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**MASTER OF SCIENCE IN COMMUNITY ECONOMIC DEVELOPMENT
(2005)**

**WATER LOGGING CONTROL AND
SANITATION MAGOMENI
SUNA**

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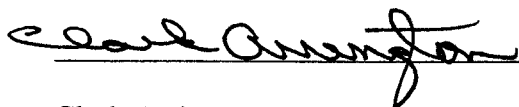
**WATER LOGGING CONTROL AND SANITATION PROJECT AT SUNA
COMMUNITY SUBMITTED IN PARTIAL FULFILLMENT FOR THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN
COMMUNITY ECONOMIC DEVELOPMENT IN THE SOUTHERN NEW
HAMPSHIRE UNIVERSITY AT THE OPEN UNIVERSITY OF TANZANIA
YEAR 2005.**

Supervisor's Certification.

The undersigned certifies that he has read and hereby recommend for acceptance by the Southern New Hampshire University at the Open University of Tanzania a project entitled

Water Logging Control and Sanitation at Suna Community in partial fulfillment of the Master of Science Degree in Community Economic Development.

I have read the Project and found it to be in a form acceptable for review.



Clark Arrington
Supervisor



Date

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Declaration.

The project I have produced is entirely my own original work. It has not been submitted for the similar degree in any other University. I have acknowledged all sources of information, which have contributed, to my work.



Materu Frank P.

Dedication.

This project is dedicated to my dearest wife, Elina, for her support, prayers, financial assistance and encouragement.

Acknowledgment.

I would like to acknowledge the efforts done by the Program Director, the School of Community Economic Development Mr. Michel Adjibodou who was also my instructor in Project Design and Management and Prof. Clark Arrington ADF – TZ who was my supervisor in this project. Indeed it would have been impossible to develop this project without collaboration, support and assistance from them. I would like to thank other people who assisted and co-operated with me while I was undertaking this project. Particularly I would like to thank Masoud Kombo and Selemani Kaboko-the CBO leaders for their availability whenever I consulted them. Lastly I would like to thank my wife Elina for her support, prayers, encouragement and financial assistance.

MFP

January 2005

Dar es Salaam

Abbreviations and Acronyms.

AIDS	Acquired Immunodeficiency Syndrome
CBO	Community Based Organization
DCC	Dar es Salaam City Council
HIV	Human Immunodeficiency Virus
M&E	Monitoring and Evaluation
NEMC	National Environment Management Council
NWP	National Water Policy
NGO	Non Governmental Organization
O&M	Operational and Maintenance
PRA	Participatory Rural Appraisal
PSC	Project Steering Committee
RWSSP	Rural Water Supply and Sanitation Project
SCDA	Suna Community Development Association
SWOT	Strengths Weaknesses Opportunities and Threats
UCLAS	University College of Lands and Architectural Studies
UNEP	United Nations Environmental Program
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Program
UHP	Urban Health Project
WHO	World Health Organization

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ABSTRACT.

The tendency of dropping waste and garbage at Mwananyamala and Msimbazi rivers in Dar es Salaam causes overflow of water to Suna community at Magomeni Mapipa every year during the heavy rainfalls. These floods cause a lot of environmental problems including loss of lives, properties and poor sanitation which bring many diseases like malaria, typhoid and cholera. My research Objective is to identify Suna community needs and assess if the community is ready to participate and contribute for development activities in their locality, and provide opportunities to assess a situation and its resources and devise a means of getting project done. Procedure and methods include selection of respondent as representative as possible for the total population in order to produce a miniature cross-section. The selected respondents constitute what is technically called "Sample" and the selection process is called "Sampling technique". The survey so conducted is known as "Sample survey". Likely outcomes include river training and tree planting along river banks to control the continuous overflowing of water and erosion, to get rid of stagnant waters by cleaning drainage systems, sewage system construction, river excavation and reduction of diseases and other losses that are brought by floods, improvement of people's environment, good health maintenance to Suna community and controlled water logging at Suna community environment.

Chapter 1.0 CBO BACKGROUND.

1.1 Background of SCDA

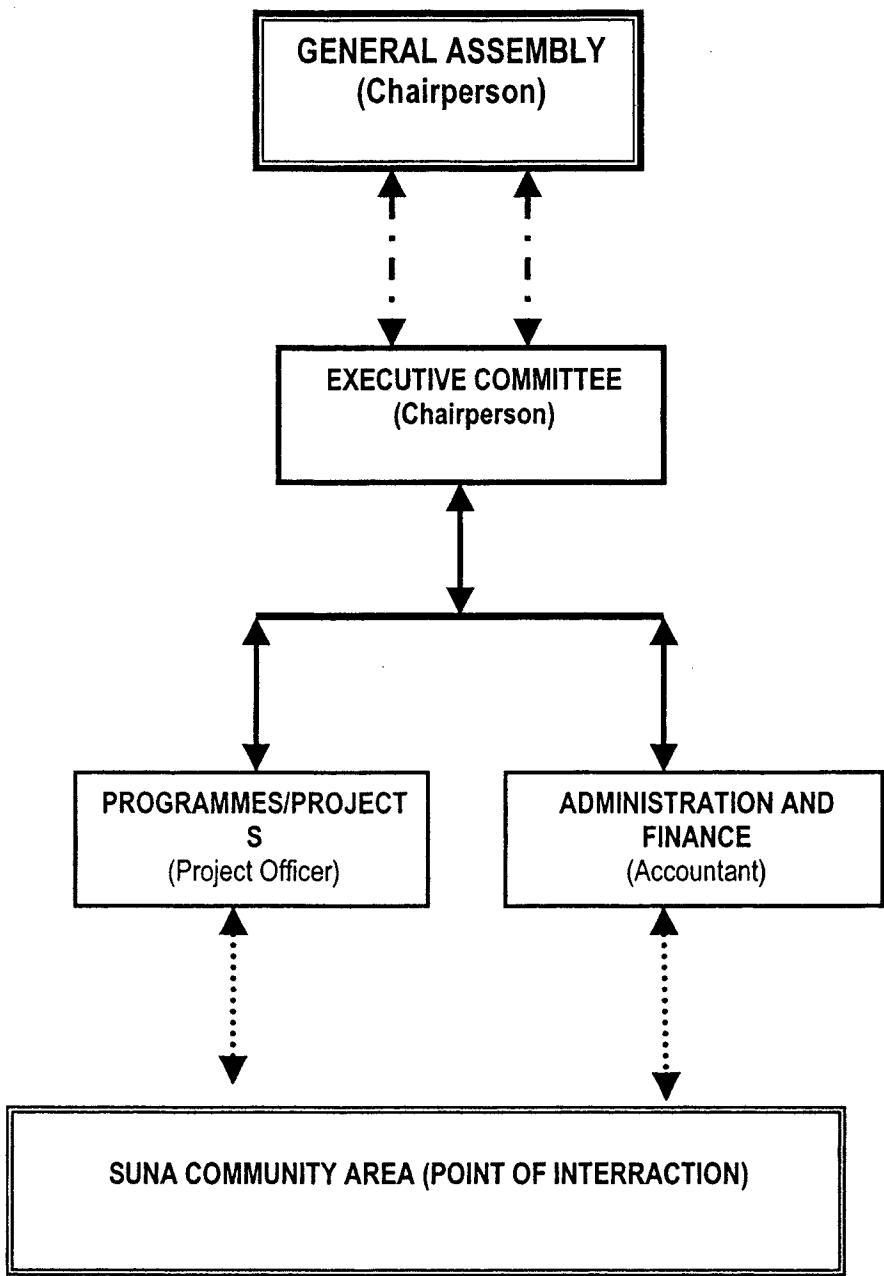
Suna Community Development Association (SCDA) is a community membership-based organization, currently with 82 members (56 men and 26 women). It was registered on 26th August 1998, and bears certificate of registration SO. No 9548, issued by the Registrar of Societies in the Ministry of Home Affairs. The Organization's address is SCDA, PO Box 3927 Dar es Salaam and its office is located at Magomeni Mapipa, Suna Street.

Organizational Structure of SCDA.

Structurally, SCDA has two principal organs namely: -

- i) Annual General Meeting (AGM), which is the highest governing body made up of all members and meets annually to discuss all key issues of the organization (SCDA Constitution, 1998).
- ii) Executive Committee is responsible for day-to-day management of SCDA. It has six members including Chairperson as chief executive officer, Vice Chairperson, Secretary, Assistant Secretary, Treasurer and Assistant Treasurer. The Committee is constitutionally allowed to hold the office for a period of two years, after which election has to be done for new or same office bearers. SCDA constitution does not allow the incumbents to be in the office for more than two terms.

Figure 1 Organization Structure of SCDA.



1.2 Mission.

To facilitate social-economic and cultural development of Suna community through the application of the principles and innovation of the spirit of self help.

1.3 Objectives.

- To mobilize and organize the people of Suna so as to bring about social-economic development.
- To carry and promote the development of education and training as well as providing facilities related here to.
- To promote and encourage small business enterprises in Suna community.
- To carry out any other activities as may be agreed upon by the Suna community.

1.4 Programs & Activities.

1.4.1 Programs.

To raise awareness among the residents of Suna on the importance of water logging control and upgrading their settlement and its environment.

The main objectives of SCDA are:-

- i) To support improvement of hygiene and sanitation including but not limited to sewage disposal.
- ii) To help improve or supplement basic requirements through enhancing education, social, economic and cultural well being of the community of Suna.
- iii) To promote, assist and encourage the grant acquisition, establishment and development of quality health services and facilities in the area.
- iv) Promote and encourage the development of the small-scale industries in the area in cooperation with the relevant authorities, public as well as private so as to provide employment to youths.

- v) To promote, assist and encourage the provision of continuous and quality water supply in the area.
- vi) To encourage and promote the provision of quality electricity supply in the area.

1.4.2 Activities

SCDA has not done much in its area of operation in terms of implementing project activities. However, to some extent, SCDA has been providing the following advisory services to the community:-

- i) Hygiene promotion,
- ii) Mobilization of own resources (paying membership and related fees as per constitution), etc.

1.4.3 Suna area.

Suna is not the residential settlement in Dar es Salaam city that has developed out of a Master Plan prepared by the Ministry of Lands, Housing and Human Settlement Development. Suna is one among the eight Streets at Magomeni ward, which is in Kinondoni Municipality.

The weather is of tropical coastal climate, typical of Dar es Salaam City. The annual mean temperature is 26°C and annual rainfall is over 1000 mm, mainly inhabited by low-income people. Predominantly poor roads, poor drainage and a high ground water table.

1.5 Assignment.

Problem Statement

On 20th October, 2003, the author began his engagement with the CBO (SCDA):

- i) To provide the host CBO with technical assistance leading to developing a proposal to address the problem of poor sewerage system (need for sewerage system).
- ii) To provide the author with a friendly environment for learning, developing and practicing skills and techniques leading to improved skills in project management (effectiveness).

1.5.1 Rationale.

Urban environments in many developing countries are increasingly degraded due to rapid population growth and urbanization coupled with unprecedented economic and industrial development activities. Dar es Salaam City in Tanzania is one of the cities that face similar problems (Mbuligwe, S.E. UCLAS, 2001). With population currently estimated at over 3 million and a growth rate of more than 7% with inadequate infrastructures, Dar es Salaam City's environmental conditions as far as sanitation facility is concerned need revamping despite remarkable efforts expended in the recent past.

Much more efforts have been observed in the approaches adopted in solid wastes or garbage collection. However, liquid waste (sullage and sewerage) poses a threat in this part (Suna) of the City and thus calling for further efforts that now need to be directed towards new sanitation initiatives (Simpson-Herbert. et al, 2001).

Most housing plots at Suna are of high-density category, and the area has no adequate and defined safe disposing of liquid waste (controlling sullage and sewerage) other than frequent mechanical emptying which is quite expensive and leaves the community in abject poverty as well as wastewater uncontrollably scattered all over the roads and around homesteads (Master-Plan, Kinondoni Municipal Council, 2000). Thus poor sanitation (due to lack of sewerage system is the root cause all sanitation related problems at Suna community. This is the problem this project is addressing at Suna Community through Suna community Development Association (SCDA). This project emerged from needs assessment that was conducted by the author together with the community as well as the CBO members.

1.5.2 Objective of the project.

1.5.2.1 General objective.

General objective of the project was to support SCDA both technically and institutionally enough to enhance the CBO's service delivery capacity to Suna community.

1.5.2.2 Specific Objectives.

The specific objectives of this project are:-

- i) To mobilize enough funds both locally and externally, for improvement of a community sewerage system at Suna community.
- ii) To construct a community sewerage system that would connect all 1,000 Suna houses to Central Sewerage System that conveys liquid wastes to main outlet or sea.

Chapter 2. LITERATURE REVIEW.

2.1 Theoretical Review.

2.1.1 Global context for sanitation.

Sanitation is defined as a process whereby people demand, effect and sustains a hygienic and healthy environment for themselves, their family members and their community (UNICEF 1997). Improvement of environmental sanitation and hygiene behavior involves changes

At the eve of Millennium, despite all progress reported worldwide in recent decades, more than 1.3 billion people still live without access to sanitation facilities and are unable to practice such basic hygiene as washing their hands with soap and water. Diseases related to poor sanitation because many people to fall ill or even die (WEDC, 1998). Children are the most vulnerable to health hazards and consequently are affected the most.

Likewise, poor sanitation has led to infestation of nearly a billion people worldwide and thousands in Tanzania, largely children, with a variety of worm infections, with its corresponding costs in health and energy (Suzanne, et al. 2000)

While the impact of poor sanitation and hygiene is known to be disastrous for community, it also has an important impact on health especially on children both at and out of school (Werner, 1993). It is thus obvious that lack of sanitation and hygiene is a public disaster that deserves urgent interventions.

2.1.2 Urban sanitation needs.

The health burden borne by those without sanitation facility or adequate sanitation facilities worldwide is huge. It is estimated that about 12,000,000 people die each year worldwide from water borne diseases, including 4,000,000 children under the age of five who die from diarrhea alone (WHO, 2002).

Further more, 80% of morbidity in developing countries is due to water and excreta related diseases. The figure is applicable for both rural and urban settings, though children in urban settings are at highest risk. Major reasons behind this include, (i) variation in technological options for sanitation, (ii) communal and individual sanitation systems facing the problems of operation and maintenance, (iii) high level of poverty to meet the costs of adequate sanitation facilities and related inputs.

2.1.3 Sanitation coverage.

Sanitation coverage is defined as the number of people or number of households or the percentage of the total population or households that have places set aside for excreta disposal (Narayan, D. 1989). According to WHO, Tanzania has sanitation coverage of 93% and 58% in urban and rural settings respectively. The coverage is far better than many other states in the Sub-Saharan countries although still many households in rural area still go without sanitation facilities. Dar es Salaam and particularly Suna Area, coverage is almost 100% that is, every house has place for disposal of sludge.

Full coverage was planned in 2000 under the WHO health for all programme, however the target could not be attained and instead encouragement of hygiene awareness for all and total latrine coverage for high-risk areas (WHO/SEARO, 1993).

These high-risk areas are, (i) surface water, which is used for drinking, (ii) high population densities are combined with poor sewage disposal facilities and (iii) there is high incidence of excreta-related diseases.

It is sometimes assumed that major cities like Dar es Salaam are fully sewered. However, this is not always true as many world cities, particularly in least developed countries whose large part of the population is not connected to sewers and hence limiting appropriate sanitation coverage (Morgan, 1990).

Appropriate sanitation is that which meets the needs of people in the best possible way in relation to the resources available and other aspects of the local situation. This includes:-

- i) People's needs for privacy, convenience and health,
- ii) Resources include availability of space, skills and above all finance, and,
- iii) The local environment resources and cultures including climate, the soil, surface and underground water, traditions, religion, culture, hygiene awareness, and proximity of other people, leadership patterns and the institutions serving the people.

However, so many communities, satisfactory sanitation simply means clean pit latrines (Bellard, Brian, 1981).

In many places in Dar es Salaam, the population has continued growing very fast while sanitation provision in terms of adequate sewerage systems have remained critically an unresolved issue (Urban Health Project, UHP, 2001). This has continued posing high health peril, especially in this part of the city where this report distinctively spotlights. Sewerage has often been affected by lack of adequate infrastructure to convey the refuses to the sea.

2.1.4 Improving health.

Good sanitation is often linked with safe drinking water, as both reduce risk of disease transmission and particularly contribute to the health and well being of children and the rest of the families. Privacy is very important, particularly for women. In addition to privacy a good sanitation provides convenience. However, with the limited resources available from internal and external sources, the lowest reasonable cost is appropriate if sanitation coverage is to be increased (Amoaning-Yankson, 1983)

Environmentally, excreta are a valuable land conditioner and fertilizer particularly in developing countries.

Also, excreta derived humus is better for the soil than artificial fertilizer (Bellard and Brian, 1981). But not if excreta is associated with high health risks in developing countries like Tanzania. Thus, appropriate methods of disposal can secure both health and environmental benefits.

2.1.5 Problems in wastewater.

Unless adequate measures are taken, the provision of or improvement of a water supply can even contribute to increasing disease in communities because more wastewater is produced (WHO, Geneva, 1992). Also, pools of sullage in lanes or open drains may provide breeding sites for mosquitoes (culex) that cause elephantiasis.

2.1.6 Disposal of human wastes

Disposal of human waste is a major environmental concern everywhere as in Dar es Salaam and of course at Suna area, where the project is located. Where there is sewerage, the volume of wastewater discharged to streams, rivers and the sea continually increases (Cairn cross and Sandy, 1992).

2.1.7 Sullage disposal.

Sullage is all household wastewater except wastewater from toilets; it is sometimes called grey water, and toilet wastewaters are termed as backwaters (Winneberger, 1974). The volume of sullage produced depends on the type of water supply. Urban households relying on hand carried water supplies (from public taps or wells) consume around 20-30 liters per capita per day (lcd), though this depends on where clothes are washed.

Sullage needs to be disposed of hygienically as it is only slightly less hazardous than other wastewater, and it can encourage mosquito breeding. Other hazardous materials that also need to be taken care of are that associated with detergents or soaps. Some have chemical remains that can be harmful to environment if left uncontrolled.

Households with VIP latrines or PF toilets need to dispose of their sullage separately as these systems are not designed for sullage disposal. Often it is simply discharged into the alleyway adjacent to the house, but this is clearly undesirable. The result is a fairly steady stream of which eventually drains to natural drainage channel. A more appropriate solution is to discharge the sullage into a hydraulically well-designed storm water drain, or into a sullage soak away.

2.1.8 Pit and latrine emptying.

As an alternative to digging a new pit, a pit may be emptied. The practice of manually emptying single pits as soon as they are full involves serious health hazards. Nevertheless, manual emptying is quite usual. Where suitable equipment is available, lined pits can be emptied mechanically.

Some accumulated solids may be lifted by jetting with water or agitating the contents with tankers used for emptying septic tanks and road gulleys are generally not

Some accumulated solids may be lifted by jetting with water or agitating the contents with tankers used for emptying septic tanks and road gulleys are generally not powered enough to completely empty pits. A pit is easier to empty mechanically if the contents wet, e.g. VIP latrine with soak away, (Drews, 1998)

2.1.9 Sewerage disposal - Removal systems, septic tanks and aqua privies.

Sewerage is an 'off site' method of dealing with excreta, as opposed to pit latrines, composite latrines and septic tanks where excreta is dealt with 'on site' or 'on plot' and only the sludge or dry solids may be removed and taken off site. Conventional sewerage is high cost, but some off-site systems are low cost. Low cost off site systems is rarely satisfactory, (JICA, 1997).

The systems of collection include the traditional container system, which is no longer used as it exposes collector to serious health hazards.

This was termed as 'night soil collection' as it is often carried out during the night. The other is called chemical toilets (chemical closets), which have containers in which a sterilizing liquid prevents nuisance from odor or flies (Perret, 1985)

The vault is another removal system, which is watertight chamber or tank under or close to a seat or squatting slab (Box et al, 1993) Scoops or buckets and the excreta taken in barrels, carts or tricycles may periodically empty vaults, or vacuum tankers may empty them.

2.1.9.1 Vault and tanker system.

A mechanized form of conservancy known as the 'vault and vacuum truck' and vault and tanker' system is widely used to remove excreta in many countries especially in the Far East. The vault is emptied by a vacuum truck every three weeks or so. Vault/tanker system is suitable for urban areas where access by tankers is possible and trucks can be properly maintained (Edwards. 1992)

2.1.9.2 Cesspit.

These are largely watertight vaults for storage of sewerage, usually from WCs in individual houses. Vacuum tankers remove the contents periodically or when the cesspits are full. However, the need for regular emptying makes cesspits a very expensive form of sanitation. These are overhung toilets that are often built with a hole in the floor so that excreta fall into water underneath. They are particularly in the coastal areas and swamplands where dwellings are elevated on poles. Often water into which excreta falls is used for washing, drinking or other domestic purposes, either close to the latrines or downstream. They are then considered as health hazards (Duncan, 1996).

2.1.9.3 Conventional septic tanks.

These are watertight chambers that receive sewage from drains or sewers, usually from a single building or a group of nearby buildings. These are normally rectangular chambers, usually sited just below ground level, in which household wastewater (toilet wastewater and sullage) is retained for 1-3 days. Most commonly they are constructed in brickwork or block work and rendered internally with cement mortar to ensure water tightness. During this time the solids settle to the bottom of the tank, where they are digested anaerobically.

Although digestion of the settled solids is reasonably good, some sludge accumulates and the tank must be dislodged at regular interval, usually once every one to five years. The effluent from septic tanks is disposed of either on-site or taken off-site by settled sewerage. Although septic tanks are most commonly used to treat the sewage from individual households, they can be used as a communal facility for populations up to about 300 (Perkins. 1989).

Grease and other light solids form scum, which in time may become quite hard. About two thirds of the heavier suspended solids in the sewage settle and decompose anaerobically, giving off methane and other gases and leaving a residual sludge. The sludge has to be removed from time to time. The liquid in a full septic tank (after settlement of sludge, flotation of scum and partial treatment in the tank) passes out of the tank as an effluent. Over time the effluent of flow is 'attenuated'. When a WC is flushed or a bath or sink is emptied the sewerage enters the tank as a surge but leaves it slowly as a trickle.

Even though scum and sludge have been removed, the effluent carries a high load of microorganisms, which may include pathogens. It is also 'septic' because it has no dissolved oxygen. The effluent usually soaks into the ground from a soak pit or drainage field (Lee, 1985)

2.1.9.4 Advantages of septic tanks.

Well-designed, constructed, operated and maintained septic tanks have the same advantages as sewerage, except that septic tanks do not usually deal with wastewater from industry. The main disadvantages of septic tanks are that they are very high cost, they have the same water requirements as sewerage, sludge must be removed periodically to reduce blocking of soakage pits or drain field and there may be pollution of groundwater (UNDP, NY, 1988)

2.1.9.5 Conventional sewerage.

Conventional sewerage consists of system of pipes called 'sewers' that take waste away from WCs, baths, kitchen, etc. The system is also called 'waterborne sanitation' or 'water carried sanitation' (Pickford and John, 1980). The cost of conventional sewerage system is very high, up to ten times that of on-site sanitation.

Under this system, the liquid flowing in sewers is known as 'sewage'. Sewage is carried in the sewers to a treatment plant works or through an outfall into a body of diluting water such as a river, lake or the open sea. Unless there is adequate treatment (such as provided by a well-designed and well maintained waste stabilization system) the receiving water will be polluted (Sinnatably. 1980)The high cost of sewerage is its greatest disadvantage. There is also the problem that it requires a lot of water for flushing particularly to places like Suna where piped water is both scarce and/or supply is intermittent. With such limited supply of water it then becomes impossible to operate the sewerage system quite efficiently.

2.1.9.6 Advantages of sewerage.

The following are some of the advantages of sewerage, (i) sewerage is very convenient for the users, who have nothing more than to keep the pan clean and operate the flush mechanism, (ii) very low flush risk, (iii) devoid of nuisance from bad smells, flies or mosquitoes and (iv) sullage (waste water from bathing, washing and laundry) can also be discharged to sewers.

2.1.9.7 Disadvantages of conventional sewerage.

The following are the disadvantages of convention sewerage; (i) high cost, (ii) the demand of continuous reliable piped water supply, (iii) construction is difficult especially in congested high-density areas, (iv) unsuitable for self-help (v) needs pumping especially in flat areas, (vi) difficult maintenance and (vii) pollution concentration. Sewerage is easier to construct and operate in places where the ground slopes. Sewers then follow the natural fall of the land flow is 'by gravity' to the main outlet. In fact land, which is better for building cities, sewers gradually have to become deeper to give this necessary slope.

outlet. In fact land, which is better for building cities, sewers gradually have to become deeper to give this necessary slope.

After some distance sewers become so deep that excavation is excessive. Then the sewage has to be lifted by pumps of some kind, with increased costs and more trouble with operation and maintenance (Black, 1994).

2.2 Empirical Review.

Despite the fact that there was not much previous work done in the aspects of sanitation in Tanzania, particularly on liquid wastes, the University College of Lands and Architectural Studies (UCLAS) somehow managed to research and experiment in solid in nearby areas. The result of their work that was published in UCLAS Journals (Mbuligwe, 2001), indicated and hence recommended further research in the area including expanding coverage in liquid wastes which is major environmental pollution and hazard in many parts of the Dar es Salaam City. Also, the Rural Water Supply and Sanitation Programme, which is was initially piloted in three districts of Rufiji (Coast), Mpwapa (Dodoma) and Kilosa (Morogoro) and later expanded to nine more districts of Kongwa, Kondoa, Manyoni, Singida Rural, Iramba, Igunga, Morogoro Rural and Handeni has yet to provide realistic results that could be documented for learning purposes as well as for replication and expansion. However, preliminary results were mentioned to be positive to the extent of motivating funders and other stakeholders to join hand in its implementation. The community should be educated that Solid Waste Management is an individual's duty and not some other organs (e.g. government). The general attitude that the government should take care of the environment should be change to community self-reliance. Solid Waste Management in a community should be a result of individual's efforts in cleaning his/her environment.

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Poverty.

The contribution of poverty towards improper Solid Waste Management was explored. It was revealed that contributes greatly into improper Solid Waste Management as poor people have limited time and resources to invest in the waste they produce but they would rather devote much of their time to struggle for survival. Hence, the states of underdevelopment circumscribe the limits of resources available for environmental protection.

Plastic Wrapping is another issue. It is observed that the increased use of plastic wrapping bags in the shops; markets and supermarkets pose a potential problem in Solid Waste Management since these plastics do not undergo decomposition. It is proposed that recycling methods of these plastics should seek.

Data and information.

This information concerning Solid Waste Management lying about in scattered offices that would be useful when analyzed and used to plan Solid Waste Management systems. It is again observed that data banks should be started within Municipalities to facilitate easy use of them for planning and implementation of Solid Waste Management programmers. Data such as how many people, markets, institutions, waste generated, income tax, prevalent diseases (endemic and epidemic) and so on. This should be collected in each municipality and stored. Due to lack of data no proper allocation of meager resources available to issues of priority. Waste Management. Presently Solid Waste Management is under the preventive health department headed by the Health Officers in each towns and municipals.

A Town plan has concern also. It was further observed that solid waste management systems are by en large affected by town/city plans and that the on going trends of unplanned housing in towns/municipalities pose a future environmental catastrophe. It was further observed that proper waste disposal systems should take precedence in plots allocation in urban areas.

City/Town planning should accommodate Solid Waste Management interests that is, width of the streets and location of various functions such as markets. Narrow streets and (unplanned) squatter settlements greatly hamper easy movement of solid waste collection vehicles. Location of markets in the heart of the city pose Solid Waste problems as vehicles have to go through long queues to ferry solid waste with inadvertent reduced efficiency.

Political awareness is important in such a way that the politicians must be sensitized on Solid Waste Management and be well informed about the role it plays in the environment and public health. Local government leaders should among other things is chosen on the merit of their ability to facilitate Solid Waste Management in their areas.

In order the population to have a sense of responsibility, the beneficiaries of Solid Waste Management programmers should contribute for the services rendered and the money collected should spend for development (improvement) of the services. Free services should be discouraged as this erodes the spirit of individual responsibility. And therefore the following measures must be of very much concern;

Involvement of a private sector in solid waste management will improve efficiency and accountability, the private sector should be involved through contracts in every Municipal and Municipal authorities should in turn assume a supervisory role (act as a client) that

should represent the people. The contractor either, should be allowed to collect revenue or should be paid by the municipal authority.

Change of attitudes of communities and minds toward solid waste management to accommodate new ideas should be changed through continuous public awareness and campaigns. It is observed that people do not cherish improper solid waste management but rather they lack a leader with proper vision, for example, experience has shown that people are ready to contribute towards solid waste management when well educated.

Decision makers such as politicians should well sensitize and educated since the decision they make affect solid waste management programmers.

A change of perspective towards active population involvement is also important.

Waste recycling is important in solid waste management as a mean of reducing the bulk of solid waste. Recycling is not only for an income generating activity but it also makes an employment opportunity and conserves the environment. It is however, cautioned, that though recycling is to be fostered it should be controlled to minimize risks.

Environmental impact assessment for solid waste management problems which are often as a result of unforeseen planning and lack of mitigation measures in many projects must be considered. It is in this understanding that, while many projects are started with a goal of improving the economy, the effect to the environment is always left in oblivion. As a step towards sound environmental management it is proposed that no project should be allowed to start without having an environmental impact assessment. Statement endorsed by an authorized body.

Vehicles in urban centers are brought about in the markets as container for goods brought from the farms. As a mean of producing the wastes, the vehicles that bring in goods should be used to take away the containers back to the farms.

Hazardous wastes must have much attention in solid waste management programmers. Hence much damage must have been inflicted on our population. A call for special attention to hazardous waste management is called for.

There are conflicting interests between the central government, local government and politicians in implementing (enforcing) the laws pertaining to solid waste management. The researcher underscores the need for a clear demarcation of powers between the central government and local governments in enforcing and instituting the laws pertaining to solid waste management.

Municipal Domestic Solid Waste: These are waste arising as a result of domestic activities including food preparation, sweeping, cleaning, fuel burning, gardening and recreation.

It also includes junks such as old clothing, old furnishing, obsolete appliances packaging and reading matter.

Hazardous Solid Wastes: These cover a wide range of chemical and biological wastes. Mostly originating from chemical substances in industries, pharmaceutical expired and obsolete chemicals, and in hospitals.

Industrial solid wastes: Wastes from processing, manufacturing and non manufacturing industries and utilities. The waste type ranges from packaging materials, food wastes, plastics and textile.

Rapid urbanization and slum development:

There is a rapid urbanization in Tanzania that doubles in each decade. In this development, solid waste is inevitable generated and hence a need for proper management to have a sustainable development

Coupled with the problem of rapid urbanization is the major problem of slum development, which causes even a wider problem to urban planners and implementers, as collection of solid wastes, among other services, is impractical. If any sustainable development has to be

achieved, the physical plans and their realization must take into consideration this state of affairs.

Knowledge of the sources and types of solid waste, along with data on the composition and rates of generation, is basic to the design and operation of the functional elements associated with management of solid wastes.

All decisions on solid waste collection, transportation and disposal cannot be made without knowledge of generation, density and composition, because collection, transportation and disposal of solid waste depend on each other.

Collection.

Most of cities and towns in Tanzania are facing problems of a similar nature on solid waste collection system. Facilities for collection are few and of poor quality. There are not adequate dustbins, waste bags and other collecting equipments. In places where this equipment is found, still there are not in proper shape for use. In some areas like market places, the generating rate is far greater than the collection capacity of vessels, which in turn lead to overload and re-scattering of wastes.

Increase of transportation and collection vessels' capacities are the alternative to address that situation. There had been a problem in maintaining collection vessels. Once installed at a point, no one cares for their maintenance, resulting into collection vessels being stolen, destroyed and later abandoned. The waste collectors lack some protective gears. Folks, glove, face masks, boots and proper garments are not supplied to solid waste collection laborers. The laborers are at risk of contracting dangerous diseases like diarrhea, tetanus and others. A little amount of solid waste is being collected. This is due to limited collection facilities as well as transportation facilities as it was said earlier above.

Transportation.

The wastes that have been collected are transported to secondary collection point and later to disposal sites. Transportation of wastes in urban centers has been a problem for many years.

The waste trucks are few and not all are in operation.

The maintenance cost of trucks is high and most municipal centers cannot afford to maintain such trucks. For instance Dar es Salaam has got about 30% of its waste trucks in operation.

The collection and transportation of waste are not sustainable activities in most municipal centers. Trucks are deteriorated and abandoned without replacement. The services for vehicles such as spare parts, fuel and other charges are not available. The poor condition of our roads contributes highly to deterioration of the trucks. Roads in many towns are rough with severe bumps and potholes. These roads are not proper especially for heavily loaded waste trucks. In some unplanned areas, the trucks cannot even penetrate easily to where wastes are collected. The trucks being used for other business could as well contribute in magnifying the problem. The proper coordination of the trucks is the basis of efficiency in the first place.

Disposal.

The waste disposal sites have become a problem in many towns in the country. Waste is dumped rather than disposed off in haphazard manner. Few of the disposal sites are organized and even those, still there are considerable limitations. The disposal sites accommodate all types of waste from the town irrespective of nature of that particular waste. It is common to find a mixture of hazardous waste, say obsolete chemicals dumped together with normal domestic waste. In many cases, even hospitals waste is dumped together with domestic waste. In principle there is a great need of separating and treating different types of waste differently at disposal sites to avoid dangerous with a number of scavengers. Scavenging is done in poor conditions; there is no adequate protection to scavengers.

In that case the risk level of contracting diseases is quite high. The general factors causing the operational inefficiencies include;

Inadequate and inefficient waste's loading/unloading facilities.

Solid waste collection is done manually using shovels and collected by worn out matenga (baskets made locally from wood sticks or similar materials). This problem can be reduced if the community collects waste in small containers of about 50-100 liters that can easily be emptied to reduce the collection time. The organization of such systems depends on community education by the municipal council particularly in residential areas. In markets, business and industrial centers large containers are preferable for example, the mechanized hauled container system. Few hauled container systems were introduced in the past for collection and transportation of wastes in market areas but due to poor management the system collapsed even before their efficiency could be evaluated.

Lack of incentives and protection gear such as boots, gloves, etc. to refuse handlers.

According to some solid waste collection crews the supply of most of the protective gears ceased far away back.

Narrow access road to waste storage places, especially in city centers, the most sensitive area.

With the traffic congestion during the day compounded by poor road conditions, the collection of wastes is rather difficult and takes a long time. It would have been easier to collect wastes during the night and where feasible during the weekends because these are periods of low traffic. Collection of solid wastes in the night may also face serious opposition from the residents on security grounds, and this factor is further compounded by lack of street lights in most parts of the city and none at all at the dumping site. Putrescible organic wastes however, require frequent collections of every 2-3 days particularly in tropical climates where wastes ferment quickly and then stink. Weekly collections are feasible only for inert wastes. Another feasible option is the use of small size truck such as 5 ton compaction type

truck which is relatively easily maneuverable than large trucks currently in use. This means that the relative distribution of type of collection truck is also important.

Too many small collection points in towns. This means that much is wasted maneuvering collection trucks between storage stations.

Irresponsibility is in most cases a reason for operational inefficiencies. It is not uncommon to see solid waste collection trucks being used for other campaigns unrelated to solid waste management while solid wastes are left piling up in town streets.

Storage containers are simply lacking in most parts of the urban centers and thus creating the atmosphere that forces inhabitants to throw garbage randomly. The consequences of inadequate collection containers are mainly:

Crude storage of solid wastes which is case of organic wastes poses a risk of spreading gastrointestinal and parasitic diseases, primarily caused by proliferation of insects and rodents.

The efficiency of refuse collection will be reduced because;

The collection crew will spend more time and energy collecting refuse.

Since the refuse is exposed, during the rainy reason, refuse moisture content will increase making it heavier and cumbersome to collect.

The insects and rodents around the collection point particularly flies will create the environment that is not conducive to refuse collection crew, who in most cases do not have any protective gear.

The provision of refuse collection containers is primarily not the responsibility of the municipal authorities except in special locations such as streets, markets, schools, hospitals, bus stand and areas under the authority of municipal council.

In other places it is the responsibility of the owner of the premises to provide suitable container(s) for collection of refuse. However, municipal councils must provide transfer

stations and must oversee that inhabitants provide suitable bin(s), container(s) to enhance efficient collection of refuse.

The hazardous waste management problem is not new and in fact waste disposal problems have plagued mankind since introduction of even the most rudimentary attempts at manufacturing. There is an obvious national as well as international dimension to the problem. Even though, unlike more convectional pollution problems, such as air or water pollution, hazardous waste problem tend to be more localized. However this is a potentially dealing with ground, soil and aquifer transfer situations and, therefore, while the extend of the transportation problem may not be great, it nevertheless cannot be totally discounted.

In fact one of the most serious problems is ground water contamination which is not only difficult to measure but difficult to predict, control and obviously remedy once it has occurred.

The other potential risk situation of importance to be considered are the transfer of hazardous waste from one point to another, common cases are from the point of origin to the disposal point. There is a concern with spills during transport and proper guidelines associated with the establishment of dump sites. Similarly, this transportation and disposal sitting problems is international in scope, since there have been numerous instances of countries generating hazardous waste and then transporting them to other nations for eventual disposal. Hazardous waste in Zanzibar Island for example, have been collected and transported to United Kingdom for final disposal.

The problems with inadequately treated or inappropriate disposal of hazardous waste can take many years to manifest themselves. Once manifested, remedial actions in extremely expensive, time consuming, and in some cases practically impossible.

The practical significance of this has to be emphasized as various hazardous waste management options such as reduction in waste generation, waste treatment and final

appropriate disposal techniques are considered. Identification and classification is important since it is the basis upon which various restrictions might apply.

Cost is undoubtedly a major consideration, either in system review, design, or management, capital and operating costs involved in actual treatment and disposal. It has been pointed out repeatedly in the media how tremendous the costs could be of reclaiming a hazardous waste dumpsite. All aspect of cost component should be considered when considering the development of an effective and comprehensive waste management system. Also included in these calculations is another very important factor: Public attitude and response to improper waste management practices. Such public reactions can well affects the position of individual companies in the market place with consequences such as adverse effects on marketing of goods and services and even effects on stock values. The logical outgrowth is the development of a team approach to hazardous waste management.

Assessment of Waste Situation.

Before we can device sensible action plan we must first have good idea of what the problem is, both in nature and in extent. Surprisingly this is often overlooked by national authorities who are in hurry to get on with building a control system. However, without firm evidence that there is indeed a problem we are unlikely to convince policy-makers to pass regulations and to commit money to build facilities. And without a good estimate of the waste sources we are in any case unable to design and build the disposal facilities that are needed. Surprisingly, good data on environmental impact are often difficult to find. This is particularly so with respect to the cost of health and other damage, the number of people affected, the value of natural resources destroyed, and so on. As such data exists should be put into an assessment report so as to document the size of the problem.

Such a report needs to keep its audience in mind. It should be simple, persuasive, must include costs estimates of damage; and draw some conclusions about immediate and future

risks. Assessment of waste sources is also complex than it first appears. Neither the type nor the quantities of hazardous waste are always immediately obvious. Paste waste surveys have often proven to be remarkably inaccurate while direct measurement are more accurate but also more expensive. Waste assessment has thus become a highly skilled exercise that requires time, patience, training and a high level of inter-agency and inter-sect oral cooperation.

In cases like our country where few data on waste sources exists, rapid assessment and inventories methods can be used to give a first estimate, and to provide a starting point for further and more detailed examinations.

Once the problem (environmental impact) and its origin (waste sources) have been identified, we can start to consider the options. It is however useful to first identify the administrative context in which the waste problem finds itself. This context includes those regulations that may already exist, the government agencies with responsibility for health and safety, the technical infrastructure and support service available. An important aspect is what is sometimes called a key player analysis that is, identification of those individual and agencies who may help or hinder in the eventual control of hazardous waste.

Experience from countries that have implemented hazardous waste management programmed in the past shows that it is necessary to act on several different fronts simultaneously.

In particular the following are indispensable:

Establishment of waste treatment and disposal facilities.

Legislation to set acceptable standards for waste handling facilities, and to require monitoring and reporting of waste operations.

And administration to enforce legislation, to monitor waste and to undertake some practical disposal operations.

Adequate infrastructure and technical support services such as waste transport contractors, analytical laboratories, consulting and design services, Training institutions, information services, data banks to monitor waste data and so on.

These elements are mutually interdependent, and have to be matched to the demand of each other. Accordingly, one often talks of the need to prepare a waste management strategy. In view of the ease with which waste can now cross borders, it is necessary for national strategies to pay regards to international developments in waste management, particularly concerning control over export/import of waste and of trade in secondary raw materials (waste sent for recycling or recovery)

The process of preparing strategy is as important as the contents. Each public consultation on proposals is essential, discussion with cooperating agencies and regular briefing of politicians are indispensable.

Even with such a consultative process success is not guaranteed, but certainly the absence of such a process has killed whatever chance of success there might have been for many programs which are technically sound. It is no longer true, that engineers and politicians can persuade the public of the merits of proposal on which the public has had no prior input. Public opposition can cause delay or even abandonment of projects that are inadequately presented.

The Cairo Guidelines and Principles for the environmentally sound management of H.W., UNEP, (1987) subsequently summarized the major consideration of a strategy, which were ultimately incorporated in the manual on the safe disposal prepared by UNEP, World Bank and World Health Organization in 1989.

The population growth and slum development. Existing situation in Dar es Salaam.

Dar es Salaam city is estimated to accommodate about 6% of the national population and by the end of next three decades about 10% of Tanzanians will be living in Dar es Salaam if the

tend remain uncontrolled. The population of Dar es Salaam has been doubling every 10 years. More than 50% of urban dwellers live in squatter settlement with very little basic amenities such as proper sanitation facilities, access roads, and solid waste disposal facilities and so on.

Solid waste generation rate.

Dar es Salaam city is estimated to generate solid waste at the rate of 2200 tons/day. About 62% of these wastes are generated in residential areas and another 15% from market areas. The remaining fraction is generated by the industries, institutions, commercial centers, hospitals, constructions and demolition works, street sweeping and car wrecks. The major fraction of the wastes is vegetables and putrescible matter, which accounts for 62% of the total wastes. These wastes contain organic matter that stinks when wastes decompose and must therefore be collected regularly.

Efficiency of solid waste transportation system. Several reports have shown that only about 17-36% of solid waste collection trucks are usually in operation at any given time.

The number of daily trips made by collection trucks to solid waste disposal site was 2.35 trips per truck per day in 1988, 1.30 trips per truck per day in 1992 and 2.51 trips per truck per day in 1996. A container truck was making 7.5 trips per day in 1998. To date the situation must have been more improved.

Number of truck trip was low primarily because of loading time and round trip travel time.

As a result only about 10% of the generated wastes were collected. This could be improved to 30% with the same number of trucks if the available capacity is effectively utilized.

Solid waste collection workers were loading 547kg/grew/day. As such one solid waste collection crew in German is doing a job which was done by between 8 and 32 DCC sanitary workers.

Solid waste collection crews did not have facilities required for handling solid wastes such as protection gear for example gloves, boots and so on. According to some solid waste collection crews the supply of most of the protective gears was stopped in 1973.

Incentive to workers was very low. Some workers say that they would work better if they receive monthly salaries of Tshs. 40,000 to 50,000/=. This was still below the proposed minimum wage of more than Tshs. 140,000/=

Disposal of solid wastes.

Dumping of solid wastes to date is still done in a poorly located site with inadequate facilities that are required for proper disposal of solid wastes.

Acquiring a land for sanitary disposal of solid wastes requires an extensive search, procedures and studies, which was not done at all for the existing dump site.

The Former dump site at Tabata was closed after Tabata residents took their case to the court and won in 1989.

Hazardous waste (e.g. heavy metals) and hospital wastes (e.g. syringes) are frequently disposed of haphazardly at the dump site. For example the concentration of copper, zinc and lead found in the leach ate from the former Tabata dump in higher than those of industrialized cities such as South Essex in United Kingdom and Hong Kong.

Tabata dump has not received any attention since dumping of wastes shifted to Vingunguti.

Vingunguti dump site is located close to residential areas, which may cause potential risk to health of nearby residents.

Allowing capable private companies and individuals to provide collection services through a process of interacting. This is now taking place in Dar es Salaam City Council (DCC), where the refuse collection contractors are authorized to collect both refuse and fees as clearly provided in the DCC (Refuse collection) by-law 1992. Of course, the aim here is to increase the capacity to collect and dispose off refuse. The application of this strategy has shown an

increase in waste collection efficiency. The willingness of the people to pay refuse collection fees to contractors coupled with the close supervision by the city authorities have contributed to this achievement.

Encouraging the community to participate in solid waste collection and management. For example in Dar es Salaam, a number of community based organizations (CBOs) and non governmental organizations (NGOs) have started participation in waste collection and creation of public awareness on proper solid waste management. Among the organizations are POCA in Sinza and Hanna Nassif Women Development Association.

Refuse recycling; where materials like waste papers, plastics, scrap metals and waste glass and so on, need not to be transported to final disposal site, but rather, to proper recycling.

The aim here is to increase life spans of refuse disposal sites. A demonstration organic waste treatment plant for biogas electricity (TAKAGAS) generation is underway.

Establishment of sanitary refuse disposal sites is yet another strategy which should be adopted. For instance in Kinondoni, there are Kinzudi and Kunduchi areas which are potential sites and efforts to acquire them are underway.

Another strategy is to enhance public health education. People should be educated or reminded on health rules and regulations, proper refuse storage disposal and concepts of privatization for example paying refuse collection fees from services rendered by contractors and the local government authorities.

In areas where no contractors or where contractors terminate contracts there is a need to strengthen a solid waste management team.

Rehabilitation and privatization of public toilets should be used as a way to control free ranging defecation.

Emergency clean-up campaign is another method-which should be adopted. This type of strategy proved success in 1992, where the then Dar es Salaam City Council increased the

removal of solid wastes amount to more than 400 tones per day. But then, the success came out because of good participation from the city authorities and residents to fulfill their responsibilities.

Law enforcement is applied as a strategy and is used as a last resort. In fact, law is used to regulate the society behavior by using expressly rules of conduct and good planned sanctions for non compliance with those rules. For a programmed social change, law is a very important device to facilitate such changes for example; government policies can only be implemented effectively when backed by legislation with explicit rules and regulations.

Collection and transportation.

Improvement on transportation facilities so that more round trips are made per truck per day is very important.

By making sure that, more than 80% of truck fleet is operative at any given time and work 7 days a week so as to collect close to 100% of all the refuse generated is also necessary.

Point in place a system whereby the human resource is properly paid (salaries and incentives) and supervised for an efficient collection and disposal of refuse is also demanded.

Assurance that trucks are filled to between 75% and 85% of the capacity so as to make a better use of the truck fleet available as recommended.

Transfer facilities.

Transfer stations are not recommended as they are expensive to maintain and they are not necessary as round trips are less than 40 km and that the trucks are small 7 to 10 tones which can maneuver in town to the dumps easily.

Recovery and recycling.

It is possible to generate bio-gas from the collected refuse. The gas can be used to run an electric turbine to produce up to about 10 MWh/day. The potential income to be generated from this exercise is about Tshs 414,350,000/=

A pilot biogas is planned at a cost of Tshs 4,000,000,000/-

There is a potential to recycle metals, glass, cardboard, paper and plastics from the collected refuse. There are a few factories which already are receptors of these materials as their raw inputs. What is left to be done is to institutionalize the process and enforce it by law.

Paying for the services.

Paying for solid waste management service would be difficult to organize but it should be paid for as any other service. However the city must be aggressive in educational campaigns so that the public understand and appreciate the essence of paying for the service. It is understood that a cultural change is necessary in this regard so as to keep the city clean.

In any case laws and by-laws enacted must be enforced so that enough is collected to sustain the system.

A fee of between Tshs 100/= and Tshs 150/= per month is suitable and can be afforded by many including the low income group.

Landfill site ownership and laws.

Landfill should be owned and operated by Dar es Salaam City Council. Collection of solid waste can be more collected by private companies who must pay fees for dumping in DCC's landfill(s), efficiently and effectively than it works now.

The landfill(s) must be organized such that solid waste of different strengths (toxicity) is separated such as hazardous wastes, hospitals wastes and non-toxic wastes.

Good governance by both local and central governments is important if the exercise is to be successful. Dar es Salaam City Council may have evolved itself on how the administrative authorities view the work to be done comfortably and successfully.

The main purpose of this topic is to look into the legal and policy interventions towards environmental conservation and protection in Tanzania.

2.3 Policy Review.

National Water Policy.

The government of Tanzania has among other things revised the National Water Policy (NWP) and with the World Bank support launched a Rural Water Supply and Sanitation Project (RWSSP) to test and implement revised policy principles. (National Water Policy, 2002) Through RWSSP, a framework for a sustainable national rural water supply and sanitation programme were developed by establishing an approach for district-based RWSS service delivery based on financial, technical and institutional principles contained in the NWP (RWSSP-Project Operational Manual, 2001).

The eased rural/urban water policy component emphasizes among other things:

- i. A demand responsive approach whereby communities chose service levels based on their perceived needs and ability to pay (*Environmental Impact Assessment and Checklist of Environmental Characteristics, 1997*),
- ii. An upfront contribution to capital costs and full financing of Operational and Maintenance (O&M) costs to foster ownership of the facilities,
- iii. Sustainability through involvement of the beneficiary communities in planning, design, construction and O&M with assistance of the district councils, NGOs and the private sector.
- iv. Maximizing health benefits by integrating water supply, sanitation and hygiene education (*MOWLD Water Supply and Waste Disposal Design Manual, 1997*).

National Environmental Policy.

The word **Environment** commands a very broad meaning. It includes: air, land and water; plant and animal life including human life; the social, economic, recreational, cultural and aesthetic conditions and factors that influence the lives of human beings and their communities; buildings, structures, machines or other devices made by man; any solids, liquids, gases, odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities of man; and any part or combination of the foregoing and the inter-relationships between two or more of them.

The lives of all Tanzanians are intimately connected to the environment: our survival and that of our future generations depends on the harmonious relationship with the natural elements. Tanzanians have no choice but strive to manage the environment and its natural resources in ways that enhance the potential for growth and opportunity for sustainable development of present and future generations. Tanzanians do not have the luxury of ignoring the fundamental stresses at the interface of development and environment. Environmental problems are real and are not someone else's problem. A healthy economy and a healthy environment go hand-in hand. Both are needed for our survival and prosperity.

There is a clear cause-and-effect relationship between poverty and environmental degradation. Environmental degradation leads to widespread poverty; equally, poverty is a habitual cause of environmental degradation as it undermines people's capacity to manage resources wisely.

Problems of underdevelopment such as poverty, ill health and others that plague the majority of Tanzanians are as much environmental as they are developmental. Environmental protection is therefore a social and economic necessity. It is an integral component of sustainable development. Correspondingly, sustainable development must be the central concept in environmental policy.

Satisfaction of basic needs is therefore an environmental concern of relevance to environmental policy. Investment in development is vital for environmental protection because the environment is the first victim of acute poverty, urban overcrowding, overgrazing, shrinkage of arable land and desertification. Resource channelling must be targeted to address poverty- related environmental problems. It must aim at eradicating communicable diseases, guaranteeing food, shelter, safe water for all, employment and income generation in rural and urban areas, particularly to combat poverty.

Sustainable development means achieving a quality of life that can be maintained for many generations because it is socially desirable, economically viable and environmentally sustainable. Development is sustainable if it takes place within nature's tolerance limits, both in the short and in the longer-term perspective. The challenge for all Tanzanians is to recognise the various demands made upon their environment, and reconcile these in ways which seek to maintain and enhance it for the future. Equally the purpose of development is to improve the quality of human life. Development is sustainable if it adequately addresses poverty in its broader sense as a composite index of human deprivation, extending from command over economic resources, access to education, food, shelter and energy needs, to control of the physical environmental quality. The challenge for the Government is how issues of environmental sustainability can be mainstreamed into the core of national development policy-making.

Tanzania is committed to sustainable development through short, medium and long term social and economic growth. The Government is currently undertaking strategies aimed at strengthening the financial base of social services through cost recovery; enhanced community participation and improved delivery systems and management of supplies.

The driving motive for economic and social change will put our country at an important crossroads, where difficult choices will have to be made in assessing trade-offs between short-term economic gains which foreclose future options, and the better based sustainable development goals. Both these choices have important economic, socio-political, ecological and ethical considerations. Given the increased role of the market and private sector, the role of the Government in steering social sectors in environmental management will have to be highlighted and pursued with the keenest interest. The Government will pursue explicit policy objectives which take into account these considerations.

Tanzania took an active part in the preparations for, and during the United Nations Conference on Environment and Development which enshrined the integration of environmental concerns and economic development in the Rio Declaration on Environment and Development, and Agenda 21. It is working closely with other countries in the Region and the International community to contribute towards a peaceful, healthier and better global environment for present and future generations. Tanzania has become a party, and is implementing a number of global and Regional Environmental Treaties, as a basis for global and regional cooperation in the pursuit for sustainable development. It is host to important sub-regional programmes and projects conceived and implemented in concert with neighbouring countries, as a basis for harmonised management actions and approaches, and as a form of preventive diplomacy.

Agenda 21 stresses the need to move from a development model in which sectors act independently of each other, to a model in which there is integration across sectors, where decisions take into account inter-sectoral effects, to improve inter-sectoral coordination. This involves the integration of policies, plans and programmes of interacting sectors and interest groups to balance long-term and short-term needs in environment and development.

It calls for a coherent policy where priorities can be defined for the promotion of long-term economic growth, creating incentives for sustainable utilisation of natural resources, disincentives for environmental pollution and degradation, and effective management of the overall environment.

For Tanzania, therefore, the role of Environmental policy lies in providing for the execution of a range of strategic functions, notably: -

- a. Development of consensual agreement at all levels for the challenge of making trade-offs and the right choices between immediate economic benefits to meet short-term and urgent development needs, and long-term sustainability benefits;
- b. Development of a unifying set of principles and objectives for integrated multi-sectoral approaches necessary in addressing the totality of the environment;
- c. Fostering Government-wide commitment to the integration of environmental concerns in the sectoral policies, strategies and investment decisions, and to the development and use of relevant policy instruments which can do the most to achieve this objective; and
- d. Creating the context for planning and coordination at a multi-sectoral level, to ensure a more systematic approach, focus and consistency, for the ever-increasing variety of players and intensify of environmental activity.

Since environmental policy involves many sectors and interest groups, its scope is necessarily broad, and the logistical demand for overseeing its implementation and ensuring coordinated attention to interconnected challenges is complex. The challenge is to ensure that all concerned take priority actions on all the main fronts; and that their actions are mutually supportive, reflecting a mission commonly subscribed to, by all.

This means that the environment must be subjected to greater accountability and control, with more effective instruments having clear objectives to be pursued. It means strengthening the functions of government and the corresponding institutions in environmental protection

The state of the environment.

The current state of the Tanzania environment is a matter of concern. A national analysis has identified six major problems for urgent attention. These are problems of: -

- i. Land degradation;
- ii. Lack of accessible, good quality water for both urban and rural inhabitants;
- iii. Environmental pollution;
- iv. Loss of wildlife habitats and biodiversity;
- v. Deterioration of aquatic systems; and
- vi. Deforestation

Each of these is important to the economic well-being of the country and the health of the people.

To expand on the above problems, it is appreciated that: -

- i. Land degradation is reducing the productivity of soils in many parts of Tanzania;
- ii. Despite considerable national effort, over half the people in towns and in the countryside do not have access to good quality water for washing, cooking, drinking and bathing;
- iii. Pollution in towns and the countryside is affecting the health of many people, and has lowered the productivity of the environment;

- iv. The loss of habitats for wildlife is threatening the national heritage and creating an uncertain future for the tourist industry;
- v. The productivity of lake, river, coastal and marine waters is threatened by pollution and poor management; and
- vi. Tanzania forest and woodland heritage is being reduced year by year through clearance for agriculture, for wood fuel and for other demands.

The reasons for the current deteriorating state of the national environment include: inadequate land and water management at various management levels; inadequate financial and human resources; the inequitable terms of international trade; the particular vulnerable nature of some local environments; rapid growth of rural and urban population and inadequate institutional coordination. These factors together are creating undue pressures on natural resource systems. Other important factors include inadequate monitoring and information systems, inadequate capacity to implement programmes, inadequate involvement of major stakeholders (e.g., local communities, Non-Governmental Organisations, the private sector) in addressing environmental problems, inadequate integration of conservation measures in the planning and development of programmes.

These environmental problems have evolved over a long period of time, and are dispersed throughout the country.

Although the costs relating to these problems cannot be quantified because of lack of data, the economic and social costs are high. It is understood that environmental degradation has had, and continues to have, adverse impact on the quality of human life and health.

A number of important measures have been initiated by the Government to promote political and economic change. Efforts are being made through economic reforms, to nudge the economic system towards a free market economy with increased role for the independent sector. The shift towards political pluralism, and the relinquishing by Government of the

major sectors of the economy to the private sector will generate important indicators on how natural resources are used and managed, on the impact on the environment of the enlarged involvement of social groups in the development process, and on the nature of policy directions and investment decisions relating to the environment and natural resources. Clearly, increased investments in various sectors of the economy will bear impacts on these variables. The restructuring and adjustment of the economy, including macro-economic changes, will impact on the use and allocation of natural resources, and on the environment.

1. During this economic transformation the Government views the agricultural and the industrial sectors, particularly tourism, mining and transportation infrastructure as the main impetus to economic growth. The Government is aware that, by promoting agriculture as the engine of growth, the sector could also bring forth significant adverse impacts on natural resources and the environment, in turn undermining further agricultural growth.

Expansion in agriculture could imply bringing more land into production from existing forests and woodlands, wildlife areas; draining wetlands; expanding irrigated agriculture, accompanied with Stalinization and water-logging; and/or increasing the use of agrochemicals, overdosing cropland soil and threatening the quality of surface and groundwater, etc.

Likewise the Government is also aware that the necessary "big push" on tourism, industrialisation and infrastructure will have implications for the use of natural resources and the environment.

Overall policy objectives.

The policy document seeks to provide the framework for making fundamental changes that are needed to bring environmental considerations into the mainstream of decision making in Tanzania.

It seeks to provide policy guidelines, plans and give guidance to the determination of priority actions, and provides for monitoring and regular review of policies, plans and programmes. It further provides for sectoral and cross-sectoral policy analysis in order to achieve compatibility among sectors and interest groups and exploit synergies among them.

2. The overall objectives of the National Environmental Policy are therefore the following:

- a. To ensure sustainability, security and equitable use of resources for meeting the basic needs of the present and future generations without degrading the environment or risking health or safety;
- b. To prevent and control degradation of land, water, vegetation, and air which constitute our life support systems;
- c. To conserve and enhance our natural and man-made heritage, including the biological diversity of the unique ecosystems of Tanzania;
- d. To improve the condition and productivity of degraded areas including rural and urban settlements in order that all Tanzanians may live in safe, healthful, productive and aesthetically pleasing surroundings;
- e. To raise public awareness and understanding of the essential linkages between environment and development, and to promote individual and community participation in environmental action.

Cross-sectoral Policies.

Addressing Poverty.

Satisfaction of basic needs is an environmental concern of policy relevance. Investment in development is vital for environmental protection because the environment is the first victim of acute poverty, urban overcrowding, overgrazing, shrinkage of arable land and desiccation.

Therefore, environmental policy has two pronged focus: satisfaction of basic needs; and protecting the environment in the cause of development. Resource channelling shall be targeted to address poverty-related environmental problems. Strategic attention shall be directed towards eradicating communicable diseases; guaranteeing food, shelter, safe water for all, sustainable energy supply; as well as employment and income generation in rural and urban areas, particularly to combat poverty.

A proactive policy objective of natural resource conservation oriented towards the reduction of the vulnerability of the poor shall be pursued. Sectoral policies and programmes to address poverty eradication shall take due account of need for sustainable resource exploitation.

Demographic dynamics.

Demographic factors and trends have a synergetic relationship with developmental and environmental issues. In any case, a rapidly growing population, even with very low levels of consumption per capita, implies increasing consumption in absolute terms. This affects the use of land, water, energy and other natural resources. The accompanying rapid increase in the number and size of urban centres also poses dramatic additional demands to the capacity to provide serviced land, shelter, infrastructure and employment.

In view of the multiple linkages involved, environmental policy objectives on population must have a broader focus than controlling numbers. Population programmes are more effective when implemented in the context of appropriate cross-sectoral policies.

Therefore, special emphasis should be placed on those policies that aim at multiple objectives. Such policies are those that combine environmental concerns and population issues within a holistic view of development, and whose primary objectives include the alleviation of poverty; secure livelihoods; environmental sanitation and health improvement.

In particular, the following policy objectives on population shall be pursued: -

- (i) Population literacy programmes, both through the formal and non-formal education sectors, with special emphasis on linkages with primary environmental care, primary health care, basic shelter, food security, access to secure tenure and infrastructure;
- (ii) Generation of socio-demographic information, and mitigation of the direct and induced effects of demographic changes on the environment, with respect to critical resources such as land, water and ecosystem health, taking account of community needs;
- (iii) Promoting awareness of the critical role of women on population and environmental issues through increased access to education, and expanding primary and reproductive health care programmes to reduce maternal and infant mortality, taking account of culturally-based information that transmit reproductive health messages, and ethical and cultural values.
- (iv) Empowerment of women is essential, and could be assured through education, training and policies that accord and improve women's right and access to assets, labour-saving measures and job opportunities.

Land tenure.

Resources which belong to everyone easily become the care of no one. The ownership of land and land resources, access to, and the right to use them are of fundamental importance, not only for a more balanced and equitable development, but also to the level of care accorded to the environment. It is only when people can satisfy their needs, have control of their resource base, and have secure tenure to land that the longer-term objectives of environmental protection can be satisfied.

Therefore, integrated land use planning, secure access to land resources, and the right to participate in decisions relating to their management shall be ensured.

Technology.

Science and Technology have a central role in the exploitation, processing and utilisation of natural resources, and in the resulting environmental impacts. The technology used has a bearing in the quality of a product and in the type and amount of the resulting waste and emissions.

Environmentally sound technologies in the context of pollution are "process and product technologies" that generate low or no waste, for the prevention of pollution. They also cover "end-of-the-pipe" technologies for treatment of pollution after it has been generated.

The primary policy objective shall be the promotion of the use environmentally sound technologies, that is, technologies that protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residue wastes in a more acceptable manner than the technologies for which they are substitutes.

The Principle of best-achievable environmentally sound technologies will be applied in all cases.

Biodiversity.

Tanzania prides itself for having outstanding biodiversity due to diverse ecosystems, topography and climate. It is one of the fourteen biodiversity hot spot countries in the world. The need to exploit this rich biodiversity sustainably is recognised. This situation places a responsibility for undertaking biodiversity actions that meet both the competing requirements of the present and the legitimate claims of future generations.

For this purpose, actions shall be focused on information generation towards a comprehensive overview of Tanzania's biodiversity resources, their status and trends, and the

costs and benefits of their conservation in order to provide basic understanding for the formulation of strategic interventions. Programmes for the conservation and utilisation of biological diversity shall be pursued to prevent and control the causes of significant reduction or loss of biological diversity. Strategic measures shall be put in place for the development of biotechnology, especially to ensure fair and equitable sharing of the results and benefits arising out of utilisation by foreign recipients, of genetic resources originating from Tanzania, and bio safety.

Biodiversity policies, strategies and programmes are only meaningful in relation to other national policies, strategies and programmes. Therefore, policies, strategies and programmes for the conservation of biological diversity and sustainable use of biological and genetic resources shall be integrated into relevant sectoral/cross-sectoral policies, strategies and programmes.

Public Participation and Education.

If sustainable development is truly to be our common goal, it must engage the interests and actions, not only of government experts, but of all Tanzanians in all walks of life. Environmental management must be everybody's responsibility. Everyone has the opportunity to make environmentally-responsible choices that can reduce or minimise their impacts on the environment and promote sustainable development. That responsibility can only be met through cooperative efforts at all levels of society. The actions of all Tanzanians as consumers and producers, as business operators and as policy-makers have an impact on the environment.

While actions of one person or group alone may appear insignificant, those of twenty-five million Tanzanians do matter when combined at local, regional and national levels. The protection of the environment shall be the responsibility of each and every Tanzanian, just as the quality of the environment is a concern for each and all.

Environmental issues are best handled with the participation of all citizens at the relevant level. It is widely recognised that interventions which are likely to have positive impacts are those which enjoy the greatest support from grassroots. It is also recognised that ideal interventions are those that are based on the people's own initiatives, and for which solutions are geared towards felt needs, thereby diminishing the gap between theory and practice.

Local level environmental action is in-situ, responds to specific needs which can change quickly, and is small. Environmental action by national institutions on the other hand is ex-situ, could be comparatively rigid, based in a large institution often in an urban setting, and is large scale. There is absolute necessity to exercise a bottom-up approach in problem identification, project planning, implementation and monitoring.

The major responsibilities of government institutions and non-governmental organisations at this level are to assist local communities become aware of their own situation and support them to become responsible for their own destiny. Local communities will participate if they are persuaded that it is right and necessary to do so; when they have sufficient incentive, and the required knowledge and skills. Environmental education and awareness raising programmes shall be undertaken in order to promote informed opinion.

Introduction of environmental education, particularly in primary and secondary school curricula creates an enduring awareness by inculcating values that support responsible environmental care and discourage attitudes that are incompatible with sustainable ways of life. This shall be undertaken.

Critical to the effective implementation of the policy objectives therefore will be the commitment and genuine involvement of all institutions and sectors of society. Formal and informal organisations in society, as well as grass-roots movements are partners in the implementation of Environmental policy objectives. The fundamental prerequisites for achievement of sustainable development is broad public participation in decision-making,

including the participation of individuals, groups and organisations in environmental impact assessment issues and in decisions, particularly those which potentially affect the communities in which they live and work.

Sustainable management of environmental resources and the need to continuously anticipate emerging challenges, requires availability of timely, up-to-date and accurate information. Generation, assembly and dissemination of information related to environmental management shall be ensured.

The Private Sector and NGOs.

The roles of non-State actors are vital in the shaping and implementation of participatory democracy. Non-Governmental Organisations possess diverse experience, expertise and capacity in fields relevant to the implementation of environmental objectives. The nature and the independent role they play are a major attribute and precondition of real participation.

The private sector, particularly within business and industry can play a major role in reducing the stress on resource use and the environment. There is increasing recognition that production, technological and management approaches that use resources inefficiently form residues which are not reused, discharge wastes that have adverse impacts on human health and the environment, and manufacture products that when used have further impacts and are difficult to recycle. Improvement of production systems through technologies and processes that utilise resources more efficiently and at the same time generate less waste; that reclaim, recycle and re-use by-products, to a very large extent is within the province of business and industry. By striving for optimal efficiencies at every stage of the product life cycle, good engineering and management practices and know-how; implementing self-regulations; and assuming greater responsibility in ensuring that their activities have minimal impacts on human health and the environment, Business and Industry can achieve more for environmental objectives with fewer resources.

The private sector and the community of Non-governmental organisations therefore offer a national network that should be tapped, enabled and strengthened in support of efforts to achieve environmental objectives.

In order to ensure that the full potential contribution of the private sector and Non-governmental organisations is realised, the fullest possible communication and cooperation between them and national and local authorities, and all institutions mandated to execute environmental objectives must be pursued. The private sector and Non-governmental organisations will also need to foster cooperation and communication between and among themselves to reinforce their effectiveness as major players in environmental activities. In order to achieve this objective they will need to establish their own mechanisms of cooperative networks to facilitate sharing of experiences and expertise for the planning, design and implementation of environmental programmes at national, regional, district and community levels

The Enhanced Role of Women.

Women are the natural resource managers in our society. Their knowledge, experience, and traditional skills in the management of resource stocks and households should be tapped for increased environmental action. The role of women in environmentally-related activities will be recognised and promoted with a view to achieving increased women's involvement and integration in all environmental management areas.

Empowerment of women is a critical factor in the eradication of poverty and effective participation of women in environmental activities. In so far as the productive potential of women is impaired by the disproportionate burden they bear in the management of household consumption and production, on account of gender division of labour, emphasis shall be placed on addressing the structural causes of poverty and reducing gender-based inequality within the overall framework of achieving environmentally sound development. Such

emphasis shall focus on literacy of women as a key element for the improvement of health, nutrition and education in the family, and for empowering women to participate in decision-making in society; as well as in anti-poverty programmes such as employment schemes and credit facilities for women, among other measures.

Sectoral Policies.

Environmental impacts of actions in one sector are often felt in other sectors.

This is why environmental goals, objectives and actions cannot be understood and framed in isolation from the development and policy sectors in which they emanate. Internalization of environmental considerations in sectoral policies and programmes, and their coordination is essential to achieve sustainable development.

Agriculture.

The main objective is to ensure food security and eradication of rural poverty through the promotion of production systems, technologies and practices that are environmentally sound.

The following specific policy objectives shall be pursued: -

- (a) Improvement of land husbandry through soil erosion control and soil fertility improvement;
- (b) Intensification and diversification of agricultural production;
- (c) Minimization of encroachment in public lands including forests, woodlands, wetlands and pastures;
- (d) Strengthening of environmentally sound use, monitoring, registration and management of agrochemicals;
- (e) Control of agricultural run-offs of agrochemicals to minimize pollution of both surface and ground water;
- (f) promotion of mixed farming, to intensify biological processes on farmlands through multiple cropping, intercropping, crop rotation and agro forestry;

(g) Improvement in water use efficiency in irrigation, including control of water logging and Stalinization;

(h) Intensification of wild and domesticated plant genetic conservation programmes; and

Livestock.

The main objective of the livestock sector is to stimulate development of livestock industry in the country taking due regard of the environment. In order to ensure sustainable livestock industry development, the following policy objectives shall be pursued: -

(a) Development and application of environmentally friendly tsetse fly control methods;

(b) Improvement and conservation of grazing lands and preservation of feed resources (promotion of planting of fodder crops, establishment of fodder banks, and stall feeding);

(c) Promotion of mechanisms for resolving conflicts among different land use interests (wildlife protection, forestry, pastoralist and agriculture);

(d) Restoration and protection of grazing lands, and promotion of rotational grazing;

(e) Management and control of the migration of livestock; and

(f) Implementation of animal genetic resource conservation programmes.

Water and Sanitation.

The environmental objective in the Water, Sewerage and Sanitation sector is to support the overall national objective of providing clean and safe drinking water to within easy reach, to satisfy other water needs, to protect water sources and to prevent environmental pollution. In order to achieve this, the following policy objectives shall be pursued:-

(i) Planning and implementation of water resources and other development programmes in an integrated manner and in ways that protect water catchment's areas and their vegetation cover;

(ii) Improved management and conservation of wetlands;

- (iii) Promotion of technology for efficient and safe water use, particularly for water and waste water treatment, and recycling; and
- (iv) Institution of appropriate user-charges that reflect the full value of water resources.

3. In respect of marine and coastal waters the policy objective is the prevention, reduction and control of pollution of the marine and coastal waters, including that from land-based sources of pollution.

Health.

The main objective here is to protect public health, not in the narrow though indispensable sense of curing diseases, but in the broad sense of promoting human well-being and informed participation in primary environmental care.

The policy objectives to be pursued are: -

- (i) Provision of community needs for environmental infrastructure, such as safe and efficient water supplies, sewage treatment and waste disposal services; and
- (ii) Promotion of other health-related programmes such as food hygiene, separation of toxic/hazardous wastes and pollution control at the household level.

Transport.

The transport sector shall focus on the following environmental objectives:-

- (i) Improvement in mass transport systems to reduce fuel consumption, traffic congestion and pollution;
- (ii) Control and minimisation of transport emission gases, noise, dust and particulates; and
- (iii) Disaster/spill prevention and response plans and standards shall be formulated for transportation of hazardous/dangerous materials.

Energy

The main objective is the sound management of the impacts of energy development and use in order to minimise environmental degradation. The policy objectives to be pursued are: -

- (i) Minimization of wood fuel consumption through the development of alternative energy sources and wood fuel energy efficiency;
- (ii) Promotion of sustainable renewable energy resources;
- (iii) Assessment and control of development and use of energy; and
- (iv) Energy efficiency and conservation

Mining.

The policy objective from an environmental perspective is the prevention, reduction, control and elimination of damage, and minimization of the risk thereof from the generation, management, transportation, handling and disposal of hazardous wastes, other wastes and emissions.

Much of the mining done in Tanzania is artisan and large concentrations of these small scale miners are found in gold-bearing areas. Large scale mining is also on the increase. The problem here is the use of mercury which pollutes water sources and is dangerous to health on account of its adverse effects on the human nervous system.

The following policies shall be undertaken to minimise pollution arising from the mining sector:-

- (i) Overall project cycle of mining (including reclamation and restoration of land after use) shall be adequately managed to minimize adverse environmental impacts;
- (ii) Mining discharges to grounds and water shall be controlled;
- (iii) Preventive and clean up measures for accidents shall be formulated and implemented;
- (iv) Air pollution from mining areas shall be controlled.

- (v) Strict regulations shall be put in place to control the use of mercury in mining activities, use of retorts will be promoted; and
- (vi) Regular and periodic environmental audits shall be maintained to ensure the adoption of environmentally sound practices in mining operations.

Human Settlements.

Urbanisation is the major issue in the transformation of human settlements. A major and growing portion of Tanzania's population will soon be located in urban areas. Urban centres are more and more subject to dramatic crisis; poverty, environmental decline, inadequate urban services, deterioration of existing services and access to serviced land and shelter are deprivations of increasing severity. The following policy objectives shall be pursued:-

- (i) Integrated planning and improved management of urban centres and designation of urban land uses based on environmental impact considerations;
- (ii) Decentralisation of urban development through the promotion of intermediate towns and trade centres, on the basis of a human settlement perspective plan at national, regional and district levels;
- (iii) Development of gardens, parks, open spaces in urban centres for public use; greenbelts with pollution tolerant species; and more generally, planting of shade-giving and fruit-bearing as well as ornamental trees along urban roads, school compounds, hospitals, government and private office building compounds, peripheries of play grounds, water bodies, places of worship, assemblies, markets, etc;
- (iv) Control of indiscriminate urban development, particularly in vulnerable sites such as coastal beaches, flood-prone and hilly areas;
- (v) Promotion of resource-based strategies in the planning and development of human settlements; and

- (vi) Development of environmentally sound waste management systems especially for urban areas.

Industry..

The policy objective with respect to environmental protection is the prevention, reduction, control and limitation of damage, and minimisation of the risk from the generation, management, transportation, handling and disposal of hazardous wastes, other wastes and emissions. The following policy objectives shall be pursued;

- (i) Industries shall be planned in a manner that minimizes adverse effects on the environment at all stages (i.e. location, effluent discharge, waste disposal, use and disposal of products);
- (ii) Industrial emissions shall be controlled;
- (iii) Application of environmental impact assessment (EIA) as an essential element in industrial planning and development for taking account of potentially harmful activities on the environment;
- (iv) Environmental audits/inventory shall be carried out for both new and existing industries for pollution control and waste minimisation;
- (v) Installation of resource-saving and waste-recycling facilities, use of clean technology and production of safe and less toxic products shall be promoted and supported;
- (vi) Workers health shall be adequately protected from environmental health hazards;
- (vii) A review will be made of laws, rules, and regulations governing importation, manufacture, transportation, handling, use, storage and disposal of toxic chemicals, and dangerous products, hazardous wastes and hazardous substances, as appropriate;
- (viii) Permissible noise levels in noise-prone industries and construction sites will be prescribed.

Forestry..

The main objective is the development of sustainable regimes for soil conservation and forest protection, taking into account the close links between desertification, deforestation, freshwater availability, climate change and biological diversity. The following policy objectives shall be pursued: -

- (i) Rational exploitation of forest resources accompanied with reforestation and a forestation programmes shall be promoted and enforced to meet requirements of domestic consumption and export earnings in a sustainable manner;
- (ii) Forest/tree cover shall be increased through a forestation; Proper management and law enforcement shall be practised for all public lands.

Instruments for environmental policy.

The environment is both a natural and a cultural heritage. It is appreciated that indigenous knowledge and culture have helped in the protection of the environment in the past. The present and future generations, therefore, can benefit from this knowledge.

Achievement of proposed policy objectives on the above sectoral and cross-sectoral environmental concerns suggests the use of the most effective means. Such means must ensure that the exploitation of natural resources, the direction of investment and the orientation of technological development are all in harmony and enhance both the current and future potential to satisfy human needs and aspirations.

Environmental Impact Assessment.

Although it is important to tackle immediate environmental problems, precautionary, anticipatory and preventive approaches are the most effective and economical measures in achieving environmentally sound development. Successful implementation of the

Environmental Policy requires the optimisation of goal achievement both within and across sectors.

In practical terms this requires finding the right balance between natural processes and unavoidable human interventions. Allowance can be made for human intervention only if we know before hand what impact it will have. A great deal of unnecessary damage and loss can be avoided by creating a degree of harmony between man-made interventions and natural laws. This adaptive process of trade-offs requires agreement amongst many sectors and interest groups.

It is in the context of an Environmental Impact Assessment (EIA) regime that policy guidance on choices to maximise long-term benefits of development and environmental objectives can be revealed and decided upon.

EIA as a planning tool shall be used to integrate environmental considerations in the decision-making process, in order to ensure that unnecessary damage to the environment is avoided. It shall be a mandatory requirement to ensure that environmental concerns receive due and balanced consideration in reconciling urgent development needs and long-term sustainability, before a final decision is made. In this way, environmental considerations will not become an afterthought in planning and decision-making, but rather, part of our consciousness and awareness of our development realities.

As part of the strategy in the implementation of the National Environmental Policy, guidelines and specific criteria for the conduct of EIA will be formulated. One of the cornerstones of the EIA process will be the institution of public consultations and public hearings in the EIA procedures.

Environmental degradation many times arises out of the promulgation and implementation of bad sectoral and macro policies. In order to mitigate the effects of existing and future

policies on the environment, strategic environmental impact assessment will be applied on those policies which impact on the environment.

Environmental Legislation.

Environmental law is an essential component of effective environmental management and improvement of the quality of life. The inherent nature of environmental law to set demands, impose duties and limits and create obligations for the individual for private and public bodies means that it can make a clear contribution to fit human activities into laws that govern the patterns of our air, water, soils and plant and animal life.

The broad range of areas covered under the field of environment, the structure and division of Government functions, and the numerous number of major players necessitate the formulation of a framework environmental legislation and a related set of sectoral legislations to provide the legal basis for effective and comprehensive environmental management.

The framework environmental legislation shall be designed to organise various agencies of Government charged with aspects of environmental protection to promote coordination and cooperation among them, and shall define environmental management tools of general scope that facilitate an even degree of policing and enforcement.

Sectoral legislations shall be designed in such a way as to factor environmental policy objectives in their areas of coverage.

It is recognised that for effectiveness, environmental law must be understood and appreciated by the people to whom it is aimed. It is therefore stressed that other instruments like public education and public awareness are essential and complementary policy instruments. Furthermore environmental standards and procedures have to be in place before or as a result of legislation for this instrument to be effective.

Tanzania is a signatory and has acceded to a number of International Treaties on environment. A review of these Treaties will be made with a view to incorporating them into national legislation.

Economic Instruments.

The market place does not yet provide decision-makers, producers and consumers with appropriate signals about the value of the environment because most environmental resources and services are either undervalued or considered as common property. A balanced use of regulations and suitable market-based approaches for environmental protection can form a sound basis for sending out "green signals". The most important advantage of economic instruments is their ability to achieve a specified level of environmental protection at lower cost, particularly where they are designed to match the cost of achieving a predetermined and tangible environmental goal.

Economic instruments are also able to take into account the reality that the cost of controlling a particular environmental problem may not be the same for all causes.

Resource prices are themselves economic instruments that can play a critical role in encouraging efficient and environmentally responsible management of natural resources, and influence users to act in ways consistent with sound economic and environmental values. User-charges are applicable for the use of collective goods and services, and are practised in the country. Ideally, the charge should match the cost of supplying the service consumed, so that consumers have an incentive not to over-use the service or abuse it. While economic instruments are not necessarily the most effective means of choice for every environmental problem, their application can be linked to specific environmental problems, so that they are made relevant in their design and application to the problems.

Already, deposit-refund schemes are practised in Tanzania primarily to encourage the return of beverage containers, and shall be used for other products which can be recycled or recovered, and which create environmental problems if not disposed of in an acceptable manner, such as acid batteries and oils, or plastics with long life cycles.

As far as possible the preventive approach to environmental problems shall be given top priority. Liability for environmental pollution shall not be passed on. The polluter-pays principle shall be adopted and implemented deterrent. In principle it shall be the responsibility of those who pollute to repair and bear the costs of pollution caused and rehabilitation, where appropriate.

Environmental Standards and Indicators.

Sustaining life of all forms is a question of balance. There are finite limits to the carrying capacity of ecosystems, that is, to the impacts that they, and the environment in general can withstand without dangerous deterioration.

The limits vary with each ecological setting and from locality to locality; and the scale and severity of impacts depend on the intensity of human activities, such as how much food, water, energy and raw materials are exploited, and wastes disposed.

Policies that bring human activities into balance with nature's carrying capacity, as well as technologies and practices that enhance that capacity through careful management form a sound basis for sustainable development.

Making timely and sound policies decisions requires relevant, valid and reliable environmental criteria reflecting the degree of acceptable stress on the environment.

Environmental standards and indicators are necessary management tools for providing early warning relating to potential environmental problems to carrying or assimilative capacities of environmental media and to habitat quality. Environmental indicators shall be defined, for example on land use conversion ratios (rural/urban, wetland/agriculture, forest/agriculture,

etc) to make possible determination of ecosystems stability/resiliency/diversity relationships, and evaluation of economic development strategies affecting natural resources. Appropriate environmental indicators and standards shall be formulated and their implementation monitored to satisfy different objectives, including: -

1. To make accessible statistical, scientific and technical information to non-technical user groups;
2. Descriptive indicators summarizing sets of individual measurements pertaining to an issue, mainly to serve scientific purposes; and
3. Aggregated, policy-oriented indicators, derived from analysis and integration of information of different disciplines to contribute to policy decision-making.

As part of strategy formulation, decisions shall be made on what components of the environment require the setting of indicators, and on the degree of the state of environmental reporting necessary. The role of scientific data in determining sustainable thresholds shall be promoted.

Precautionary Approach.

On the ground that knowledge of the effects of environmental impacts may often be incomplete, and that some impacts only give demonstrable effects after a long time, application of a precautionary principle, i.e. it is better to be roughly right in time, than to be precisely right too late, shall be pursued.

This means that in certain cases action may be taken to protect and enhance environmental integrity even without complete knowledge of the causes and effects involved, or without waiting for more substantial proof of damage.

International Cooperation.

Environmental problems do not recognize national boundaries of sovereignty. Any policy on the environment is a policy only on the basis of effective forms of international cooperation which take into account both ecological relationships on regional and global scales, and the interdependence of the world economy. Virtually no part of the world can claim immunity from natural disasters and man-made abuses of the environment.

Global and Trans boundary resources, especially the atmosphere, the ocean and shared ecosystems can be managed effectively only on the basis of a common purpose and resolve, when all affected countries are part of the solution.

Thus, for example Tanzania's coastal and marine pollution can be addressed more fully and effectively through regional cooperation. In many cases, some international framework is necessary to address trans boundary environmental problems. Tanzania will intensify its cooperation with other countries of the sub region, region and the world at large.

The earth's atmosphere is not confined within national boundaries. The protection of the atmosphere must therefore be a global effort.

International efforts at the protection of the atmosphere have so far consisted of the Vienna Convention on the Protection of the Ozone Layer and its Montreal Protocol and the United Nations Framework Convention on Climate Change which largely addresses the emissions of greenhouse gases in the atmosphere which have an impact on climate change. Global, regional and national efforts should be made towards ratification and implementation of these Conventions.

The need to undertake climate studies in order to come up with mitigation options is stressed. In view of Tanzanian's vulnerability to climate variations, an assessment of impacts of climate change and climate variations will be undertaken. In this regard strategies will be

Chapter 3. RESEARCH METHODOLOGY.

3.1 Research Design.

The need to carry out community survey emanated from the needs assessment exercise that was conducted on December 15th, 2003 at Suna, by SCDA with the facilitation of the author. The outcome of needs assessment revealed that improved sewerage system was the pressing community need at Suna (Table.2). Thus study methodology was that of Participatory Rural Appraisal (PRA). The scope of the community survey was the whole of Suna community and the target population was around 10,000 people.

3.2 Research Approach & Strategy.

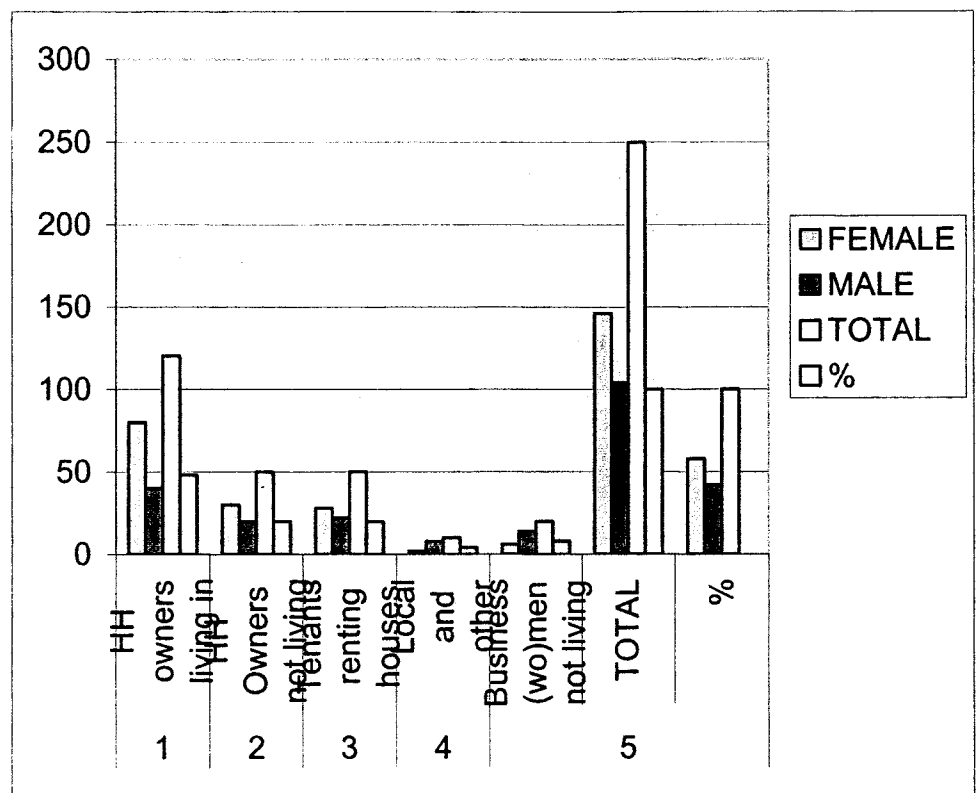
In consultation with SCDA and local government leaders at Suna, the profile of the community members in Suna was carefully studied and a small sample of 250 household heads or representatives was randomly selected as respondents to represent the entire community of around 1,500 households.

Due nature of the area, availability of the-would be respondents and time limit, it was agreed that the 250 respondents would be quite satisfactory. It should be noted that a sample size represents 17% of the total household occupants (in terms of HH heads) in Suna, which is a fair representation of the entire population. Considering nature and profiles of occupants of Suna, the author with his team further decided to have fair representation of all categories of residents occupying Suna Community houses. It should be noted that the position of local leaders in this survey had nothing to do with the analysis and final result of the study and indeed will not count to it. However, it only meant participation of leadership in the process.

3.3 Sampling Techniques.

Since the gender issues, particularly involvement of women in the whole exercise, it was deliberately decided by all of us to have at least 50% women respondents who are household heads (Table 9). Thus, 146 respondents, equivalent to 58% of the total were women and men were only 104 (i.e. 42%). This was in recognition of their roles and responsibilities in the family and the fact that it is among the most vulnerable groups in the community that is more affected by poor sewerage system than the male counterpart. Also, the sampled target included heads of households, who were owners of the houses living at Magomeni, owners not living in the project area, tenants, and business-women/men with enterprises at Magomeni and some Suna local leaders. In this way, at least all interest groups, with stake in the project were normally represented.

Table No. 1: Categories/status and size of sampled respondents



3.4 Data collection.

The methods for collection of data were documentary review, focused group discussion and questionnaire. Thus, from May 12-17, 2004, a research by using Participatory Rural Appraisal (PRA) was commissioned at Suna community in order to obtain some important information in the community that would lead the assessment of their felt needs.

Participatory Rural Appraisal is a tool that involves using the same targeted community to obtaining useful information about themselves and their environment in urban setting under the facilitation of a professional and in this case the author.

The research team consisted of eight persons including four leaders of SCDA, two ordinary community members, one local government leader and the author who was a team leader.

The data which was required include primary and secondary data. The required data can be found on the Suna Community Development Association, The Kinondoni Municipality, UNICEF Library, National environment Management Council, Vice Presidents Office, Department of environment.

This study included the period of eighteen month from September 2003 – March 2005.

The sample design was random giving equal chance for each population.

The techniques of data collection since this was recognized as a social study which employs social science approach strategy to give access to useful data and information, the approach to be used in data collection was that which was usually used in social survey, histories or archives. Qualitative and quantitative techniques of data collection were used to get useful data for this study from both primary and secondary data sources.

3.4.1 Primary data collection.

This involved review of available information and several literatures within SCDA and local government offices within the Magomeni ward and the Kinondoni Municipality

3.4.2 Secondary data collection.

This was done through self administered questionnaires from 229 respondents who could read and write properly and hence understood the questionnaires quite well. Different team members verbally administered a total of 21 questionnaires as the expected respondents had problems in reading, writing and generally understanding the questionnaires. However, their ideas, views and reflections were well accommodated in respective questionnaires. The process of field survey, i.e. obtaining all the required information through filling questionnaires took about five days.

3.5 Data Analysis.

3.5.1 Primary data analysis.

Primary data analysis was done through involving the community members who participated in the exercise. This involved systematic arrangement of the collected information according to set or defined categories and clusters to an extent of giving clear direction of the expected results. After this stage, the collected data was ready for secondary analysis.

3.5.2 Secondary data analysis.

Secondary data analysis pertained the collected information at SCDA office by using Microsoft Excel in computing the percentages and correlation method showing relationships. Response rate was 89% meaning that out of 280 questionnaires that were distributed, 250 responded.

Chapter 4. FINDINGS AND CONCLUSION.

4.1 Findings.

Results from the needs assessment (see table...for analytical results) that was carried out on December 28, 2003, showed lack of sewerage system was the pressing need and hence ranked number one with total 5 score. This was followed by HIV/AIDS prevalence which scored 3, next was lack of drainage scoring 2, prevalence of malaria tied with low income levels among the youths and women by each scoring 1 and lastly unemployment among the youths was the last where it scored zero.

Results of the field survey further justified the above needs assessment results where one again lack of sewerage system scored high with a total of 171 respondents out of 250 (68.4%). HIV/AIDS prevalence was the second in line with 27 respondents (10.8%), lack of drainage was the third with 21 respondents (8.4%), unlike needs assessment results, youth unemployment tied with prevalence of malaria each having 11 respondents (4.4 %) and the last one being low level of income among the youth and women with 9 respondents (3.6%). Slight difference between the needs assessment results and field survey results were disregarded since they did not affect the most pressing community need, i.e. need for community sewerage system. This they concluded that lack of sewerage system was the critical problem in the area and that the need for improved community sewerage system was the pressing need at Suna Community.

Further analysis on how much each household was ready to contribute showed that 152 out 191 respondents (i.e. 79%) who agreed to contribute towards improvement expressed readiness to contribute TZS.50,000/- per family, whereas 24 respondents (13%) and 15 (8%) agreed for each household to contribute TZS.40,000/- and 30,000/- respectively. The overall results were good, impressive, showed high commitment and inspiration among the community members and good indicator of sustainability of the intervention.

With such willingness, assuming that 1,500 household would be willing to contribute Tshs.50, 000/- over the period of six months, a total of Tshs.75, 000,000/- would be raised for improvement of the facility. However, from the design point of view, given some other factors, such contribution has been estimated to around 60,000,000/-. Thus the total project is estimated to be TZS.121,452,000/-, much of which will come through own contribution amounting to TZS.60,575,000/- (50%), Kinondoni Municipal Commission has agreed to contribute around TZS.7,000,000/- (12%) and the approached donor (in this case the Japanese Embassy in DSM) has been requested an assistance of TZS.53,927,000/- (38%).

The above results could be interpreted into the following key findings:-

- i) Majority of the population acknowledged an improvement of their sewerage system as the most community pressing need.
- ii) Majority of the community, particularly households' owners were really inspired by the project and were ready to contribute Tshs.50, 000/- per head within six months, for the construction of the facility.

- iii) Almost all tenants resisted contributing to the facility improvement, but were positive over hygiene promotional activities, which were surely lacking in the area.
- iv) Most of owners at Suna were of low-income earners but able to contribute if motivated and mobilized as well.
- v) SCDA has already identified possible donors who have shown interest to jointly fund the project. They are the Japanese Embassy in Dar es Salaam and the Kinondoni Municipal Council. However, they require feasible and viable project proposal.
- vi) SCDA was institutionally weak in a number of areas including proposal writing and project management.
- vii) Improvement of sewerage system is the only way that can improve sanitation and hence health status of Suna community.
- viii) Institutionalization of culture of contribution is essential and would work in Suna if well organized.
- ix) Emphasis on contribution for the project could be fruitful if directed to owners of households who control rents. However, tenants ready to do so are welcome.
- x) Promotion of hygiene education is crucial for sustaining the intervention as well as keeping the environment always clean. Such education is necessary for every community member living in Suna anyhow.
- xi) Capacity of SCDA needs to be strengthened in areas of management and proposal writing in order to sustain the organization in terms of community service delivery.

4.2 Recommendations.

- i) It was recommended that SCDA assisted by the author **“Develop a Project Proposal called “Water logging Control and Sanitation”. This is an assignment the author dealt with.**
- ii) It is recommended that SCDA undergo Organizational development process in order to strengthen its capacity. Hired OD Expert should carry the process by using extra funds realized out of community contribution.

Chapter 5: IMPLEMENTATION.

5.1 Proposal.

PROJECT TITLE:	“Water Logging Control and Sanitation at Suna ”
CONTACT PERSON:	Masoud Kombo
PROPOSAL SUBMITTED BY:	Suna Community Development Association (SCDA)
PROBLEM STATEMENT:	Improvement of Suna Community Environment
MISSION STATEMENT:	To facilitate social-economic and cultural development of Suna community environment through the application of the principles and innovation of the spirit of self help.
TARGET GROUP:	Suna Street at Kinondoni District – DSM
ACTIVITIES:	Sewage system Construction and River Excavation
OUTCOMES:	Improved Suna Community Environment
REQUESTED FUNDING:	Tshs.53, 927,000/- (US\$51,800)
OUR CONTRIBUTION:	T.shs. 60,500,000/- (US \$ 6,050,000)
DURATION:	12 Months
SUBMITTED TO:	UNDP

5.2 The Project Area.

Suna is not the residential settlement in Dar es Salaam city that has developed out of a Master Plan prepared by the Ministry of Lands, Housing and Human Settlement Development. The services, which are not adequately provided in the area, include improved roads, drainage, water supply and sewerage system. Furthermore, the lack of infrastructure services, the emerging unplanned housing and high population densities are environmentally unsound and pose healthy risks to the residents in the area.

Its weather is of tropical coastal climate, typical of Dar es Salaam. The annual mean temperature is 26 and annual rainfall is over 1000 mm. Basically Suna Community is characterized by a semi-planned residential area, mainly inhabited by low-income people. Predominantly poor roads, poor drainage and a high ground water table prevail.

5.2.1 Magomeni Area.

Location:

Suna area is located at Magomeni in the Kinondoni Municipality.

Socio-economic Services.

In education sector, Magomeni area has also 8 primary schools (6 governments and 2 private), 10 nursery/pre schools and 4 private secondary schools. In terms of health facilities, Magomeni area has three Health Center (1 government and 2 privately owned) and 10 private dispensaries.

In terms of denomination, Magomeni area have 12 churches and 15 mosques (attached spreadsheet indicates distribution of this data per sub area). Major road within Magomeni area is the Morogoro road to City Centre

Magomeni area .

In terms of health facilities, Magomeni area has four private hospitals.

Population wise, Suna Community have a total of 1,800 households with a total population of 10,000, (3500 men, and 4500 women).

5.2.2 Brief Profile of SCDA .

Suna Community Development Association (SCDA) is a community membership-based organization. It was and registered on 29th August, 1998, it bears certificate of registration SO. No. 9548, which was issued by the Registrar of Societies in the Ministry of Home Affairs? The Organization's address is SCDA, PO Box 3927 Dar es Salaam and its office is located at Suna Community area.

Structurally, **SCDA** has two principal organs namely: -

- i) The annual General Meeting (AGM), which is the highest governing body made up of all members and meets annually to discuss all key issues of the organization (SCDA Constitution, 1998).
- ii) The Executive Committee is responsible for day-to-day management of SCDA. It has six members including the Chairperson as chief executive officer, Vice Chairperson, Secretary, Assistant Secretary, Treasurer and Assistant Treasurer.

The Committee is constitutionally allowed to hold the office for a period of two years, after which election has to be done for new or same office bearers. SCDA constitution allows the incumbents to be in the office for no more than two terms.

5.2.3 Situational Analysis.

The reasons behind carrying out such analyses were (i) to allow the beneficiaries relate the collected information and data with the reality (prevailing situation) and hence understand the essence of the project proposal, (ii) to better understand other actors, interest groups and individuals with stake as well as the proposed project, i.e. those who will positively and/or negatively be affected by the project and hence involve them or not in implementation plan and (iii) enable the community to share and discuss their issues and problems including suggesting the most feasible and viable alternative or the way forward.

Thus on October 23, 2004, a group of 55 people from the entire community and other stakeholders spent the whole day together making analysis of the collected information, that covered stakeholder analysis, problem analysis, objectives analysis and finally alternatives analysis. The stakeholders included 30 community members as beneficiaries who were among the target group, 7 executives of relevant institutions in Magomeni (schools, health facilities, and 3 religious leaders), businessmen/women, 5 local leaders and 10 SCDA leaders.

5.2.4 Stakeholder Analysis.

SWOT analysis tool was used in assessing the strengths, weaknesses, strengths, threats and potential in each category of the stakeholders.

Results of the analysis generally suggested that all of them were crucial for the success of the project and hence they should be involved in each specific tasks and stages of project implementation (See appendix 3).

5.2.5 Problem Analysis (Needs Assessment).

The participatory needs assessment (problem identification) workshop was organized at Suna Community for two consecutive days (December 27-29, 2003).

Day one was used for identification of general problems currently facing Suna Community residents, which came out of assessment of questionnaires and through participatory needs assessment during the workshop. Results from day one through 'pair wise ranking tool' (see table ...below), revealed and hence validated **"Water logging Control Improved"** to be the most pressing need for residents of Suna Community.

Day two was used for in-depth analysis of the extent and magnitude of the sewerage problems in orders to workout the most appropriate and feasible solution (objective analysis). The following were the validated causes and effects of the sewerage related problems (in priority order) currently facing the community members at Suna Community:-

- i) Increasingly high morbidity rate due to water borne diseases (diarrhea, dysentery and cholera) caused by water logging.
- ii) Lack of conventional sanitation facility (sewerage and drainage systems) to contain sewerage and silage to main outlet (sea)
- iii) Low household income levels to meet high cost of frequent mechanical emptying.

- iv) high level of poverty to meet the cost of the facility as well as inadequate awareness and skills on hygiene promotion

Table 2: Needs Assessment Results (PAIRWISE RANKING)

Items	Low HH income levels	Unemployment to women & youths	Prevalence of malaria	High rate of HIV/AIDS transmission and spread	Lack of drainage system	Lack of sewerage system	SCORE	Rank
Low HH income levels		High rate of HIV/AIDS transmission and spread	High rate of HIV/AIDS transmission and spread	Prevalence of malaria	Lack of drainage system	Lack of sewerage system	1	4
Unemployment to youths			Lack of drainage system	Low income levels	Lack of drainage system	Lack of sewerage system	0	5
Prevalence of malaria				High rate of HIV/AIDS transmission and spread	Low HH income levels	Lack of sewerage system	1	4
High rate of HIV/AIDS transmission and spread					Prevalence of malaria	Lack of sewerage system	3	2
Lack of drainage system						Lack of sewerage system	2	3
Lack of sewerage system							5	1

Objectives Analysis.

For each of the problems in item 2.2, a number of possible solutions were identified so as to be used as objectives of the project, and they are tabulated below:-

Table: 3: Problems with respective solutions.

#	<u>Sewerage related problems</u>	<u>Proposed solutions</u>
1.	Increasingly high morbidity rate due to water borne diseases (diarrhea, dysentery and cholera) and water logging.	i. Provision of sanitation facility, i.e. construction/improvement of sewerage and drainage systems ii. Construct and equipping water logging control. iii. Hygiene promotion/education (soft ware)
3.	Lack of conventional sanitation facility (sewerage systems) to contain sewerage to main outlet (sea)	i. Provision of sanitation facility, i.e. construction/improvement of sewerage systems ii. Continue with mechanical emptying (by the use of truck)
4.	Low household income levels to meet high cost of frequent mechanical emptying.	i. Engage in range of profitable or viable income generating activities. ii. Diversify income sources to avoid monotype income (i.e. salary alone is not enough to meet basic household needs)
5.	Inadequate awareness and skills on hygiene promotion	i. Carry out awareness raising and training on hygiene promotion and general health and environmental education.

5.2.6 Alternatives Analysis.

Out of many proposed solutions in Table 2, the following were the three alternative solutions felt to be appropriate and feasible enough to address the felt need above:-

- i) Training of the existing river/stream to allow easy flow of water including excavation to widen and deepening narrow and shallow parts of the stream/river to control water logging.
- ii) Carry out an awareness raising and training on hygiene promotion
- iii) Training of few selected community members on simple or basic operation and maintenance of the facility.

5.2.7 Project Goal, Purpose and Objectives/Outputs.

5.2.8. The Goal

The project goal is to improve living condition of the poor community in Dar es Salaam through improved public health.

5.2.8.1 Project Purpose.

To construct the community sewerage system at Suna Community and training the existing rivers/streams to control water logging.

5.2.8.2 Specific Objectives.

- i) To construct the sewerage system and excavate to widen and deepening narrow and shallow parts of the river/stream.
- ii) To increase community's knowledge and skills on hygiene promotion including operation and maintenance.

5.2.8.3 Project Outputs/Results

Output 1: Sewerage system in Suna Community improved and water logging controlled.

This output will be achieved by construction of sewerage system covering a total length of 2.km, connecting around 1,000 houses and excavation of Msimbazi and Mwananyamala rivers. The proposed sewerage system to be constructed will be connected to Central City Water sewerage system to the main outlet, i.e. the sea and excavation of rivers to control water logging will be done by UNDP.

Output 2: Community knowledge and skills on hygiene promotion improved.

The community will be sensitized and educated on hygiene promotion through communal meetings and gatherings. SCDA will facilitate this training and where external resource is required; the same CBO will facilitate availability of this kind of expertise.

Output 3: Effective service delivery by SCDA to community in Suna is realized

Full facilitation of project implementation rests on the management of SCDA in collaboration with the community itself through a joint Project Steering Committee (see management of the project), which will also be responsible for operation and maintenance of the facility.

5.2.8.4 Project Activities.

Activities under Output 1:

- i) Formation of a Joint Project Steering Committee
- ii) Training joint PSC members in management of the project
- iii) Selection of a contractor (through competitive bidding)
- iv) Mobilization of the community members for excavation of trenches for sewers
- v) Procurement of construction materials
- vi) Supervision of construction work
- vii) Organize on-the job training to 4 community members on operation and maintenance of the facility.

Activities under output 2:

- i) Organize awareness raising meetings in the community on hygiene promotion and general environmental health.
- ii) Organize study visit to colleagues at Tandale area on sewerage improvement and resource mobilization issues

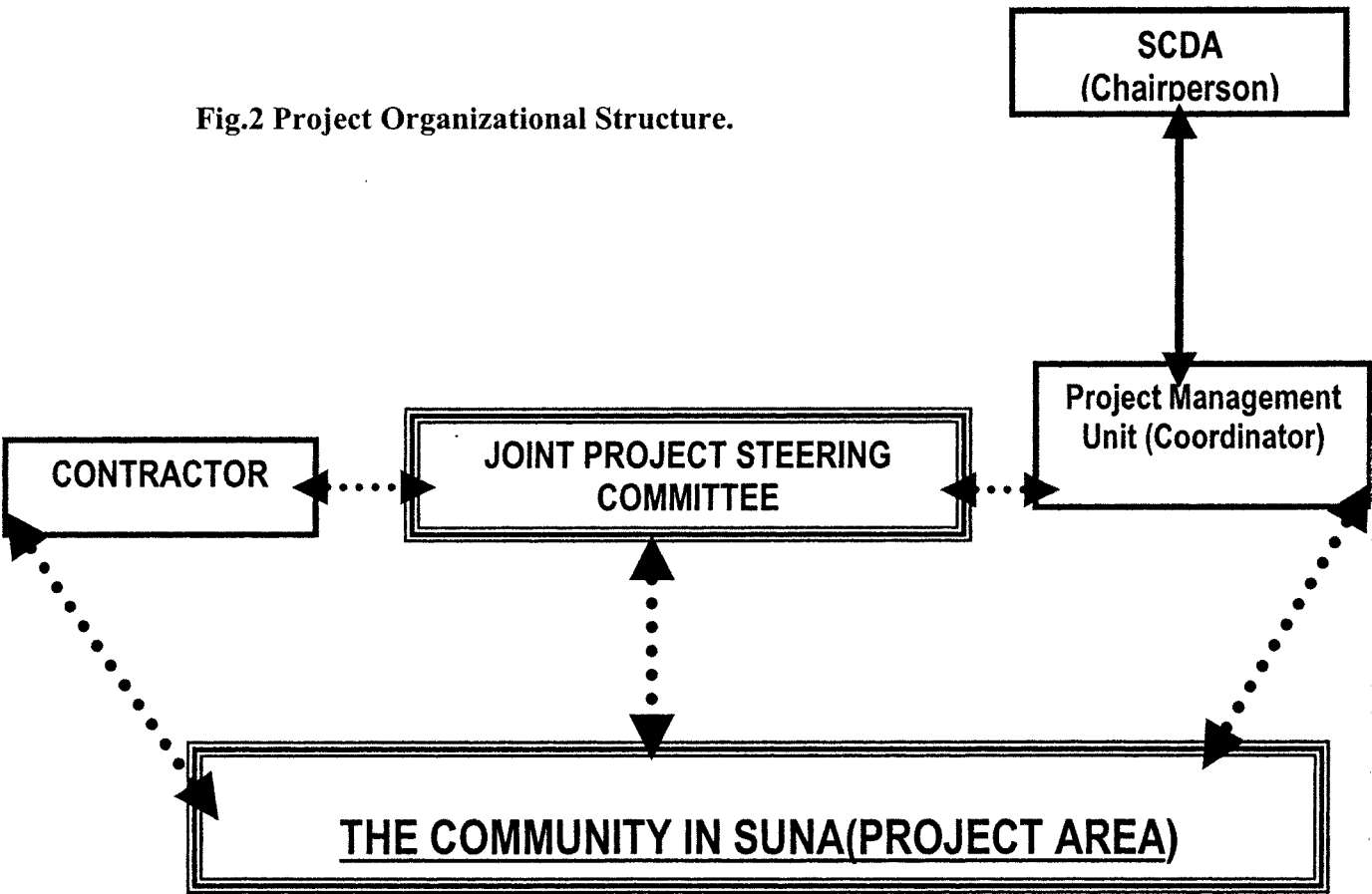
Activities under output 3:

- i. Organize fortnightly site/progress meetings
- ii. Organize community meetings to provide feedback on the progress of work
- iii. Organize regular site visits by members of joint Project Steering Committee
- iv. Carry out end of the project evaluation.

5.3. Management f the Project.

SCDA in this project will be the facilitator and coordinator of implementation in collaboration with the joint Project Steering Committee. A joint Project Steering Committee is a 10-person committee that will be responsible for day-to-day implementation of the project. Members of this committee will include 6 people from the community and 2 SCDA staff (who will be ex-official, but rather advisors to the committee).

Fig.2 Project Organizational Structure.



This committee will discuss and agreed on all payments to be made under custodian of SCDA. Such payment will include contractor's fee, purchase of materials and some project related overheads. The committee members will convene fortnightly to discuss general progress of work and provide feedback to all stakeholders (interested parties) especially the community members.

It will also be the duty of the PSC with facilitation of SCDA to ensure that each household contributes Tshs.50, 000/- over a period of six months starting from January 2005. Construction work is scheduled to start in July 2005 with own funds and after long rain season. Donors funds are to compliment own contribution. The community through their own contribution, expects to raise a total of TZS.75, 000,000/-, which is enough to let the project start while further mobilizing the remaining funds. The role of author in this was to support in laying down mechanism for funds mobilization, including awareness raising importance of own contributing to their project.

5.3.1 Community participation in management of the project.

The community members, who have already been involved in planning and formulation of this project, will further be involved in the implementation and monitoring and evaluation of the project. Specific areas of their involvement include: -

- i) Providing local knowledge and relevant information to UCLAS and the author,
- ii) Through contribution of cash money amounting to around TZS.60,000,000/- (i.e. from around 1,500 HHs , each contributing around TZS.50,000/-)

- iii) Provision of unskilled labor throughout planned construction period.
- iv) Day to day running of the project including monitoring and evaluation by the joint Project Steering Committee (PSC).
- v) Management of the system by the community themselves after handing over, which will entail carrying out simple operation and maintenance of the system in collaboration with City Water Services.

It should be noted that all these involvements will result in real empowerment of the community and enable them to have a say and hence ownership of what will have been put in place (improved sewerage system) and thereby sustaining the intervention at Suna Community.

5.3.1.1 Project Beneficiaries.

5.3.1.1.1 Direct beneficiaries

Direct beneficiaries are estimated to be around 10,000 people who are household heads (owners and tenants) from 2,000 households and a few institutions (schools) at Suna Community.

5.3. 1.1.2 Indirect beneficiaries.

Indirect beneficiaries are considered to be those outsiders with say enterprises at Suna Community and others who often come to Suna to access specific services.

5.4. Monitoring and Evaluation.

Monitoring and evaluation, which will be used throughout implementation period to check whether the project is “**on track**” as well as whether the project is “**on the right track**” respectively, will be achieved through development of simple set of indicators drawn from

a site plan that will be prepared and presented by the contractor and approved by a PSC. In general M&E will be achieved as follows:-

- i) Continuously through usual project or field visits by the joint PSC and SCDA members.
- ii) Through weekly site meetings by the joint Project Steering Committee (minutes)
- iii) Monthly and quarterly progress reporting (physical and financial)
- iv) End of the project assessment or evaluation.

5.4.1 Expected Impacts.

With a one-year project, no impact can really be realized or felt in the project area, but in a long run the impact of this project will be quite substantial. However, the following project immediate and short-term outcomes are expected during and immediately after construction of the sewerage system:-

- i) Increased purchasing power due to increased household income after reduced cases of sanitation related diseases that consume money for their treatments as well as reduced no more paying for mechanical emptying of septic tanks. No more environmental health hazards [recast this into tangible impacts not speculations)
- ii) Improved aesthetic beauty of the location.
- iii) Relatively economic advancement as the clean and tidy environment will attract many businessmen and tenants to rent business apartments and houses hence bringing more income to the household owners at Suna Community.

5.4.1.1 Project Sustainability.

In order to sustain this intervention, the following will be addressed in the project:-

- i) Semi/skilled persons among the community will be trained on simple operation and maintenance of the facilities so that they can carry out those minor breakdowns and cleaning and grubbing alongside of the river/stream to allow easy flow of water. These semi skilled persons will be paid from the established special sewerage fund after they have carried out such repair or maintenance to the system.
- ii) Establishment of sanitation fund for operational and maintenance of sanitation facility. The funds will be used for repair and maintenance (purchase of spare parts and sanitation materials) of the facility including payments to casual, semi skilled or skilled laborers for the rendered service.
- iii) Routine check up by the maintenance team to the facility to identify some defects
- iv) Appropriateness of the technology (simple) will make it easy for the community to operate and repair when necessary.

5.4.1.2 Risks and Assumptions.

Environmental.

All sillage and sewerage will then be under control meaning that no more relevant environmental pollution in the area, hence no further risks in the area. Also, where the trenches for sewers will be excavated, will eventually backfilled properly to ensure that the disturbed soil is not eroded. Indeed, the project aims at conserving

the environment by ensuring that wastewaters now posing a serious environment pollution hazards is no more a threat. The hazardous matter will be wholly conveyed to the sea. Some of the likely environmental hazards likely to originate from this project include water ponds if excavations and back fillings will not be adequately carried out. Others include feeder/street roads destruction (demolition) where sewers will have crossed them and lastly, houses and other buildings that will be demolished incase sewers have to pass through on its way to joining City Water central sewerage system.

However, all necessary precautions have been taken into consideration in the design and layout in such a way that proper excavation and backfilling will be done immediately after sewers have been correctly laid, the same backfilling and proper compacting will be ensured where the system has to cross the feeder/street roads and also the design layout by UCLAS has been done so professionally that no any public or private building will be demolished to give way for the sewer system to pass. Based on the above facts therefore, the project will be environmentally friendly, in that not detrimental to the environment.

5.4.1.3 Gender Understanding the crucial roles the women play in hygiene promotion (water and sanitation), and understanding the way women becomes the victims of circumstances, should the objectives of this project are not met, the project will ensure that women are actively involved, fully participate and benefit as well to the project.

5.4.1.4 This will be achieved through ensuring that their presence in any committee is at least 40% and also empowered to come out, speak out and decide. Also, in any leadership positions, if a man is chairperson, secretary must be woman.

5.5 BUDGET AND BANK ACCOUNT DETAILS.

5.5.1 Budget.

The total project cost is **Tshs.121, 500,000/-**. Out of this, the community in Magomeni will contribute total cash amounting to **Tshs.60, 500,000/- (equivalent to 50%)**; Kinondoni Municipal will contribute a total of **Tshs.7, 000,000/- (equivalent to 12%)** while the donor (UNDP in Dar es Salaam) will contribute **Tshs.54, 000,000/- (equivalent to 38%), equivalent to US\$51,800**. Contribution in kind that has not included in the budget will be borne by the community and is estimated to be around 10% of the total project cost, i.e. **Tshs.12,150,000/-** in non-monetary terms.

5.5.1.1 Bank Account details SCDA operates Bank Account, with Account name “**Suna Community Development Association**”, at the National Microfinance Bank (NMB), Magomeni Branch, in Dar es Salaam.

THE PROJECT BUDGET.

Item NO.	ITEM DESCRIPTION	UNIT	QTY	RATE (Tshs)	TOTAL AMOUNT (US\$)	CONTRIBUTION (TSHS)		
						Community	Kinondoni Municipal	Donor
A:	SEWERAGE SYSTEM							
	PIPE WORK							
1	MAIN SEWER (200MM uPVC PIPES): In accordance with specification Clause 2.715 with spigot and socket joints							
1.1	150mm nominal bore pipe in trench, depth not exceeding 1.5m commencing at surface level.	m	8	650,000	5,200,000	1,000,000	750,000	3,450,000
1.2	150mm nominal bore pipe in trench 1.5 - 2.0 commencing at surface level.	m	8	1,300,000	10,400,000	4,000,000	1,500,000	4,900,000
2	LATERALS/BRANCHES (150MM uPVC PIPES) In accordance with specification Clause 2.715 with spigot and socket joints							
2.1	100mm nominal bore pipe in trench, depth not exceeding, 1.5m commencing at surface level.	m	8	5,500,000	44,000,000	22,000,000	1,500,000	20,500,000
3	MANHOLES, CHAMBERS AND PIPEWORK ANCILLARIES.							
3.1	Concrete Manhole with cast iron 600 x 600mm Grade A heavy duty manhole cover and frame dept not exceeding 1.5m.	No	290	88,000	25,520,000	13,500,000	1,700,000	10,320,000
3.2	Ditto but 1.5 - 2.5m deep.	No.	350	25,000	8,750,000	5,000,000	1,500,000	2,250,000
4	CROSSINGS							
4.1	Crossings, electricity cable pipe bore not exceeding 300m.	No	55	2,000	110,000	40,000	-	70,000
4.2	Ditto but water mains	No	55	10,000	550,000	25,000	-	525,000
4.3	Ditto but telephone cables		55	2,000	110,000	10,000	-	100,000
5	BREAKING UP AND PERMANENT REINSTATEMENT OF ROAD.							
5.1	Pipe nominal bore ne 200mm	m	80	11,500	920,000	400,000	-	520,000

6	PIPEWORK - SUPPORTS AND PROTECTION ANCILLARIES TO LAYING AND EXCAVATION							
6.1	Excavation in pipe trench for rock	m3	15	5,000	75,000	-	-	75,000
6.2	Ditto but in manhole or chamber	m3	15	5,000	75,000	-	-	75,000
	SUB-TOTAL MATERIAL COST				95,710,000	45,975,000	6,950,000	42,785,000
7	ADD CONTRACTOR FEE (40% material cost)				19,142,000	8,000,000	-	11,142,000
	TOTAL - 1: MATERIALS & CONTRACTORS' FEES				114,852,000	53,975,000	6,950,000	53,927,000
B:	OPERATING COSTS							
1	Project Team Leader	months	12	200,000	2,400,000	2,400,000		-
2	Animator	months	12	120,000	1,440,000	1,440,000		
3	Secretary	months	12	80,000	960,000	960,000		
4	Office Rent	months	12	100,000	1,200,000	1,200,000		
6	Office Stationeries supplies	months	12	50,000	600,000	600,000		
	TOTAL - OVERHEAD				6,600,000	6,600,000	-	
C:	UNSKILLED LABOUR / IN KIND CONTRIBUTION							
	GRAND TOTAL				121,452,000	60,575,000	6,950,000	53,927,000
				%	100	50	12	38

5.5.1.2. Overall conclusion and recommendation.

Based on the results of 18-month's author's involvement with a CBO, the following have been drawn as general conclusions and recommendations:-

a) Overall Conclusion.

- i. This project approach stimulated two-way learning whereby a student got an opportunity to learn a lot from a CBO and also, the CBO symbiotically enjoyed wealthy experience and knowledge from a student.
- ii. In this approach, it is the community (CBO members) and not a researcher/author who determined what should be researched and for what purpose. In this kind of approach, a student did not go to a CBO with a "ready made research topic or proposal". Everything started at (from within) a CBO and a researcher then becomes a facilitator of the entire process. In this way the community became the sole owner of the process, which is one of the key aspects of "Community Empowerment".

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