
- Provision of water supply is important only if it is accompanied by adequate environmental sanitation and positive behaviour practices.
- Sanitation is a human right and it should be accorded to everyone.
- We have recognized that the role of the government is changing from that of a provider to that of a facilitator. NGO's, CBO's and the private sector also have a role to play in the provision of services in the low income urban areas.
- Full cost recovery is not easy at the start of the commercialisation process, but should be encouraged.
- Involvement of stakeholders in the monitoring of services, promotes efficiency, and accountability.
- Questions of urban land tenure are complex and politically sensitive.
- Land ownership and adequate sanitation should be a basic human right
- Challenges in the low income urban areas include high densities, strain on the service provision environmental risks particularly on women and children.

Recommendations

- Revisit the issue of land tenure.
- Recognize the existing settlements.
- Stop allocating public land.
- Water and adequate sanitation are both a social and economic good and should be implemented as such.

Proposed Options for Increasing Access to Sustainable WES in Low Income Urban Areas:-

- Commercialisation of private sector providers encouraged.
- Stakeholder participation (especially women) advanced.
- Demand responsive approaches instituted.
- Stringent monitoring and evaluation systems established and implemented.
- Technological sanitation options availed.
- Issues of population growth and urban planning addressed.
- Equity and social justice enhanced.

Proposals for Improved Policy and Legal Framework for Provision of WES in Low Income Urban Areas:-

- The inability of the poor to pay for services addressed.
- Negative effects of SAP and political interference examined and proper advice given to those concerned.
- Need for adequate staffing considered.
- Adequate funds for operation and maintenance availed.
- Policy and standards developed.
- Central authority for promotion of sanitation established.
- Multi sectoral approach and micro financing funding encouraged.
- Overhead costs addressed.
- Hygiene and sanitation accorded high profile.
- Demand response approach institutionalised.
- Inbuilt accountability procedures in place.
- Land tenure system reexamined.
- Proper regular/framework in place.
- Adequate institutional frame in place.
- Informal settlements recognised.
- Private sector providers recognised and facilitated.
- Issues of cost sharing and recovery addressed.
- Social/development/trust funds for WES established.

Proposed Strategies for ITN Centres:-

- Skills of service providers developed and sustained.
- Consultancy services availed
- Findings documented.
- Information sharing on technology issues enhanced.
- Operation research conducted.

J. S.

Water and Sanitation Africa Initiative

Checklist of **KEY ACTION AREAS**

Water and Sanitation Africa Initiative
Abidjan, 17-20 November, 1998

This checklist of action areas was developed from the outputs of working groups convened during the Africa Consultative Forum. As the various countries within Africa are at different stages in their development and face different problems, the checklist is intended as a tool for selecting appropriate actions at country level.

Country Level Actions

1 SECTOR REFORMS

Appropriate sector policies, legislative support and institutional framework need to be put in place to guide the stakeholders.

1.1 POLICY

1.1.1. Ensure overall consistency in all policies relating to water and sanitation (health, sanitation, water and environment)
1.1.2 Recognise and incorporate the role of other actors in service delivery (private sector - formal and informal sector, communities)
1.1.3 Clarify the roles of key actors and strengthen mechanisms for coordination
1.1.4 Raise the profile of sanitation by developing specific sanitation policies
1.1.5 Establish an enabling framework for developing safety nets/mechanisms for protecting the poor, and children in particular, from adverse impacts of inadequate access to water and sanitation

Actors: Government, ESAs, Lending Agencies, Civil Society, regional agencies (OAU, etc), Utilities

1.2 LEGISLATION

1.2.1 Ensure suitability of technology standards to local context/conditions
1.2.2 Revise existing legislation to encourage qnd facilitate participation of other actors (private sector - informal and formal, community, NGO) in service delivery, provide quality assurance and safeguard consumer interests
1.2.3 Establish regulatory authorities (autonomous where necessary) to guide and oversee water and sanitation service delivery and ensure accountability

Actors: Government,

1.3 INSTITUTIONAL

1.3.1 Develop institutional transition programmes for changing the role of Government from a provider to a facilitator
1.3.2 Introduce or encourage community and private sector involvement in the management and delivery of services
1.3.3 Harmonise and standardise sector norms used by various institutions/sector agencies
1.3.4 Support institutional development at the lowest appropriate level through decentralisation and deconcentration of activities.
1.3.5 Develop appropriate institutional arrangements for the coordinated planning,

monitoring and management of water and sanitation services, including emergency preparedness.

1.3.8 Identify the range of operators engaged in service delivery and establish the necessary conditions for increasing their involvement

Actors: Government, Private Sector, ESAs, Civil society, utilities

1.4 DEMAND RESPONSIVE APPROACHES

Adopt demand responsive approaches to water supply and sanitation which encompass appropriate levels of cost recovery

Actors: Government, Private Sector, ESAs, Civil society, utilities

2 CAPACITY BUILDING

Because of the changing roles in the sector, development of human resources and institutional strengthening at all levels is necessary to ensure sustainable water supply and sanitation services, including links to appropriate institutions for emergency preparedness, to meet the needs of all the population. Special attention should be given to data collection and management as well as sector monitoring to ensure more informed decision making.

2.1 Develop appropriate and accountable institutional frameworks for management at the lowest appropriate level with particular focus on urban informal settlements

2.2 Assess capacity and/or train sector actors in the use of participatory tools/training modules for mobilising communities to take action on water, sanitation and health issues.

2.3 Carry out gender assessments to ensure that projects and programmes do not overburden women with unnecessary additional roles and responsibilities

2.4 Develop means for exchange of experiences and dissemination of best practices among various actors at country level

2.5 Build capacity for improved management and accountability at all levels, and in particular between service providers and consumers

Actors: Government, Civil Society, ESA, Private Sector, Beneficiaries, Other Institutions

3. FINANCIAL SUSTAINABILITY

Questions of cost recovery, affordability and equity, must be addressed and appropriate funding mechanisms for sustainable service delivery developed, with attention to effective and efficient utilisation of resources. Priority should be given to reliable arrangements for maintenance of installed facilities in order to prevent their premature deterioration and safeguard investments.

3.1. Advocate for the allocation of adequate resources from national and international funding sources to the water and sanitation sector (e.g. redirecting resources used in combatting disease epidemics for investment in improved water and sanitation services)

3.2 Develop mechnisms for mobilising capital from all actors (Government, Private, Community) for example: establishing targeted development funds;

providing guarantee facilities to ensure access to credit; develop means for participation of commercial banks; establish means for accounting for in kind contributions

3.3 Establish and encourage cost sharing and pooling of resources (e.g. trust funds) and develop appropriate financing mechanisms for channelling funds to the various users

3.4 Develop means for linking the mobilisation of resources water and sanitation and establish appropriate measures for financing sanitation

3.5 Develop realistic tariffs that ensure sustainable operation and maintenance of facilities and target and/or reduce the level of subsidy

3.6 Link the approval of capital investments to adequate operation and maintenance plans

3.7 Give priority to operation and maintenance of existing systems and prioritise action to optimise and improve the efficiency and effectiveness of new facilities

Actors: Government, Lending Agencies, ESA, Private Sector, Commercial Banks, Microcredit Institutions, Civil Society

4. INTEGRATED WATER RESOURCES MANAGEMENT

Efficient water use and attention to integrated water resources management can 'stretch' the water supply from existing investments and provide the opportunity for increasing service coverage at relatively low cost.

4.1 Ensure integration of policies, legislation, projects and programmes for water, sanitation and water resources management

4.2 Improve demand management, and link new investment decisions to adequate demand management

4.3 Ensure adequate measures for the prevention of pollution of water resources and the environment through

4.4 Ensure integrated water resources management

- establish an appropriate regulatory framework
- provide adequate financial resources
- create awareness among users through public education programmes

SPECIAL AREAS OF FOCUS

5 SANITATION

5.1 Disseminate and expand the use of participatory tools for hygiene education and social marketing through health and water professionals, and other service delivery agencies latrine builders

5.2 Increase awareness of the relationship between health; hygiene and water supply/sanitation through revision of school curricular and health and hygiene education campaigns that use participatory methodology

Actors: Government, service providers, local industries, local landing agencies, Communities

6 PERI URBAN AND INFORMAL SETTLEMENTS

Define criteria and standards and develop strategies for increasing water and

sanitation service delivery to informal settlements and peri-urban areas in the short and long term

Actors: Government, NGOs, beneficiaries, ESAs, lending agencies, PS, sector networks

7. RESPONSE TO EMERGENCY SITUATIONS
Develop appropriate mechanisms, tools, strategies for responding in a timely manner to refugee; post civil strife and natural disaster situations

Actors: Government, NGOs, beneficiaries, ESAs

Regional Actions

8. SOUTH SOUTH COLLABORATION

Where sustainable solutions have been achieved, these should be regarded as models at all levels. Pan African and South-South collaboration and the participation of the international and local private sector should be encouraged with adequate protection for the consumer.

8.1 Conduct workshops and seminars to share experiences and disseminate best practices
8.2 Encourage and facilitate sharing of knowledge and expertise between countries.
8.3 Develop mechanisms for resolving conflicts over transboundary waters.
8.4 Develop partnerships/mechanisms for coordination between regional agencies and projects/programmes (WUP, ITNs, etc)

Actors: WASAI, WSSCC, ESAs, Regional Agencies UADE, WUP, Government

Regional organisations such as WASAI should play an advocacy role disseminating the Action Plan to governments, passing resolutions/decisions, creating awareness of sector issues and priorities.