

**PROGRAMME OF ACTION
FOR INCOME GENERATION ACTIVITIES
IN TANZANIA**

PROGRAMME PROPOSAL

*Support Programme
for an integrated solid waste management
strategy in Dar es Salaam*

The International Labour Organization
Programme of Action for Income Generation
Activities in Tanzania

**PROGRAMME OF ACTION
FOR INCOME GENERATION ACTIVITIES
IN TANZANIA**

PROGRAMME PROPOSAL

*Support Programme
for an integrated solid waste management
strategy in Dar es Salaam*

The International Labour Organization

Programme of Action for Income Generation
Activities in Tanzania

LIBRARY IRC
PO Box 93190, 2509 AD THE HAGUE
Tel.: +31 70 30 689 80
Fax: +31 70 35 899 64
BARCODE: 18116

824TZDA93

PROGRAMME PROPOSAL

Code: MEI/07/93

Project Title: Support Programme for an Integrated Solid Waste Management Strategy in Dar es Salaam

Sector(s):

- Employment creation through enterprise development and infrastructure upgarding
- Environmental protection

Duration: 3 years

Location: 3 Communities in Dar es Salaam

Executing Agency: NIGP

Implementing Agency: to be determined

Associated Agency: International Labour Organization

Estimated Starting Date: January 1996

Donor Input: NIGP/UNDP: US\$ 700,000
Other donors (to be identified by NIGP): US\$...

Government Input: to be determined

Brief Description:

The Government of Tanzania is implementing a National Programme of Action for Income Generation Activities (NIGP), which is designed to support the National Employment Policy set out by the Government in 1992. The programme strategy is centred on the principal of targeting sectors which have the highest potential for income generation (infrastructure, agriculture and informal sector).

Confronted with growing volumes of waste and the inadequate provisions for its removal and dumping in an environmentally sustainable manner, the Dar es Salaam City Council has initiated a strategy for improved solid waste management. A principle element of the strategy is a greater involvement of the private sector in waste collection, transport and recycling. This strategy aims at establishing a public/private partnership through the support to community-based and individual waste handling and the complementary provision of public transport and dumping facilities. The merit of an integrated city waste management plan based on such a partnership lies primarily in its potentially large positive impact on the creation of employment opportunities. The aim of the proposed Support Programme is to create a lasting capacity to sustain the waste management strategy and to maximize employment and environmental benefits, in particular through the promotion of micro- and small enterprise development.

TABLE OF CONTENTS

	page
I. Context	
Description of sub-sector	1
Host country strategy	1
Prior or on-going assistance	2
Institutional framework for sub-sector	3
II. Background and Justification	
Introduction	4
Reasons leading to project formulation	4
Solid waste generation	5
Waste composition	6
Waste collection and disposal	7
Waste recycling	7
Constraints	7
III. Problems to be addressed	8
Rules and regulations	9
Local capacity building	10
Waste collection	11
Waste recycling	12
Sanitary landfill	13
IV. Anticipated end of programme situation	
Institutional and regulatory framework	15
Capacity building	15
Waste collection	16
Waste recycling	16
Sanitary landfill	17
V. Programme Strategy	
Integrated approach	17
Incremental approach	18
Incentive-based approach	18
Focus on sub-contracting	19
VI. Institutional Framework	19
VII. Target Group and Programme beneficiaries	20
VIII. Objectives	
Development Objective	21
Immediate Objectives	21
IX. Outputs and Activities	
Immediate objective 1	21
Immediate objective 2	22
Immediate objective 3	23
Immediate objective 4	25
Immediate objective 5	26
X. Inputs	27

ANNEXES

- I. Outline for a community-based collection system
- II. Outline for solid waste transfer stations
- III. Outline for improving Vingunguti dumpsite
- IV. Terms of reference for assessment of additional dumpsite
- V. Suggested profile of implementing agency
- VI. Budget for continued Technical Support (TSS2)

I. CONTEXT

1. Description of sub-sector

Unemployment and poverty in urban areas is becoming increasingly widespread because of, inter alia, rapid urbanization and the inability of national economy to generate enough job opportunities for its job-seekers. The harsh reality today in Tanzania is that an increasing number of its population are searching for an opportunity to become productive citizens, enabling them to support themselves and their families.

A majority of the urban residents (at least 70 per cent) are living in poorly-serviced and unplanned settlements. Like other local Governments, the Dar-es-Salaam City Council (DCC) is unable, due to lack of resources, to supply and upkeep urban infrastructure and services, nor is it able to halt the deterioration of the existing urban infrastructure and the erosion of the level of services, including those in the 42 unplanned settlements in the city.

The number of wage-sector jobs created per year in Tanzania dropped from 30,000 in the mid - 1980s to just 9,500 in the early 1990s. Further, the retrenchment in the public sector has led to a reduction of its payroll by approximately 50,000 people thereby aggravating the problem. According to a major Employment Sector Review in 1991 by the ILO/JASPA, there is an "obvious mismatch" between annual 300,000 - 350,000 new entrants to the labour market and only 9,500 new jobs created in the formal sector of economy. Clearly, the role of the public sector providing in employment opportunities to the labour force remains marginal.

Over the past decades, informal sector activities have been developing fast. In urban areas, 61 percent of the labour force is absorbed in the sector, including most new entrants to the labour markets. The problem confronted by micro enterprises development is however the marginal position of the poor women and youth in particular, having little access to credit, skills, training and the market.

2. Host country strategy

Government efforts to generate incomes and employment over the past twenty years include the Employment Exchanges established after independence and the Human Resources Deployment Act of 1983. Since the Human Resources Deployment Act was approved, several changes in the economic, social and political areas have occurred. In 1992, the Government prepared the National Employment Policy (NEP), aiming at employment growth in sectors with the highest potential and providing an institutional framework for effective coordination in employment promotion. The National Employment Council was created under this Policy, which in turn has initiated the National Program of Action for Sustainable Income Generation (NIGP).

Recently, privatization and the introduction of the Investment Promotion Centre into attracting private sector investment has had some positive results. Also, employment in the public sector has diminished. The informal sector expands so that employment in this sector is expected to increase. Despite the fact that there have been several policy initiatives to support the sector, such efforts have not yet been formulated in a comprehensive policy to guide the informal sector in Tanzania.

For these reasons, a National Policy to promote Informal Sector and Microenterprise Development has been formulated. The Ministry of Labour, in collaboration with the Planning Commission has prepared the National Informal Sector Policy (NISP) which sets the strategy and defines the enabling environment for the promotion of informal sector and microenterprise activities.

3. Prior or ongoing assistance

ILO support

An UNDP/ILO/UNCIIS/UNV project entitled "Improving Living Conditions and Expanding Employment Opportunities in Low-Income Community" is being implemented in the Hanna Nassif unplanned settlement in Dar es Salaam by the DCC in partnership with the Hanna Nassif Community Development Committee (CDC). In applying community-based and labour intensive methods, it is practising a community contracting system. The on-going and future project phases involve the construction of a drainage system, four km of gravel roads and measures for improved solid waste management.

The ILO is carrying out several other projects in the area of employment creation and skills development. Policy advisory services are provided through a Dutch-funded project called "Microenterprise Development through Policy Reform", essentially supporting the development of an enabling regulatory and institutional framework, both at national and municipal level. Capacity-building for enterprise and cooperative support is realized under the project "Strengthening Small and Micro-enterprise Cooperatives and Associations" implemented by SICATA/SIDO. An important contribution of this project is the development of appropriate, low-level training materials and the strengthening of producers' groups. Thirdly, the Interdepartmental Project on the Urban Informal Sector, a two-year ILO-funded undertaking, is aiming at reaching a policy consensus and developing action-oriented approaches which help increasing the employment and income-generating potential of the informal sector and at the same time improving social protection and working conditions. In a first phase, a comprehensive informal sector survey has been carried out in Dar es Salaam in June/July, 1995, to up-date the knowledge base of the size and dynamics of the informal sector.

Other relevant ILO activities include: the International Programme for the Elimination of Child Labour (IPEC), with a national project in Tanzania, and the Working Conditions Improvement for Small Enterprises programme (WISE). A Regional Africa training programme with an antenna in Tanzania is the Improve Your Business programme, providing useful and to-the-point training materials for small entrepreneurs, both in starting and existing units. A sectoral elaboration of this programme concerns the construction sector, with detailed guidelines and training materials in bidding, contract management and financial aspects.

Other agencies

To address the urban sector problems, the Government - supported by the World Bank - is preparing the "Urban Sector Rehabilitation Project", which aims at rehabilitating urban infrastructure, streamlining the roles and responsibilities of the Central and local government and establishing improved institutional and financial management within the local governments. An

area of particular interest - be it so far only outside Dar es Salaam - is improved solid waste management, for which several Dar es Salaam based consultancy firms have submitted bids.

On-going projects also include the Dar es Salaam Roads Rehabilitation Project (DRRP) launched by the Government of Japan and the Sustainable Dar es Salaam Project (SDP) financed by UNDP and executed by UNCHS. The SDP has guided an environmental planning and management process within the City Council of Dar es Salaam. It has provided technical assistance to the Council's departments in addressing nine priority environmental issues identified in a city consultation workshop. These include improving solid waste management and upgrading un-serviced settlements. Several working groups have been established which have brought together important experience on solid waste, community development and privatization.

PLAN International, an NGO, is supporting emerging community management structures by proposing Tawi Development Committee's. Its representatives will join Area Development Committees, which will be responsible for development activities at ward level, such as waste management.

4. Institutional framework for sub-sector

Both the central and local governments in Tanzania are responsible for planning and management of urban development. The central government is mainly responsible for policy matters, while the local authorities are responsible for the implementation and management of development. For employment issues, the Ministry of Labour and Youth Development is responsible for policy making and implementation. Further, the Ministry is also involved in implementing various schemes in urban areas in collaboration with the local authorities. The Economics and Trade Department of the DCC deals with, inter alia, development of micro-enterprise activities.

Typically urban matters are dealt with by several Government departments. The local authorities are responsible for area planning and management of municipal services, including maintenance of infrastructure and solid waste collection and disposal. In the case of Dar es Salaam, this takes place through a decentralized structure based on Zonal offices of the City Council. Technical support and guidance to the municipalities come largely from the Ministry of Lands, Housing and Urban Development. However, in the informal settlements where the majority of the urban population live, the actual management of their current affairs is largely carried out by the communities themselves, often with assistance of Zonal Community Development Officers.

The SDP is developing a new mechanism in planning and managing urban development aiming at the establishment of a partnership between Government line ministries, service-providing agencies, the private sector and non-governmental organizations (NGOs) and Community-Based Organizations (CBO's).

In November 1994 the National Employment Council (NEC) was established to deal specifically with income generation issues under NIGP. In executing its duties the council will liaise with the relevant Government ministries, the private sector (consultancy firms contractors and other entrepreneurs), NGOs and CBOs.

II. BACKGROUND AND JUSTIFICATION

1. Introduction

In many developing countries, the problem of waste accumulation is becoming a serious threat to the health situation of many of its inhabitants. Waste which is not well managed easily becomes a health hazard, facilitating the spread of diseases. Not only are garbage dumps created at random, but waste is also preventing the effective drainage of rain water, and, as a consequence, increasing the risks of flooding.

Many countries have responded to the problem of urban waste by introducing solid waste management systems. In most cases these systems are initiated and managed by the local government. The Dar es Salaam City Council also has embarked on a strategy for improved solid waste management, with as a principal element the greater involvement of the private sector in waste collection and recycling. This strategy aims at establishing a public/private partnership through the support of community-based and individual waste treatment and the complementary provision of public transport and dumping facilities. The merit of an integrated city waste management plan based on such a partnership lies primarily in its potentially large positive impact on the creation of employment opportunities.

2. Reasons leading to project formulation

One of the major problems in the implementation of the settlement upgrading efforts undertaken by the City Council is the randomly deposited household waste. The undesirable impact of rampant waste on citizens health and hygiene is evident, but a more indirect setback on the efforts to upgrade settlements is its detrimental effect on effective drainage. The aforementioned ILO/UNCHS/UNV project in Hanna Nasif therefore had included, in 1993, a special component in its proposed approach to alleviate this problem. For budgetary reasons, however, this objective had to be deleted from the final project document. Once started, the project succeeded in mobilizing other ILO funds to carry out a study on community-based waste collection and composting. Subsequently, and pursuant to its objectives, the NIGP requested the ILO to carry out an advisory mission to facilitate the formulation of an overall, integrated solid waste management strategy for the whole of Dar es Salaam. This request was also inspired by a need expressed by the SDP/City Council for a special support programme under NIGP to implement a waste management strategy. Furthermore, the ILO advisory mission was thought to build upon preparatory work undertaken within the framework of the interregional project "Urban Informal Development Support", which has as one of its main objectives the promotion of microenterprises engaged waste management.

Under TSS-2 financing by UNDP, the ILO undertook to contribute to the elaboration and formulation of a comprehensive Support Programme which was to accompany the implementation of the integrated strategy by public and private bodies. As many different stakeholders were involved (local government, community-based organizations, entrepreneurial associations, private businesses, NGO's), the mission aimed primarily at *facilitating* the integration of the interests of all concerned in the programme strategy.

To facilitate the Project Formulation Mission in carrying out this assignment, a national consultant was appointed by the ILO to identify existing background studies and experience and assist in the formulation process of a support programme. The mission's anticipated outputs were:

1. a consensus of the solid waste management strategy to be implemented.
2. participating local partners identified and prepared to take on implementing responsibility.
3. a comprehensive overview of the supply of waste and the market for recycled products, of the actors presently involved and the development constraints prohibiting the evolution of the sub-sector.
4. a proposed Support Programme for the implementation of the Integrated Solid Waste Management Strategy, submitted to the NIGP for financial support.

During the formulation period, two workshops were held: one to collect and discuss inputs from future programme participants (May, 1995), and one for the joint appraisal of a the first Draft Programme and to raise commitment from the stakeholders (July, 1995). The present documents includes most of the contributions made during these two workshops.

3. Solid waste generation in Dar es Salaam

Municipal solid waste are defined to include: refuse from households, nonhazardous solid (not sludge or semi solid) waste from industrial and commercial establishments, refuse from institutions (including non-pathogenic waste from hospitals), market waste, yard waste, and street sweepings (Cointreau-Levine, in: WASTE Consultants, 1995). Estimation of waste from various generators can be used as basis for estimating the total waste generated in the city.

Domestic solid waste are all the wastes generated at households and income level usually is a determining factor for domestic solid waste generation rate. Haskoning and M-konsult in 1988 established the average rate of 0.34 kg/cap./day, while the survey conducted in high, medium and low income settlements by Ame, A. (Ardhi Institute, 1993), lead to the determination of average domestic generation rate of 0.39 kg/cap./day. Currently there are 20 big markets in Dar es salaam city. Kariakoo market is the biggest and the recent studies have shown that its waste generation per day is quite big compared to the other remaining 19 markets. Haskoning and M-Konsult (1989) determined the total market waste in Dar es Salaam to be 150 ton/day, while in a more recent study (Ame, A, 1993) the Dar es salaam market waste was determined to be 206.8 ton/day. Estimation of the total commercial waste generated within Dar es salaam city has been done by conducting a survey on selected restaurants and hotels. This method was used by Haskoning and M-Konsult in 1989. From a survey of such selected enterprises the quantity of waste generated in this sector in Dar es Salaam was assessed at 45 ton/day.

Institutional waste is normally generated by public like government offices, Universities, schools, the airports the army etc. Institutional waste is also generated by private companies conducting commercial services such as banks, insurance companies etc. Haki R.B, 1993 (Ardhi Institute), on a study based on field measurements on the institutional waste established generation rates of 0.173, 0.209 and 0.095 kg/cap./day for the University of Dar es salaam, Ardhi Institute and Water resources institute respectively. Hospital waste in Dar es salaam has been estimated through a study in selected major hospitals in Dar es salaam (10 major private and government owned hospitals), complemented by data analysis of hospital waste collected by city trucks and by interviews with hospital staff.

The total solid waste generation in Dar es Salaam as determined by Haskoning/M-Konsult (1988), Manus Coffey (1992) and Kaseva/ILO (1995) is as indicated in the table below:

Table 1: Dar es salaam city solid waste generation

Waste category	1988 (tons/day)	1992 (tons/day)	1995 (tons/day)
Domestic	650	860	975
Commercial	45	50	53
Institutional	60	80	101
Market	200	200	200 *
Others including Industrial waste	185	230	230 *
Total	1140	1420	1559

* Default values in absence of current data

4. Waste composition

The analysis of waste composition has been conducted at various collection points to determine the percentage share by weight of different components. The predominance of organic waste components is generally confirmed by recent findings of an ILO-commissioned study carried out in Hanna Nassif (if the sand component is disregarded). Most likely, the composition in higher-income areas of Dar es Salaam will be different.

Based on those percentages the actual amount of each component has been estimated for the whole of Dar es Salaam as shown in table 2 below.

Table 2. Extrapolated amount of waste components generated in Dar es Salaam city in 1995

Waste component	Percentage by wet weight	Amount tons/day
Food/vegetable	59.8	932
Papers	8.7	136
metals	2.8	44
Plastics	1.9	30
Glass	0.4	6
Textile	0.9	14
Others	25.5	397
Total	100	1559

This composition analysis was done using fresh wastes (before sorting) at collection points. Since markets dispose their wastes directly to the dump site, this analyzed waste composition is taken to represent only domestic, commercial and institutional sources which dispose their waste first to collection centers.

5. Solid waste collection and disposal

Various institutions involved in the collection of solid waste in the city have been identified as the City council, Communities (especially from the markets), Individuals (from households), Private enterprises (eg MULTINET), Hospitals and Institutions (like the University, Banks, Diplomatic missions, etc). There are also various destinations of the collected solid waste. Crude dumping, burying and filling of the gullies by the collected waste to prevent soil erosion is commonly practised by many individuals, while the city council normally disposes of the waste at Vingunguti dump site. Recent studies have similarly indicated that small scale and large scale enterprise recycling and reuse of the waste is practised in Dar es salaam.

6. Solid waste recycling

Recent analysis indicates that there are about 600 scavengers in Dar es Salaam daily, many of whom are at the main Vingunguti dump site and others at various collection centers. The intermediate handling of recyclable materials is hardly organized. Sorted materials are sent and sold directly to the users. The recent findings have however indicated that factories prefer buying the recyclable wastes in bulky quantities, and this has been achieved through the use of middle men (e.g. KIOO Ltd. and Aluminum Africa). Research from 1993 indicate the following amounts of materials in kg. recycled daily by scavengers: Paper: 1446, Metal: 1710, Plastics: 1428, Glass, 185: Textiles, 132.

These recycled materials are re-used as follows:

i) Metal: Metal sheets are made into charcoal stoves, dust bins, pot lids and other kinds of kitchen utensils. Tins and cans are used for making local lamps, charcoal stoves, utensils for fetching water, pot lids and others. The only large enterprise recycling is Aluminum Africa which recycles 1.1 tons/day.

ii) Papers: Clean papers are mainly sold to fish vendors and others, to be used as wrapping materials. Kibo paper milling industry recycles about 20 ton/day.

iii) Textiles: Textile wastes and sometimes spongy materials are sold to local pillow makers for making pillows.

iv) Glass bottles: These are re-used for storage purpose, some of them are purchased by patients on their way to hospitals to collect medicine and some are used by local herbalist who sell the herbs in the streets. At KIOO industry internal (recycling and reprocessing of all cullet from within the industry) accounts for 20% of the total glass processed in the industry, while the external recycling accounts for 10 - 15% of the total glass processed in the industry.

v) Leather and rubber: Plastic sheets are used as covering materials an the top of street shop corners while plastics bottles are put back into use for storage purpose and sometimes used in making local sinks and toilet bows cleaners.

7. Constraints on the existing situation

At a workshop held with resource persons in May, 1995 in Dar es Salaam, the following constraints on the existing solid waste management have been identified:

a) Constraints at the waste sources:

Poor housekeeping habits and the use of inappropriate/crude technology has resulted in excess amounts of waste generated at household and factories. The lack of waste bins and packaging materials and lack of awareness and knowledge on sorting at the source adds to the growing volume of waste.

b) Constraints for waste movers:

The main constraints at this level have been identified as lack of authorized or recognized collection points, poor infrastructure i.e roads and transport capacity, insufficient financial resources, poor transport management and maintenance systems, over centralization of solid waste collection system, lack of integration at different levels/means of collection (e.g. wheelbarrows, carts, trucks) and lack of transparency on the use of various revenues collected by the city council. Similarly, lack of by-laws enforcement, adherence to them by the public, insufficient or lack of database and poor exchange of information has contributed to the poor solid waste management in the city.

c) Constraints at the waste destination:

Lack of environmentally and publicly accepted waste disposal site and poor access to the dump site have been identified as the main constraints. Others are lack of financial resources for the construction of additional dump sites, lack of organization and recognition of small scale recycling (scavengers), and insufficient productive resources and support for these enterprises. Other constraints are very poor working conditions for scavengers and working children, and insufficient market information and -linkages for small scale recycling industry.

III. PROBLEMS TO BE ADDRESSED BY THE SUPPORT PROGRAMME

The previous Chapter has given an inventory of the problems involved in getting an effective solid waste management in place. The Support Programme is not designed to address all of these at once. Instead, following the consultations with the actors involved, it will focus on the following areas of support:

1. the creation of facilitating set of rules and regulations for the effective participation of the private sector and CBO's;
2. capacity-building among public and private actors to take up their respective roles in an effective solid waste management strategy
3. promotion of community-based collection and transport systems
4. support to small business development in clean and safe waste treatment and recycling activities (creating markets and equipping actors with skills and technology and credit)
5. establishment and management of collection-, transfer- and dumping sites

In addressing these issues, the Programme - giving its limited initial duration of three years - will opt for a phased approach.

1. Rules and regulations

The existing legal and regulatory conditions which govern municipal waste management in Dar es Salaam are not fully adequate for the participation of the private sector and CBO. Only recently, in February 1994, a specific set of by-laws has been developed to allow waste pick up and client fee collection by a private enterprise in the Central Business District. After 12 months of operation, however, problems arose about the validity of the arrangements and the safeguarding of all interests under these by-laws. Before extending or replicating similar arrangements for privatization and/or sub-contracting, a review of the regulations is required and a new set of by-laws may have to be introduced.

A number of issues should, in that process, be addressed. First, existing public contract laws may prevent sub-contracting to the type of firms that the Support Programme intends to promote, like small contractors and small recycling enterprises. Financial criteria may be too stringent, or procedures may be too cumbersome and costly for small entities to afford. Second, the legal instruments and capacity to manage sub-contracts and take appropriate action in case of under-performance, may be lacking. Third, prevailing health and safety regulations may be inappropriate for the capacity of small, informal enterprises to finance adequate provisions. Fourth, certain environmental laws may not be in line with the practice of presumably unhealthy or "dirty" business.

But regulations also determine the functioning of enterprises, CBO's and NGO's. A guide is required for the choice of legal status for enterprises wanting to engage in waste treatment, whilst for associations and NGO's options for their internal regulations should be elaborated, which would allow them to profit maximally of the business opportunities created in a privatised waste management scheme. The fiscal aspects of enterprise creation and growth should also be addressed to obtain an optimal result from an employment promotion strategy through private enterprise development.

Before continuing the privatization of municipal services, a procedure for competitive bidding would have to be determined. The Support Programme should assist in the design and management of that process. In general terms, privatization should be guided by three principles: *transparency, competition and accountability*. The principle aim of the Programme is to maximize the employment impact of privatised functions. Therefore, small enterprises and their associations, CBO's and supportive NGO's should be the prime candidates to enter into sub-contracts or franchising arrangements. Encouraging examples of such participation can be found in Costa Rica, where a local NGO - assisted by the ILO - was given the responsibility for establishing a group of microenterprises for waste collection and to provide these with training. The microenterprises organized the various tasks and areas to be serviced, and could contract their own workforce, including outgoing civil servants. Clients do not pay the microenterprises directly, but instead pay taxes and fees to the Municipal Government, who in turn contracts the microenterprises through the NGO.

There are other examples where clients do pay directly to the servicing enterprises. This improves accountability and customers control, but reduces the potential for revenue generation by the municipality to finance complementary services, such as a landfill. An issue which has to be addressed, therefore, is the costs involved in the current waste collection and disposal system, and the future costs of an improved, integrated system. In addition, the revenue-base should be

assessed, both assuming cost-based fee payment and indirect financing through taxation. Once these parameters are known and an investment and financial forecast has been calculated, a waste management plan can be drawn up that will eventually pay for itself and allows for gradual extension to the whole of Dar es Salaam. This, however, assumes that the start-up costs and long-term investments are financed externally, based on a firm and long-term commitment from donors and private investors.

The presented and other types of privatization can improve significantly the amount of waste to be collected and disposed of, but can never substitute an overall, **municipally-based and integrated** solid waste management strategy. The task of the City Council is to ensure that the various services provided by the private sector are complementary and cost-effective. Its role is confined to facilitation, coordination and supervision - tasks which can not be delegated to the private sector.

2. Local capacity building

Perhaps even more than adequate legal provisions is the *technical and managerial capacity* of both public and private actors to actually carry out the tasks assigned to them in the waste management strategy. It has become clear that the City Council is not in a position to fulfil its role in clearing and depositing the municipal waste. The City Emergency Clean up Project in 1992, although having increased significantly the collection of piled up waste, has not resulted in a lasting and overall improved coverage of Dar es Salaam. The privatization experiment whereby MULTINET Ltd. collect both the solid waste and the refuse collection fee has led to reciprocal claims by the company and the City Council over outstanding payments. Although thought of as a way to improve the efficacy of the City's fleet of garbage trucks, the arrangement that MULTINET hires the vehicles from the City to collect waste also from the very Municipal services and Departments seems unnecessary complicated and prone to managerial conflicts. The City Council may have satisfactorily monitored and sanctioned the company's performance. On the other hand, MULTINET's efforts to recover debts from institutional clients have been frustrated by legal deficiencies. In the future, both the legal framework and the capacity to monitor the implementation have to be strengthened before new contracts will be offered.

The roles to be assigned to private sector actors, including CBO's and NGO's, also need to be explained and guided. At present, few of them are ready to serve as partner for the municipal government and to extend collection and other services to all urban zones. An important area for capacity building is the primary waste collection systems including separation at source, neighbourhood collection centers and compost plants. This requires an education and counselling effort both on the side of the municipality (community contracting) and with the CBO's. Women constitute an important target group in this respect. The ILO has accumulated valuable experience with the role of CBO's through the Hanna Nassif project, jointly executed with UNCHS and UNV. The recently submitted project proposal entitled "*Community-based settlement upgrading to alleviate urban poverty*" contains instruments to enhance the community capacity to manage infrastructural works which can be used directly to the Support Programme, or, preferably, be applied jointly.

The above cited case of the NGO in Costa Rica assisting microentrepreneurs to organize themselves and take part in a sub-contract by the municipality is another example of capacity building. The Support Programme should address the needs of micro- and small entrepreneurs

through their associations, through existing NGO's and through available and appropriate training institutions. The adoption of available recycling technology and the better use or creation of marketing channels for products are important areas for support. Another important need to address is the upgrading of financial capacities of enterprises active in waste treatment. This, again, relates to both building an appropriate support structure in terms of sources for credit and financial advice, as well as to the managerial skills of the entrepreneurs to use finance profitably.

A last group of actors whose ability to execute contracts satisfactorily is the formal private enterprises. To improve their performance, management assistance may be required. The ILO has developed a training approach called *Improve Your Business* which could be very valuable here. Also, a sector-specific methodology for small contractor training has been developed which is most suitable for the Programme. Candidates contractors are taken through the whole process of participation in bidding procedures to project execution and financial management. Small contractors should be an important partner in the waste management strategy as their impact on employment is more significant and they are inclined to use more local resources.

For many of the above mentioned problems, additional research and a continuous capacity to monitor and adjust the Programme is required, especially in view of its multi-faceted and multi-partner character. In Dar es Salaam, a well-developed research capacity is available, but needs to be focused and brought together to optimally benefit the Support Programme. Once united in a single platform or network, the available expertise can be mobilized for further investigations in such areas as waste generation, organic and non-organic waste recycling and marketing studies. These studies should include reviewing experiences from outside Tanzania, with a view to their transfer and adoption in the Support Programme. An appropriate and resourceful opportunity for international networking is given by a recently started, Dutch-funded project UWEP, implemented by WASTE Consultants, which has as objective to provide information and promote knowledge regarding community- and microenterprise-oriented waste policies and to enable local organizations to carry out waste management in low-income areas and the waste handling by microenterprises.

In guiding the Programme, special and serious attention must be given to the occupational health and working conditions which prevail in sensitive parts of the waste chain, namely in collection, recycling and at the dumpsite. Hazardous conditions occur in transforming plastics, handling household batteries and, especially, the treatment of insanitary and hospital waste.

A group with a very specific involvement in waste-related activities is working children. Their situation is often precarious both in terms of labour relations and living conditions. The Programme, in improving employment opportunities in waste management, should give very careful attention to the impact on children. The ILO's International Programme for the Elimination of Child Labour (IPEC), could provide assistance in this regard.

3. Waste collection

As mentioned above, the estimated coverage rate of waste collection in Dar es Salaam does not exceed 15%. The remainder of domestic and market waste is either buried, burned or dumped illegally. Given the intensifying pressure on land and the increasing density of the City's unplanned settlement, this practice is giving rise to mounting environmental and social hazards.

In addition, randomly deposited waste frustrates infrastructural improvements, such as storm-water drains. Where large quantities of waste are generated, like at markets, sanitary and health risks are considerable.

Improving the collection and disposal services at neighbourhood level is a felt and expressed need of many of its inhabitants, in particular by women. An ILO study carried out in Hanna Nassif in November 1994, showed that 60% of the respondents was not satisfied with the current solid waste collection and disposal system. Private waste collectors were servicing about 26% of the waste, whilst the rest was deposited by people themselves. As many as 80% of the respondents would welcome a formalized, door-to-door waste collection service for which the majority were prepared to pay a fee of 100 Tsh. per visit.

Another study, on the settlement areas of Vingunguti and Buguruni, realized in June 1994, confirmed the willingness of inhabitants to pay appropriate waste collection fees. It also reported a pronounced activity of informal private waste collectors, in particular at markets. Still, there is great need for improvement, and many stall owners, for example, stated their willingness to contribute to higher collection costs, if adequate services would be provided.

In the three research areas, the City Cleansing Department does not collect the waste. In reaction, people have organized waste disposal themselves on ad hoc and insufficient basis. In certain cases, children are also assisting in waste collection, sometimes under poor and undesirable conditions. There is a clear need to improve these self-managed, community-based collection systems and to match these with the provision of complementary services organized by the municipality.

A very important problem to address is the lack of decentralized deposit-and-transfer stations. These are required to allow for a controlled, temporary storage of collected waste. They are of one the most crucial links in the waste chain and determine to a large extent both the viability of community-based collection systems and the potential for recycling industries, as they will also serve as sorting centers for further recycling of waste products. In addition, they form the entry point for complementary, private transport services. Such stations have existed, but fell out of use when the City stopped emptying them. It is essential that these facilities are re-opened, and expanded.

To reduce the amount of waste to be collected, however, and to facilitate low-technology collection services, an increased awareness among inhabitants is required to separate household waste and re-use valuable components. A factor to be taken into account is the critical role of women as household waste managers. They constitute the single most important target group for improved, community-based domestic waste collection. An appropriate channel for organizing neighbourhood waste collection by individuals is CBO's and locally-based NGO's. Assistance is required to enable these organizations to effectively facilitate and support (associative) microenterprises in waste collection and transport.

4. Waste recycling

The re-use and recycling of waste represents an important means to reduce the overall volume of material to be transported and deposited. It also provides a potential business opportunity for many people and generates cheap consumer goods. Compared to other cities, the

potential of waste recycling seems underutilized in Dar es Salaam. As seen above, some larger companies are buying and processing glass, metal, paper and plastic waste. The recycling of organic waste, which constitutes the larger part of the city's garbage, has, however, not yet been tried on plant basis. A recent ILO study which examined the feasibility of setting up compost production plants at community level found that the main problem is the current insufficient demand for compost in Dar es Salaam. Although there may be large potential demand for compost as an alternative fertilizer, its value is relatively unknown and is seen as an inferior substitute for chicken manure. Therefore, a marketing campaign to promote the use and purchase of compost is a prerequisite for any initiative to establish composting plants. Alternative options for the re-use of organic waste which also need to be explored are: charcoal manufacturing, mushroom cultivation, biogas extraction, pig raising and sustaining public green zones.

Based on the limited available evidence, it seems that the current recycling activities of non-organic waste are to a great extent concentrated in large-scale, formal industries. They should continue to be an important consumer of recycled waste. With a view to employment creation and poverty reduction, however, future expansion of this activity should concentrate on small-scale enterprises. There is a need to develop a comprehensive support programme for existing and starting recycling businesses. It should be considered to utilize technological and managerial know-how in formal, large-scale enterprises through attachment-programmes (such as KIOO and Aluminium Africa). This support should have general business improvement elements such as management and marketing training, but must also include an important focus on technology. In the recycling sector in other Third World countries (Egypt, The Philippines, India), a good range of adequate technologies are practised and available for being transferred. Copying and adjusting waste processing devices represent in itself a business opportunity for metal and machine working enterprises, thus amplifying the employment impact. Technological innovations should also be selected on their impact on occupational safety and health, which should be a general concern in developing a small enterprise support programme. Another important element of a support programme is access to adequate finance for initial investment. Lastly, as in the case of compost, an increased awareness and increased willingness to purchase recycled products is conditional for successful promotion of this industry. Attractive pricing is a key instrument in such a marketing strategy.

The proposed Support Programme should not only focus on small enterprises. An important group in the waste chain which undertakes recycling is scavengers, and more importantly, children. Their role as separators and providers of raw materials for recycling is essential and will continue to exist, if not expand when the recycling industry expands. Appropriate support is required to address the often appalling, unsanitary and hazardous working conditions of scavengers. This support should begin with assistance to self-organization, on the basis of which a participatory needs analysis can be made. The ILO has a valuable experience in supporting NGO's working with scavengers in Manila, The Philippines, which could prove useful. An experience closer by is found in the *Zabaleen* community in Cairo, where a support programme has improved living conditions and assisted in the creation of new jobs.

5. Sanitary landfill

The promotion of recycling of organic and non-organic waste will take some years before these alternatives can substantially reduce the amount of garbage to be disposed of. It can therefore be assumed that landfilling will remain the main option for waste disposal. Landfilling

is the most manageable option for large scale waste disposal and it does not require separation of waste into a biodegradable and non-biodegradable fraction. It is, however, important that waste which contains biodegradable matter (such as household waste), is deposited in a cell with gas extraction and a provision for collection and treatment of leachate.

A properly sited, well-constructed and soundly managed landfill is an environmentally acceptable option for waste disposal. Furthermore, there are opportunities for income generation and employment creation when operating a landfill site. These include:

- employment creation for landfill operation.
- energy utilization by extraction of landfill gas
- treatment of leachate by natural systems utilizing the high nitrogen content by irrigating tree-plantation

The present and only available landfill is the Vingunguti site. Its current capacity to absorb more waste is limited due to very poor access and environmental hazards, in particular bad smell. Consequent neighbourhood protests have further aggravated the situation. There is therefore a need for at least one additional sanitary landfill. Whilst preparing for the construction of a new site, however, the Vingunguti landfill requires an improved management system and provisions against flooding and leachate problems. A study thereto, carried out by the Ardhi Institute on commission by the SDP, has identified critical areas for improvements and recommended a four phased intervention: storm water cut off drain and basic infrastructure, landfill investigations, construction and site management support.

The present Support Programme should include an intervention based on the above recommendations and the initiatives taken by the Sustainable Dar es Salaam Project, with a modifications of the proposed modality of implementation. In particular, more emphasis should be put on the labour-intensive character of the construction, using trained small contractors and expertise to the maximum extent possible. This would contribute to the creation of local capacity to construct and maintain additional landfills as well as deposit-and-transfer stations.

The Programme should further support initiatives to identify, examine and plan at least one additional sanitary landfill and assist in efforts to mobilize the required capital resources for its financing.

IV. ANTICIPATED END OF PROGRAMME SITUATION

The Support Programme is planned to last three years. Phased over this period, the following end-situation is expected:

1. Institutional and regulatory framework

The various parties involved in waste management in Dar es Salaam will be operating according to an overall, integrated solid waste management strategy. This strategy will have been developed and agreed by all stake-holders during the first year of the Support Programme. Rather than being a menu or predescribed manual of operations, the strategy provides a framework of action which serves as a guide for planning and monitoring an integrated and incremental approach.

A more facilitating set of rules and regulations will be operational that enable full private sector - both formal and small/informal - participation in the dealing with the City's waste. The procedures for sub-contracting, franchising and for the granting and application for fiscal and other incentives will be transparent and have been explained to the public. The accessibility for the private sector, in particular the micro- and small businesses, to regulatory procedures will have increased, for example through the establishment of a special facility in the City Council for privatized services. The enterprises and other productive entities such as producers' and trade organizations, will have adopted appropriate legal status and enjoy the benefits of a promotional regulatory treatment.

Together with improved collection and depositing services enjoyed by the public, increased revenues are witnessed by both the municipality and the private sector through improved fee-collection and taxation measures. An investment plan has provided for the financing of decentralized collection- and -transfer stations, private enterprises in transport and recycling and improved landfill facilities. Enterprises involved in waste collection and recycling do operate on a viable basis and contribute to the sustainability of the waste management strategy.

As the waste sector (waste collection, transport, recycling and dumping) is showing opportunities for profit making, investors and donors renew their commitment for financial support.

2. Capacity building

At Programme level, an agency or company with an independent status is managing effectively the overall waste system in Dar es Salaam. It is recognized and advised on institutional basis by all important stake-holders. The entity is characterized by full accountability and high cost-effectiveness, but it will still rely on outside financial support.

A special role is performed by a research and development group, which carries out necessary data collection on waste generation and treatment, assists in developing methodologies for community-based action and undertakes feasibility studies on technology improvements. Periodic self-evaluation of the Support Programme are held and the results are used for programme improvement.

At target group level, the municipality will be capable to offer, manage and control sub-contracts to the private sector. Sites for new landfills will have been allocated and the municipality is actively supporting their proper maintenance. The establishment of collection-and-transfer stations is facilitated through lease of land and the provision of licences. The capacity of the municipality to enforce adherence to fee-payment and to quality standards and labour standards in the enterprises who are involved, has increased.

Community-based organizations and NGO's are supporting neighbourhood collection services, either by associations or individual microenterprises, and are sensitizing households for separation of domestic waste and proper packaging. They are supporting fee-collection measures and capable to manage the use of these fees, as well as the operation of collection-and-transfer stations.

Micro- and small enterprises engaged in waste collection and recycling are capable of running their operations through improved technical, financial and marketing skills. Small contractors are able and do execute public contracts according to performance standards. Transport companies have improved the management of their vehicle fleet and are effectively assisting in depositing of waste. The management of the landfill has improved its supervisory capacity, is characterized by accountability and its ability to generate revenues. An organization of scavengers is capable of vocalizing the needs of its members and is instrumental in improving their living and working conditions.

3. Waste collection

In three neighbourhoods waste is being collected in an organized manner by either community groups or private enterprises, generating more than 60 jobs in total. Inhabitants, especially the women, are aware of the potential of income and employment generation potential of waste and contribute to separation of waste.

In each of the three neighbourhoods, collection-and-transfer points have been designated, equipped, and started operations. Jobs, for both women and men, have been created and - in the case of physical construction of a transfer station - small construction enterprises strengthened in this process. Working conditions are compatible with local standards on occupational safety and health, and the management of the centers is adhering to these. CBO's are managing the centers themselves or either contracting the management of the centers to private enterprises. At the transfer stations, recyclable components are separated, treated and/or sold. The CBO's are ensuring that the remainder of the waste is transferred to the landfill by private transport enterprises.

4. Waste recycling

The Dar es Salaam population is buying more recycled products. There is increased awareness of the merit of recycling and prices of products are competitive. Marketing channels have been developed with the support of the public authorities and private enterprises.

Existing small-scale recycling enterprises have increased productivity and employment and new units are set up. The total amount of new jobs exceeds 150, at least half of them for women. Scavengers have increased their revenues because of increased demand and improved self-

organization, and their living conditions have improved. Through awareness raising and supportive action, the role of children is reduced to a minimum and they have access to education and medical services.

A comprehensive business support programme is assisting clients in identifying and acquiring technologies, finance and markets. Through its intervention, at least 30 small enterprises have received and fully reimbursed a loan for investment and working capital expenditure. Other enterprises needing credit are being recommended to financial institutions and counselled by the support programme. It has further trained 60 entrepreneurs, men and women, in improved business management and on safe and healthy working conditions, esp. with regard to newly introduced technologies.

5. Sanitary landfill

The Vungunguti landfill is operating under improved conditions and creates less nuisance for the adjacent inhabitants. Flooding is considerably reduced, leaching is controlled and access roads have been improved. The site is better managed and generates revenues.

A new landfill has been designed on the basis of thorough studies on the requirements for safe waste disposal. Options for biogas extraction and leachate treatment have been studied and taken into account. An investment plan has been made and negotiated with financial institutions. Construction of the landfill has begun and is planned to utilize a maximum of labour-intensive methods and/or small contractors.

V. PROGRAMME STRATEGY

1. An integrated strategy.

Most solid waste management strategies focus on collection, disposal and storage of waste products only. An *integrated* strategy includes all steps in the waste product chain. Particular emphasis would be placed on adding programme elements focusing on recycling of waste at the source and elsewhere. This not only reduces the quantity of material to be transported and dumped at a safe site, it also creates opportunities for employment creation and income generation.

A second qualification of the integrative character of the programme is the complementarity of public services and private initiatives. The main types of actors involved in solid waste management are: the municipal government, the formal private sector, the informal private sector and community-based organizations/NGO's. These actors can only work together if a favourable regulatory and institutional framework exists. It is the role of the municipal government to create and maintain such an enabling environment. A supportive framework would, for example, include tax exemptions for starting waste collecting enterprises, or admission of associative undertakings in a bidding procedure for private waste transport services. Also, the local government should make efforts to promote the use of recycled products, both in the public sector and by private consumers.

A third element of an integrated strategy is the expansion of the number of dump sites in an environmentally sound manner. The identification of alternative locations and the collection

of necessary survey data would involve local engineering firms. The actual construction of new dump sites would be undertaken by local contractors, eventually supported by technical training based on the ILO methodology of contractor training. In a similar manner, private contracts could be established with community groups for the collection and central disposing of garbage. Useful experience in community contracting is locally available in Hanna Nassif, where a joint ILO/UNCHS/UNV project is assisting the carrying out of infrastructural works based on such partnership.

In a sense, an integrated (or holistic) approach to an improvement in living conditions might look ambitious, since it would appear that everything will be done by a single programme. However, the most essential characteristic of the approach is the notion of existing and potential linkages between elements and actors in the system. All intervention anywhere in the system have an effect on the other elements, and this notion should guide the strategy whilst being implemented.

2. Incremental approach

Given this complexity, it is most important to avoid addressing the different aspects all at the same time. Consequently, a *phased, or incremental approach* is most indicated. The Support Programme will start with building partnership on a small scale, with one or two communities. Once a modality for working together is developed, new communities can be included.

A practical approach oriented towards achieving visible results in a relatively short time is highly important both to raise commitment among the public and the municipality. It will motivate other community members to contribute to waste collection and recycling, and it will increase the pressure on local government officials to reform regulations and by-laws. In this sense, a successful example could pilot both partners in the system, as well as provide lessons for the Programme itself.

A way to economize both on time and financial resources is to build upon existing collection and recycling activities, and expand from there. The services of MULTINET Ltd. could, for example, be expanded to other neighbourhoods, where - simultaneously - community-based collection is initiated. These communities should be selected on their willingness and possible experience with such action. The UNCHS proposal for a community infrastructure programme settlement (March, 1995) could provide useful guidance in this selection.

3. Incentive-based mechanisms

The key to successful privatization of public services is providing incentives to the intended partners for their effective participation. Inhabitants of the city must see an immediate benefit and be able to rely on sustained waste collection. Once recycling activities become more profitable, households will be able to sell valuable waste products, such as glass and paper. But to ensure regular fee payment for collection services, sanctions can also provide the incentive for adherence: proof of payment could be linked to access to other community services, like joint transport or housing. For enterprises, business licenses could be made conditional on waste collection fee payment, as could access to training and credit.

For those enterprises who start venturing in waste activities, tax benefits could be introduced. But in case they substitute public services, they should be entitled and have legal access to prosecuting debtors.

The most important, overall incentive is, however, the potential for job- and income generation. Once waste becomes recognized as a source of wealth, more and more people will be inclined to set up a business and provide services.

4. Focus on sub-contracting and franchising

The effective management of solid waste is a complex and difficult issue, since it needs to deal with practical all aspects of the waste chain. In addition, it involves relating to a large variety of partners - public and private - which will have to work together in effective manner. The programme strategy will, therefore, be based on the principle of specific sub-contracts within an overall, facilitating framework. To emphasize the employment creation goal of the Programme through enterprise development, these sub-contracts will in the first place be awarded to private and community-based entities, incl. NGO's. Public institutions with a potential for job creation could also be included.

Tentatively, the following major components could be sub-contracted:

- a) community-based waste collection and organic waste recycling
- b) development support for recycling small enterprises
- c) construction and management of collection-and-transfer stations
- d) transportation from intermediate station to landfill
- e) design, construction and management of landfill
- f) research and development

VI. INSTITUTIONAL FRAMEWORK

The Programme strategy as outlined above has important consequences for the institutional set up to be chosen. The management of the Programme has to strike a balance between working in partnership, on the one hand, and managerial and financial autonomy, on the other. The recommended approach of sub-contracting to private entities will already establish partnership and complementarity. But in addition, the many stake-holders involved should be given a role in the management of the Programme.

Consequently, it is proposed to delegate the execution of the Support Programme to an independent and autonomous Project Management Team, supported by a Steering Committee with a mandate to advise and monitor. The team would exist of a Programme Manager and Contract Supervisor, assisted by a professional secretariat. For the preparation and evaluation of the specific sub-contracts, temporary consultants would be engaged.

At the end of the Programme, the management team should have established, together with the Steering Committee, an Agency for City Waste Management. Whether this Agency should be a private, limited company, a parastatal or an NGO should be decided during the implementation of the Programme. The aim of the Programme is to have reached institutional sustainability of the Agency. Suggested profile of the implementing agency is given in annex V.

The composition of the Steering Committee should be based on the intended partnership to be established. Recommended members are: representatives of Prime Ministers Office, Ministry of Lands, Housing and Urban Development, City Council, NIGP, private contracting firms, private recycling firms, small-scale recycling enterprises, private waste transport firms (such as

MULTINET Ltd.), TAKAGAS, CBO's, NGO's and institutions active in community mobilization and/or small business support, financial institutions and intermediaries, research institutions.

Specialized agencies like ILO and UNCHS could also be invited as resource persons.

At the end of the programme, this steering committee could possibly be transformed in a Board of Directors for the Agency.

VII. TARGET GROUP AND PROGRAMME BENEFICIARIES

The intended beneficiaries of the Support Programme are men and women residing in Dar es Salaam who will live in a cleaner and healthier environment and have increased access to employment and income opportunities.

The direct programme participants will be:

1. *Micro level*: private sector actors, such as small individual and group enterprises - often consisting of previously unemployed or scavengers - who are involved in waste collection, transporting, recycling and selling; small enterprises involved in site construction and management

2. *Meso level*: intermediate organizations supporting the private sector response to newly created job opportunities, like Community-based organizations, NGO's, Business Service Associations, Industrial Cooperatives, and also financial institutions. An additional participant group is research institutions expected to assist in the guiding and evaluation of the Programme ;

3. *Macro level*: municipal officials responsible for facilitating and supervising the private sector contribution to waste management .

VIII. OBJECTIVES

DEVELOPMENT OBJECTIVE:

- *improved living conditions and increased employment opportunities through effective and sustainable solid waste management in Dar es Salaam*

IMMEDIATE OBJECTIVES :

INSTITUTIONAL DEVELOPMENT

1. • *a sustainable integrated solid waste management strategy in place with the involvement of private sector in waste collection, recycling, transport, site construction and management*
2. • *increased local capacities in public, community-based and private bodies to sustain and expand the solid waste management strategy*

DIRECT SUPPORT

3. • *improved waste collection systems with maximum involvement of community-based organizations and small enterprises*
4. • *improved re-use and recycling of solid waste by viable small enterprises*
5. • *improved waste dumping facilities*

IX. OUTPUTS AND ACTIVITIES

related to Objective 1

Output 1.1. a strategy document adopted by the Programme Management and agreed by all important stakeholders

Activities

- 1.1.1. elaborate the current Support Programme into an operational strategy through a process of consultations with the Steering Committee members
- 1.1.2. commission additional research where required, for example for an update on volume and composition of solid waste, or on recycling networks and markets;
- 1.1.3. determine the priorities and phasing of implementation;
- 1.1.4. gain agreement and commitment on the strategy and its implementation framework

Output 1.2. a review undertaken of rules and regulations governing waste management by different private sector actors, incl. CBO's and NGO's, and proposals made for the creation of a facilitating institutional and regulatory framework.

Activities 1.2.1. commission a study for a comprehensive review of institutional and regulatory barriers to effective private sector participation, including data collection among municipal officers, lawyers, private enterprises and other relevant institutions and organizations
1.2.2. review past experience of privatization with MULTINET
1.2.3. review and discuss study results with Steering Committee
1.2.4. propose reform of institutions and regulatory mechanisms, in particular appropriate by-laws
1.2.5. mobilize support and lobby intensively for the adoption and implementation of the newly proposed regulations

Output 1.3. an assessment of the costs of effective waste management and the capacity for revenue generation from fee collection; a proposal for improved cost-recovery mechanism.

Activities 1.3.1. commission a study on the costs of waste management and revenue generation potential, comparing alternative options such as taxation, service-based fee collection, cross-subsidization;
1.3.2. propose alternative cost-recovery mechanisms to programme partners
1.3.3. design incentive-based mechanisms for public and private sector contributions;
1.3.3. investigate on additional sources for investment in Tanzania and abroad;

Output 1.4. a procedure designed and operational for the contracting and contract supervision of programme components

Activities 1.4.1. examine different options for sub-contracting components of the Programme
1.4.2. formulate a procedure manual for tendering, appraising and contracting
1.4.3. establish procedures through introductory meetings with potential candidates and publications (registration, short-listing, bidding, appraisal).

related to Objective 2

Output 2.1. 20 City Council staff, 3 community-based organizations and/or NGO's, a business support organization and 2 large-scale enterprises trained in managing and supporting solid waste collection, recycling and disposal

Activities 1.2.1. organize training courses and exchange visits for municipal staff to become familiar with privatized waste management services; train staff in management of sub-contracts, including financial and legal aspects
1.2.2. train and counsel CBO's in the initiation of local collection schemes, in the formation of associative microenterprises and the (co-)management of collection-and-transfer centers and a pilot compost plant
1.2.3. translate in Swahili and provide training materials and guidance to trainers of a small business development organization for improving and customizing their support to entrepreneurs engaged in waste handling

1.2.4. organize exchange visits and peer training facilities for personnel of such a support organization to facilitate transfer of technological innovations and new marketing techniques

1.2.5. sensitize and support scavengers to encourage self-organization for improvements in working and living conditions

1.2.6. provide social, medical and educational support for working children.

Output 2.2. A network of research capacity identified and linked to the Support Programme for effective support during implementation

- Activities
- 2.2.1. identifying and sensitizing research institutions in Tanzania to join a network of waste-related investigators
 - 2.2.2. organize an inauguration symposium with international attendance to link with experience and support from abroad (in particular from UNCHS Nairobi and WASTE Consultants)
 - 2.2.3. determining critical areas of programme support and matching these with available research and development capacities, and where needed upgrade these.

Output 2.3. A database on waste management created and made accessible to users

- Activities
- 2.3.1. liaise with the SDP Solid Waste Working Group for the identification of data sources and to assemble background documents, lists of resource persons, project reports, technology source lists, etc.
 - 2.3.2. transform an existing entity, for example part of a SDP Working Group, into a Data Desk to which the Programme's institutional partners (and others) can have easy access

related to Objective 3

Output 3.1. agreed community plans for solid waste collection and transportation in three neighbourhoods

- Activities
- 3.1.1. establish contacts with organizations in the selected areas and ascertain the extent of their social legitimacy and commitment to contribute to waste management
 - 3.1.2. assist CBO's and NGO's in familiarizing themselves with community-based collection and transfer of waste, and provide guidance in mobilizing support from inhabitants, in particular from women
 - 3.1.3. show and explain model Community Action Plans and assist in the formulation of such a Plan for waste management

Output 3.2. an awareness campaign for improved solid waste treatment by house-holds

- Activities
- 3.2.1. identify existing and alternative mass communication channels for reaching large numbers of the intended programme target group
 - 3.2.2. design campaign materials in Swahili on benefits of recycling and the need for organized collection and transfer of waste and separation at source

3.2.3. promote purchasing of recycled products by households through mediatizing key consumer behaviour (institutions, politicians, music stars, etc.)

Output 3.3. at least one waste collection (associative) enterprise set up and operating in each of the three neighbourhoods

Activities

- 3.3.1. identify - through CBO's, NGO's and a small business development organization - unemployed people capable and willing to engage in waste collection and recycling, in particular women
- 3.3.2. ensure compatibility with by-laws franchising regulations
- 3.3.3. organize group of candidates, carry out training needs assessment and, consequently, training
- 3.3.4. assist in the establishment of a simple business plan
- 3.3.5. determine, jointly with the CBO's and NGO's, the level and modality of fee-collection
- 3.3.6. establish transparent accounting system
- 3.3.7. register the enterprise
- 3.3.8. conclude subcontract
- 3.3.9. provide initial equipment such as handcarts, bags and protective gear
- 3.3.10. assist CBO's and NGO's in undertaking introduction campaign and launching of enterprise
- 3.3.11. mobilize required additional business support.

Output 3.4. a collection and transfer station set up and operating in three neighbourhoods

Activities

- 3.4.1. liaise with CBO's and City Council to identify requirements and options for establishing collection and transfer station
- 3.4.2. assess scope and feasibility and make cost estimate of station
- 3.4.3. consider various options for intermediate transfer stations/points
- 3.4.4. assist in the acquiring of a site
- 3.4.5. mobilize additional investment funds and finalize grant agreement
- 3.4.6. establish subcontract
- 3.4.7. draw up a physical plan and construction scheme utilizing local manual labour and small contractors
- 3.4.8. ensure proper training and contract implementation by contractors, with assistance from NCC and current support programmes on labour-intensive infrastructure provision
- 3.4.9. prepare financial management plan and management contract of transfer station and, if required, ensure appropriate supplementary training and guidance, in particular on safety and health aspects
- 3.4.10. ensure fee-payment by users
- 3.4.11. ensure complementary transfer services from station to dumpsite.

related to Objective 4

Output 4.1. an operating pilot compost plant in one neighbourhood which shows viability

Activities

- 4.1.1. select a neighbourhood with sufficient organic waste generation and close enough to clients for compost
- 4.1.2. liaise with CBO's to identify requirements and options for establishing a compost plant
- 4.4.3. assess feasibility and make real cost estimate of plant
- 4.4.4. establish subcontract
- 4.4.5. assist in the acquiring of a site
- 4.4.6. identify potential workers and draw up basic business plan, with a special emphasis on pricing and marketing
- 4.4.7. ensure proper construction of plant and safe and healthy working conditions
- 4.4.8. making available an expert in composting for extension services and assistance in start-up period
- 4.4.9. identify desirability and feasibility of complementary income-earning activities such as pig raising and farming
- 4.4.10. assist in start-up of compost plant.

Output 4.2. at least 200 new jobs created through promoting small enterprises in recycling paper, glass, metal and others

Activities

- 4.2.1. identifying existing small business development organizations for extending their assistance to small recycling enterprises
- 4.2.2. assist in the identification and creation of market opportunities for recycled products
- 4.2.3. shape a specific, comprehensive support programme for identified, viable business ideas (including financial assistance to 30 clients, technology support and skill upgrading, among others through exchange visits)
- 4.2.4. determine, with male and female beneficiaries, modalities of participation in support programmes
- 4.2.5. carry out support programme
- 4.2.6. encourage peer training and business linkages with other, large-scale enterprises for improving market links and business management

Output 4.3. a group of scavengers organized and action initiated for improving their working and living conditions

Activities

- 4.3.1. identify and contact scavengers, including children, for initial assessment of social organization and prevailing working and living conditions
- 4.3.2. undertake sensitization and mobilization visits to encourage self-organization
- 4.3.3. jointly analyze problem areas and possible solutions
- 4.3.4. support initiatives for improving conditions
- 4.3.5. develop contacts with other actors in waste sector and with organizations capable and willing to assist in self-help

related to Objective 5

Output 5.1. an environmentally improved and more effectively managed landfill, including eventual biogas extraction and separate leachate collection and treatment.

Activities 5.1.1. determine the need, scope and costs of improving the existing landfill along the lines specified below (for additional sites)

5.1.2. prepare and realize a site management support programme as indicated in SDP Concept Paper Two of May, 1995

Output 5.2. a new landfill is established which is constructed on an environmentally sustainable basis and with maximum use of labour-based methods

Activities 5.2.1. determine the need, scope and design criteria for the new landfill(s), related to the amounts and character of the refuse that will be received in the future.

5.2.2. define design criteria for a biocell for organic waste with special attention given to a) gas extraction through horizontal drainage and energy utilization, and b) leachate treatment through a combination of anaerobic biological treatment by leachate recirculation and irrigation of tree plantation

5.2.3. define the site selection criteria and selection process for localizing a new landfill, addressing in particular its environmental, social and financial aspects.

5.2.4. select a suitable site for the landfill and assist in its formal allocation

5.2.5. consider the operation and maintenance of the landfill based on the amount and character of the waste received on the landfill and the possibility of operating the landfill as two or three separate parts (biodegradable, non-biodegradable and possibly toxic waste).

5.2.6. develop a fully-costed proposal

5.2.7. present the feasibility, costs and environmental justification for a landfill with separate biocell to the responsible authorities.

5.2.8. seek funding from, among others, the Global Environmental Facility (GEF) with special reference to the possibility of reducing greenhouse gases through utilization of landfill gas.

5.2.9. construct the landfill using labour based methods and local contractors wherever possible.

In the beginning of the Support Programme and after the adoption of a strategy document (Output 1.1.), a workplan will be prepared for the phased implementation of the above activities. It is recommended, however, to immediately start with selecting one neighborhood where waste collection can be initiated, a waste transfer point be established and from where transport to the landfill is feasible. Existing recycling enterprises should be interested to obtain materials from waste collected in this neighbourhood, and a support programme should start with those units. Such a methodology will make an incremental expansion of the Support Programme possible.

X. INPUTS

<i>Personnel</i>	<i>cost estimate/year</i>
	<i>US\$</i>
1 Programme Manager	30,000
1 Contract Supervisor	24,000
14 Technical Consultants, on average 2 w/m/year, in the following fields:	56,000
- legal and regulatory issues	
- financial aspects	
- waste volume, composition and flows	
- contract management and training	
- community development	
- gender issues	
- small business development (in particular business start-up, technology dissemination and adoption, financial services, marketing, occupational safety and health)	
- self-organization	
- awareness-raising techniques	
- small contractor training	
- design of collections centers and sanitary landfill	
- transportation and logistics	
- recycling technologies, esp. compost making and selling	
- environmental issues	
<i>Other support</i>	70,000
Programme administrator	
accountant and secretary	
2 vehicles and 2 drivers	
computer and copying equipment	
installation and operation of Programme Office	
<i>Duty travel</i>	
Provision for Programme Staff travel in Dar es Salaam and abroad	15,000
<i>Subcontracts</i>	
a) community-based waste collection and organic waste recycling	(to be reviewed)
b) development support for recycling small enterprises	-
- including provisions for technology dissemination, financial services, technical-, managerial and marketing skills upgrading	-
c) construction and management of 3 collection centers	
d) upgrading existing dump site	
e) design, construction and management of additional landfill	-
f) research and development	-
- including data collection and -analysis, community-development support, feasibility studies, programme and impact evaluations	-
<i>Group training, workshops and awareness-raising (outside sub-contracts)</i>	25,000
<i>Miscellaneous</i>	15,000
Total costs per year	235,000
<u>Total core costs of 3-year Support Programme</u>	<u>700,000</u>

ANNEX I. OUTLINE FOR A COMMUNITY-BASED SOLID WASTE COLLECTION SYSTEM.

Initiating Solid Waste Management community-based collection system, including provisions for a start-up of a pilot composting plant in one neighbourhood.

I. Concept of community participation in waste collection

Community participation in any development projects is an active process by which beneficiaries (community) influence the direction and execution of development projects rather than merely receiving a share of benefits. The concept of community based approaches is the empowerment of communities. That is building and strengthening organizational and management capabilities at community level to enable themselves analyze problems and take appropriate actions against those problems.

II. Objectives of community base waste collection system

Community participation in the waste collection is expected to achieve the following main objectives:

- 1) Promotion of the capacities of the community in dealing with waste problems. By participating fully in the whole process of waste management. Community members will gain skills and mastery, determine the steps which should be taken in order to tackle the problem and in monitoring and evaluating the project being implemented.
- 2) Participation will also ensures sustainability of the initiated programme, and it is expected to take into full account the possibilities of income generation and increased employment opportunity within the community.

III. Steps to be followed in initiating a community based collection system.

- 1) Awareness creation - Implementation of community based waste collection must go hand in hand with the awareness creation among the beneficiaries. It is expected that wherever possible the programme should utilize the local organizational structure and local knowledge.
- 2) Evaluation - At this stage individuals at the community are expected to evaluate the proposal both in relation to present and future sustainability and determine the method of waste collection to be adopted and finally decide on whether to try it or not.
- 3) Site selection - After the adoption of the programme the actual work of implementing the project may start. The decision on compost plant and disposal site selection for example should be decided by the community themselves after being knowledgeable about the factors to be considered in the selection of compost sites.
- 4) Design - Participation at the early stages of the design will contributes to the success of the programme. The individuals in the community will be knowledgeable and be able to sight out the required materials which they may contribute.

- 5) Construction stage - People are expected to contribute labour for the construction work. This contributions will help to reduce the capital costs, stimulates feelings of local ownership and commitment, develops local capability and will present opportunities for the selection and training of suitable personnel for the operation and management process.
- 6) Operation and maintenance - It will be a responsibility of the community to ensure continues functioning of the programme. It is expected that people from the community will be trained for this purpose. Supports are also essential from Dar es Salaam city council.

IV. Activities involved in initiating community based -waste collection system

a) concerning residential waste

1) On-site handling waste

These involves the activities associated with handling of solid waste until they are placed in storage containers ready for collection. It is an important process in solid waste management to avoid direct handling of waste which may contain faecal materials. On-site handling will be the responsibility of the individual household. Equipments such as brooms, pans, which are locally available will be used for handling of the waste materials.

2) On-site separation of organic solid waste

For the purpose of separation, separate bins will be required for storage of organic waste materials. The materials for recovery or reuse at this stage includes glass, metals, tins and papers. Every householder is expected to be responsible for separation and collection of recyclable materials. The community health authority is expected to solicit for the marketing of the these materials in such places as Aluminum Africa, KIOO Ltd, SIDO, etc.

3) Storage of solid waste

It will be necessary to store the organic waste from the time and spot of waste production until collection. The use of steel bins is recommended as it is easy to maintain a small household container than a communal storage chamber or container. Steel bins are also resistant to corrosion and can be easily available from the shops and markets in the city. The proposed number of storage bins for the community is 1500 i.e one storage bin for every household.

Capacity of the bins: It is assumed that the population of the neighbourhood is 15,000 people with the waste generation rate of 0.39 kg/ca/day. The total waste is therefore expected to be 5850 kg/day. If the density of the waste is taken to be 375 kg/m³, then the volume of the waste will be 15.6 m³. The volume of each storage bin will thus be $15.6 \text{ m}^3 / 1500 = 0.0104$. As the waste collection is expected to be effected after every 2 days, the volume of the bins will be 0.0208 m³. However for design purposes

3 days are considered, and the volume of the bins will accordingly be 0.0312 m³ which is approximately 0.04 m³.

b) concerning commercial waste

1) Market waste handling and storage:

Handling: At the market each stall man/woman will be responsible for the handling of the waste until it is stored in the storage bins.

Storage: The waste generated at market places is normally mainly organic. The construction of a storage chamber for easy collection of waste by handcarts to the composting plant is proposed. The chamber is to be located within the market, where space may allow and it will be designed to allow the collection frequency of the waste after a maximum of three days.

Determination of the capacity of the chamber:

Assumptions:

Number of stalls in the market	= 60
Waste generation rate	= 8 kg/stall/day
Waste density	= 375 kg/m ³

Waste generation per day = 480 kg

Volume of the waste = 480 kg/day/375 kg/m³ = 1.28 m³

Assume collection rate of 3 days, then the total waste = 3.84 or appr. 4 m³

Assume height of the chamber = 1.3 m, then the area will be 3.0 m². The dimensions of the chamber can thus be taken as follows:

Length	= 2.0 m
Width	= 1.5 m

2) Collection and transportation of organic waste

The organic waste to be generated at the community is expected to be collected and transported to the composting plant by handcarts. Handcarts are chosen due to the narrow paths in many unplanned areas. Group of people from within the community is expected to undertake this activity. After composting and reuse of recyclable materials, non-recyclables can not be expected to be much, and can therefore be transported to the dumpsite.

c. concerning processing solid waste: composting

Biological decomposition of organic constituent of solid waste (composting) is recommended. Windrow which is a manual operated system of composting seems to be optimal. The required operations for composting process are the following:

- 1) - Sorting of non-compostable materials - This process is expected to take place at the household level.
- 2) - Transportation of the organic waste materials to the composting plant. This activity will be achieved by the use of the handcarts
- 3) - Piling the waste - Piling is to be done after the waste has been sorted. This process requires the construction of a pile of wastes in the designed heap size
- 4) - Turning the waste periodically. Turning may be conducted at the interval of 2 - 4 days
- 5) - Marketing of compost - Compost materials will be sold to interested individuals.

d) concerning the promotion of compost products

Studies carried out in Dar es Salaam (Rubindamayugi and Kivaisi, 1994) have indicated that the use of compost product among many vegetable growers in the city is not common. The promotion of compost product will therefore be inevitable in order to make composting profitable for the community. Regular laboratory analysis to test the quality of the compost, especially at the beginning, will therefore be necessary.

V. Indicative cost estimates for initiating community-based solid waste management including the costs of a pilot composting plant.

The actual cost of the entire project can be made only after the detail designs have been prepared. However in order to come up with the indicative costs, the current prices of different items have been obtained from various shops and markets in Dar es Salaam, while estimation guidelines from TANZANIA INSTITUTE OF QUANTITY SURVEYORS have been used.

1. Cost estimate for storage bins

Estimated number of storage bins in community	=	1500
Cost of each storage bin (Tsh.)	=	4,000.00
Total costs of bins (Tsh.)	=	6,000,000.00

2. Cost estimate for handcarts

Estimated number of handcarts in a community	=	23
cost for each hand cart (Tsh.)	=	40,000.00
Total costs of handcarts (Tsh.)	=	920,000.00

3. Cost of waste transportation to the composting plant

Estimated number of people for collection/transportation	=	23
Cost for each person Per day (Tsh.)	=	1,000.00

Total cost for one month (15 days) = 345,000.00

4. Cost estimate for the proposed storage chamber at market places

Cost of the chamber size 2.0 x 1.5 x 1.3 = 150,000.00

5. Cost estimate for community solid waste composting

- Site clearing (strip top soil) 1350 m³ : through community labour input

- Construction of compost piles : through community labour input

- Wheelbarrows/handcarts 4 in number @ 40,000.00 = 160,000.00

- Spades 10 in number @ 2500.00 = 25,000.00

- Safety equipment: gloves, boots and overalls = 100,000.00

- Training and training equipments = 500,000.00

- Marketing of compost products:
Promotion, materials and transport = 1,000,000.00

- Laboratory analysis
(pH, moisture, temperature, Nitrogen) = 300,000.00

Sub total = 2,085,000.00

- Miscellaneous costs at 15% = 312,750.00

Total cost for composting will thus be Tsh. = 2,397,750.00

VI. Total costs for initiating neighbourhood community waste collection system including the costs for of a pilot composting plant

1. Storage bins 6,000,000.00

2. Handcarts 920,000.00

3. Waste transportation 345,000.00

4. Storage chamber 150,000.00

5. Composting plant 2,397,750.00

Total costs = 9,812,750.00 (US \$ 16,355)

ANNEX II. OUTLINE FOR THE DESIGN AND MANAGEMENT OF SOLID WASTE TRANSFER STATIONS IN THREE NEIGHBORHOODS

I. Background information

Transfer stations may be defined as linkage between the community collection system and the private motorized collection system to transport the waste to the landfill. They are meant to provide an efficient back-up for the collection services which cuts down the turn around times, increases the payload and reduces the number of vehicles travelling to the landfill sites. Transfer stations can also be designed to perform various methods of waste treatment prior to disposal and can be adapted as reclamation center, thus reducing both transport and landfill costs. For developing countries communal collection systems are preferred as all the other methods of waste collection for final disposal are vehicle intensive and needs developed infrastructures.

The existing situation of solid waste management in Dar es Salaam as depicted in various studies, among other things shows a great imbalance between generation rates of solid waste and the existing means and methods of waste collection which is the linking operation between the generation centers and the landfill site.

One of the outputs of a support programme for an integrated solid waste management strategy for the city of Dar es Salaam is thus, a collection and transfer station set up and operating in three neighborhoods, with a view to achieve the following main objectives:

- 1) To provide storage space for the generated waste in a given period of time i.e between the collection from the generation points to transfer stations and transportation to disposal sites.
- 2) Provide enough ventilation to the collected waste to reduce foul smells resulting from anaerobic conditions.
- 3) To provide shelter to the collected waste against wind, rain, haphazard scavenging and sight of the general public.
- 4) To provide efficient handling and loading equipments to fasten loading process and safeguard health of working crews.
- 5) Provide weighing facilities for monitoring the collection and transportation processes and establish reliable data base for future management and engineering plans.

II. Solid waste transfer station - design criteria

In order to achieve the above objectives, the design criteria for the transfer stations have been based on the following main factors:

- 1) *The quantity of waste to be handled by a transfer station and the detention time of the waste in the station before onward transfer to the dumpsite.*

The quantity of waste depends on among other factors, the waste generation rate in the neighbourhood and the number of residents. The waste that could be brought to the station will be already two days old, further retaining of waste will result in foul smells due to decomposition of waste. The total amount to be handled in the transfer station is expected to be 50 m³. This amount is to be stored in a waste store of an area of 5.0 m x 5.0 m.

- 2) *The means of bringing the waste to the transfer station and the means of transporting it to the dumpsite.*

It is envisaged that handcarts will be used to bring the waste to the transfer station, while 7 tons trucks are to be used to transport the waste to the dumpsite.

- 3) *Characteristics of wastes coming and leaving the transfer station (density and composition of waste).*

The main operation at the station will be sorting which will be done by scavengers for the purpose of recovering recyclable materials such as papers, glass, metals, textiles, plastics rubber etc. The waste leaving the transfer station to the dumpsite is expected to be about 10% less in volume than the incoming waste.

III. Proposed typical design of waste transfer station in three neighbourhoods in Dar es Salaam city

The transfer station will be a central collection point for waste from neighborhoods for onward bulky transfer (of waste) to the dumpsite. Detail design of the station can be done after a thorough analysis of the factors mentioned above. However the following common facilities are proposed to form part of collection stations in every neighbourhood which is expected to occupy a maximum of 10 square meters.

- 1) A small office (approximately 2.5 x 2.5 meters) with all the necessary facilities for recording of waste delivery and despatch and control of operations
- 2) A waste store (a semi enclosed building with concrete slab floor-over) used for dumping of solid waste which will be marshalled by front loader, and for loading of bulk carrying vehicles - tipper trucks by the front loader.
- 3) A covered parking and maintenance area for the front loader and other plant - part of the waste store building
- 4) An amenity facility (waste storage bay) to be located just outside the site to enable the residents to dump large items of solid waste, for onward transportation to the dumpsite, without their need to enter into the transfer station (size of the bay approximately 2.0 x 2.0 meters).
- 5) Washdown facilities and waste water drainage system
- 6) Gates and fencing of the entire collection center

IV. Design of a waste store

Assumptions:

- a) Existing population of the neighbourhood = 15,000 people
- b) Design period = 10 years
- c) Population growth rate = 4.8% per year
- d) Waste generation rate = 0.4 kg/c/day

Population after 10 years = 23,972 people (projection formula, $P_n = P_o(1+K/100)^n$)

- P_o = Existing pop.
- P_n = Pop. after 10 years
- K = Growth rate
- n = Projection period

Total residential waste generation at the end of design period = 23,972 x 0.4 kg/ca/day = 9,589 kg/day, adding 480 kg/day market waste then the total waste will be 10,069 kg/day. But for design purpose 2 days collection interval is assumed, thus the total weight will be 20,138 kg.

The normal waste density at the neighbourhood is taken to be 375 kg/m³. However it is assumed that the waste density increases by 40% after 2 days of storage. The waste density after 2 days of storage will therefore be 525 kg/m³.

The volume of the waste will thus be 20,138 kg/525 kg/m³ = 38.4 m³ or appr. 39 m³. Less 10% sorted materials = 39 - 3.9 = 35.1 m³ or approximately 36 m³. If 25% is added for design purposes, then the volume of the waste will be 45 m³. In the design the value of 50 m³ is considered.

If for lifting purposes the height of the waste store is kept at 2.0 m, the area will be 5.0 m x 5.0 m.

V. Cost estimates of a community base waste collection supported by collection stations in 3 neighbourhoods (main components only).

Detailed calculations of the cost estimates of a neighborhood transfer station can not be done accurately until further consideration and detail design of the structures including the exact location of the stations and other equipments are made. It might also be necessary to include the cost of acquiring the site as most of the land in many neighborhoods belong to individuals. The following general approximation is meant to give only the indicative costs of the waste collection center (the costs of purchasing/compensation for the land are not considered).

- | | |
|---|--------------|
| 1. A small office with recording keeping facilities | 700,000.00 |
| 2. Steel gate approximately 1.5 meters high | 300,000.00 |
| 3. Block work fencing appr. 40 meters length | 500,000.00 |
| 4. Waste store 5.0 x 5.0 meter | 1,000,000.00 |
| 5. Covered parking and equipments maintenance area | 300,000.00 |

6. Wastewater drainage facilities	100,000.00
7. Waste storage bay appr. 2.0 square meter	500,000.00
8. Weighing machine	600,000.00
Sub total	4,000,000.00
Miscellaneous items - add 15% of the above	600,000.00
Sub total	4,600,000.00
9. Design and supervision costs appr. 15% of the above	690,000.00

Total costs of constructing one transfer station 5,290,000.00

Total cost of constructing 3 transfer stations 15,870,000.00 (US \$ 26,450)

ANNEX III. OUTLINE FOR IMPROVING VINGUNGUTI DUMPSITE.

Immediate measures for improvement and effective management of the existing Vingunguti dump site

I. Introduction

The capacity of the only available in Dar es Salaam Vingunguti dumpsite to absorb more waste is now limited due to various reasons. However a brief study of alternative locations put forward by the Dar es Salaam city council showed that the proximity of Vingunguti to the city showed very substantial benefits over other sites proposed and decision was made to continue to use Vingunguti for the emergency cleanup of the city and future disposal pending the location and development of a more suitable site. While preparing for the construction of a new landfill, the Vingunguti dumpsite requires an improved management system and provisions to alleviate constant neighbourhood protests. The anticipated end of support programme situation is the Vingunguti landfill operating under improved conditions where flooding and leaching have been considerably reduced and that the access road has been improved.

II. Main problems

During the dry seasons:

During the dry seasons the access road is very dusty and as such very serious air pollution due to dusts is caused by the fast moving Multinet vehicle.

During the rainy season:

Due to the poor conditions of the access road, pools of stagnant water are formed along the road. As a result the fast moving waste transporting vehicles, splashes dirty storm water to the nearby house or vingunguti residents passing along the road.

Generally:

1. Due to burning of the waste at the dumpsite, Vingunguti residents have for long time been complaining about serious air pollution around the dumpsite.
2. The existing Vingunguti dumpsite is located on the banks of Msimbazi valley. The major activity within the valley is light cultivation of mainly seasonal crops such as rice and vegetables. Whereas rice is grown mainly during the rainy seasons, vegetables are grown almost through out the year and within 30 meters from the stream. Stream water is also used for bathing, and washing. As a result of a created dumpsite from December, 1991 Msimbazi stream has continuously been polluted especially during the rainy season when there are a lot of contaminated storm water running from the dump to the stream.
3. Due to anaerobic decomposition of the organic wastes the Vingunguti residents have been complaining about very bad smells from the dumpsite.

III. Proposed environmental engineering improvements at the existing Vingunguti dumpsite

The Support programme for an integrated solid waste management strategy for the city of

Dar es salaam includes some interventions in the form of environmentally accepted measures for the disposal of waste at the existing Vingunguti dumpsite, while the preparation for the construction of a new sanitary landfill are under way. The following activities based on two major studies (Ardhi Institute, 1993 and Manus Coffey, 1995) are proposed to be immediately implemented at the existing dumpsite.

Activity (1) Provision of cover materials

Daily covering reduces the spread of papers and plastics by wind, reduces the smells from the waste, reduces the occurrence of flies, rats and birds. Cover material also reduces the risk of fires, improves safety for personnel, and gives greater access to the fill area. At present only a limited amount of cover material is being provided. Cover material takes second place to the demands for refuse collection when it comes to scarce DCC resources. There are small hills on either side of the present landfill which could provide suitable fill material with very low haul cost. This however involve dispatching some informal low income housing and compensating the owners. Cover material will facilitate sanitary dumping of the waste at the dump site. The costs of providing cover material can be obtained from the charges of refuse disposal (RDC) at the site. Studies have shown that present funds are inadequate and as a result the landfill is being as an uncontrolled dump instead of a managed and preferably a sanitary landfill. As recommended in March, 1994 study, refuse disposal charges are levied at the landfill at the rate of T.sh. 800/ton of waste. This rate is intended to make a landfill a self sustaining cost center.

Activity (2) Leachate collection system

The analysis of water balance at Vingunguti dump site carried out by Mgana in 1993 shows that leachate generation at the site occurs in the month of March and April in the order of 57.76 mm and 2.56 mm respectively. The annual leachate generation is 60.32 mm. Manus Coffey in 1995 reported that the net rainfall in the area (rainfall less evaporation) is quite small (average annual leachate is only 41 mm), and average maximum generation in any month is only 27 mm. Thus in average the amount of leachate in a year will be almost negligible.

Due to the high evaporation in the area a simple method of leachete control which involves simply pumping the leachate back to the landfill and allow it to evaporate is proposed. Pumping system may be combined with a holding lagoon (basin) from which any excess leachate could be removed by the DCC vacuum tanker trucks whenever problem arise. Leachate collection system should consist of a network of perforated pipes which will be properly sloped to enable gravity flow of the leachate. The recirculated water to the dumpsite may be used to extinguish fire if there will be any.

Activity (3) Improvement of the access road

Some of the neighbourhood protests are mainly caused by poor state of the present access road to the top of the landfill, which is poorly surfaced and unsatisfactory. The access road is particularly bad during the rainy seasons. Apart from nuisance it causes

to the villagers, it also causes punctures and tyre problems on the trucks. An immediate improvement can be made to this road by filling the pot holes with hard core materials, while site bulldozer can be used to level off the ruts in the road. It is also proposed to install street lights along the road to facilitate dumping of the waste during the night.

Activity (4) Landfill operation

The present system of landfill operation consist of dumping the waste from the top down and there are a number of reasons why this should be discontinued as soon as possible.

- (i) The density of the waste in the landfill is reduced by this method with the corresponding reduction in the landfill life.
- (ii) It is difficult to compact the landfill surface adequately and the present landfill difficulties with the trucks bogging down during discharge. In particular difficult can be expected during March - May rainy season.
- (iii) Trucks are being diverted through the village at the top of the landfill creating a nuisance to the inhabitants and any landfill fires will blow smoke towards the village. A landfill working from the bottom up will be sheltered from the village during the development stage and fires will be more easily controlled with the cellular system of filling and odour and litter problems reduced.

Activity (5) Weigh Bridge facility

A weigh bridge facility at the landfill will assist greatly in the proper management of both the landfill and the collection services.

Activity (6) Storm water drainage system.

The dumpsite preparation and landfilling operations should normally be designed in a way to minimize contact of surface runoff and percolating rain waters with the refuse. This requires diversion of upgradient surface drainage away from the dumpsite/landfill operational area, sloping the cells to avoid ponding of waters on top of them, and compaction of refuse and soil to be conducted so that infiltration potential is minimized. While preparing for the construction of a new landfill in Dar es Salaam, it is proposed to carry out provisions against surface storm water runoff and the percolating rain water. This can be achieved by designing and constructing storm waster drainage channels (as proposed in a study by Ardhi Institute, 1993). The channel are expected to intercept all the surface runoff and direct it to the evaporation pond (lagoon) and by so doing the pollution of the river will be minimized. Studies conducted at the dump site indicated a predicted 10 - year flood recurrence of 75.5 m³/sec. Accordingly the proposed storm water channel is recommended to be designed using the 10 -year, 24 - hour rainfall event. A study in 1993 indicate a proposed channel of a approximately 500 meters length. Although the details of the size of the channel are to be decided during the detail design, for cost estimation

purposes however, a lined trapezoidal channel is proposed.

Activity (7) Surface and ground water pollution monitoring

Ground water sample from shallow and deep wells were analysed (Mgana, 1993), and no indication of contamination by leachate from the existing dump site was recorded. As soon as the leachate collection systems have been introduced, constant ground and surface water monitoring is recommended. This will help in any future development decisions. Ground and surface water monitoring can be carried out by an independent suitably qualified person or organization.

Activity (8) Gas extraction studies at the landfill

The disposal of organic materials in landfill site generates a gas, which is referred to as landfill gas. The generation of landfill gas starts soon after disposal and continues for along period, even after the closure of the site. For this reason the recovery of the landfill gas is now considered a natural factor in waste management. It is not only a source of energy, but also a way of minimizing the environmental problem associated with gas generation in landfill sites.

The two principal gases generated in a landfill are carbon dioxide (CO₂) and methane (CH₄). Carbon dioxide is generated during the early (aerobic) stages of landfill life. Methane is generated during the later stage of landfilling (anaerobic). As an environmentally improved and more effectively managed Vingunguti landfill includes eventual biogas extraction, studies to establish this possibility are proposed.

IV. Proposed management of Vingunguti dumpsite

(a) General

The operation of a landfill site implies a large number of different operations which requires a wide range of skills. It is therefore proposed to have one work leader (landfill manager) to be assisted by machine operator(s) and weighing machine personnel at the dumpsite. The above mentioned landfill personnel will be responsible for undertaking the following minimum site management tasks:

- 1) Close liaison with the residents of Vingunguti and other affected nearby areas shall be maintained. Any particular complaints shall be dealt with promptly and efficiently.
- 2) Not to allow access road to the landfill to deteriorate to the extent that the refuse collection vehicles are subjected to unnecessary wear, tear, delays or cause unnecessary problems like dust, or storm water splashes to the residents.
- 3) A bulldozer with a front loading shovel shall be kept on the site at all times. Resources to maintain the bulldozer in good working order at all the time shall be available.

- 4) To keep the record of the quantity of waste coming to the site.
- 5) To maintain all fencing to the site in tidy fashion. Immediate repair should be carried out and any litter should be cleared from all fencing at least once in week.
- 6) Provide adequate lighting in order to ensure that landfill operations during darkness can take place without any substantial reduction in the quality of site operation.

(b) Financial management

Studies have shown that there have been constant financial difficulties including problem with obtaining diesel oil for the bulldozer, cover material for the waste and materials for repairing the dump access road. The Vingunguti landfill started collecting refuse disposal charges (RDC) on all the waste arriving at the site from October, 1993, on both the Multinet and other private waste haulers. The landfill earned Tsh. 7 million during the initial 2½ months. This funds however were inadequate for the running and maintenance of the landfill. As recommended in 1994 the disposal charges are now Tsh. 800/ton of waste. Based on the studies by Manus Coffey it is recommended that a separate bank account should be open for the RDC which should be allocated solely for the operation and development of the landfill.

V. Indicative cost estimate for the immediate measures for improvement and effective management of Vingunguti dumpsite

1) Cover material (all transportation costs should be realized from DRC)	
2) Compensation of houses to be demolished for obtaining cover material	10,000,000.00
3) 2 pumps (one standby) @ 150,000.00 total cost of pumps approximately	300,000.00
4) Construction of Lagoon	1,000,000.00
5) Leachate collection pipes approx. 50 pipes @ 20,000.00	1,000,000.00
6) Improvement of the access road including provision of street lights	10,000,000.00
7) Weighbridge	500,000.00
8) Storm water channel 500 meter length @ 8,000.00	4,000,000.00
9) Pollution monitoring 3 times in a year @ 1,800,000	5,400,000.00
10) Gas extraction studies (based on similar studies in Pakistan)	15,000,000.00
sub total	47,200,000.00
+ 10% contingencies	4,720,000.00
Grand total	51,920,000.00 (US\$ 87,000)

ANNEX IV. TERMS OF REFERENCE FOR ASSESSMENT OF ADDITIONAL DUMPSITE

I. Introduction

The objective of the support programme for an integrated solid waste management strategy for the city of Dar es salaam includes among others, the promotion of community-based collection systems and support to small business development in clean and safe waste treatment through composting and recycling activities. Landfilling however, remain the most manageable option for large scale waste disposal which does not require separation of waste into a biodegradable and non-biodegradable. One of the outputs of the support programme is thus, a new landfill which will be constructed on an environmentally sustainable basis and with maximum use of labour based methods. The current document is not aimed at detailing the design of new landfill, but rather at *the preparation of terms of reference and costing of the preparatory work for design and construction of a new landfill.*

II. Sanitary landfill design criteria

A sanitary land fill is a contained engineered structure which leads to anaerobic biodegradation and consolidation of compacted refuse materials within confining layers of compacted soil. In a sense a sanitary landfill is bio-reactor. At a sanitary landfill, there a no nuisance impacts of constant burning, smoke, flies, and unsightly rubbish heaps. However, because the refuse is not exposed to rainfall, surface runoff or groundwater, leachate consist largely of waters generated during biodegradation. Therefore, leachate generated from sanitary landfill is typically much more concentrated in organic and metals than the leachate generated from an open dump often by a factor of more than 10 and thus needs to be properly treated. Similarly because of the anaerobic nature of decomposition, methane gas is generated and needs to be properly ventilated.

There are no formal criteria for sanitary landfill design used by multi-lateral development agencies. Sanitary landfill located in arid areas with limited potential for infiltration may have more relaxed design requirements than those located in wet areas. Similarly sanitary landfill located in coastal lands underlain by naturally unpotable groundwater may have more relaxed design requirements than those in inland areas overlying potential usable ground water regime.

Based on experience in a wide range of developing countries, as well as from a review European and US siting standards, the following describes the most common standards to which sanitary landfill projects being accepted for World Bank financing are currently designed. In summary, as described below, a sanitary landfill design would need to have a structural integrity over the long term, provide for daily cover for fresh refuse, and incooperate mitigative measures to manage leachate and gas produced within the landfill cells.

Sanitary land fill is a step by step construction activity involving daily layering, compacting, and soil covering of refuse into cells. The site should not be subject to seasonally high ground water levels or to periodic flooding. The site preparation and landfilling operation

must be designed to minimize contact of surface runoff and percolating rainwater with the refuse. This requires diversion of upgradient surface drainage away from the landfill operational area, sloping of the cells to avoid ponding of waters on top of them, and compaction of refuse and soil as each cell is being constructed so that infiltration potential is minimized.

At site where potentially usable groundwater exists in unconfined layers, any rain and surface runoff waters which percolate through the refuse and become contaminated leachate needs to be collected. The leachate collection system consist of network of perforated pipes within a gravel bed which is placed over the landfill liner. At a minimum for sites in developing countries , the liner would consist of a layer at optimum moisture content and compacted with a roller. At large landfill receiving municipal refuse for major metropolitan areas or at co-disposal landfills where hazardous waste quantities could be received in significant quantities, additional liner made from impermeable material may be necessary to protect sensitive groundwater resources. The landfill liner and the leachate collection network need to be properly sloped to enable gravity flow of contaminated water to treatment ponds.

The ponds would be designed to encourage anaerobic decomposition, followed by aerobic decomposition. The extent possible, full evaporation in the final pond is desired so that no discharge of treated effluent is necessary. If full evaporation is not possible, recirculation of treated effluent back to the landfill (on the completed area of fill), discharge to a sewage treatment plat is recommended. Discharge to the surface water is not acceptable unless the treated effluent can be assured of not having a significant adverse impact on the water quality requirements of the receiving water.

In additional to leachate management, landfill gas management is a critical component of every sanitary landfill design. For developing countries, minimum requirements are that the landfill gases would need to be properly ventilated. During site preparation, the landfill side slopes are lined with impermeable clay to curtail lateral mitigation of the gases to escape to the atmosphere. Within every 0.1 hectare, or less, of the refuse cell development are, landfilling would be conducted around gas ventilation structure coasting of either a perforated pipe packed in gravel or a rock-filled wire mesh enclosure. Construction of landfill occur in regular phases, over the life of the site. At the start of construction, the access road, entrance gate, weghbridge, fencing, water supply and phase I refuse cell areas are constructed. Leachate treatment facilities to handle flows generated st the peak period over the life of the site are constructed from the onset. Once the capacity of the phase I refuse cell area is nearly utilize, the phase II refuse area requires site preparation and construction (i.e the phase II liners, leachate collection networks, gas ventilation system, etc). And so on, over the life of the site, until each phase of the landfill is completed. Each phase typically has 3 to 5 years of refuse capacity.

III. Sanitary landfill siting criteria

Each sanitary landfill is uniquely designed to conform to the soil, geologic, topographic, and water resources conditions of the site. To minimize the costs of operating a landfill, the first most critical step is proper siting in a location which enables economic operation and cost-effective environmental protection. Also, proper siting is essential to enable a site which minimizes adversely affecting the cost of refuse collection.

The following selection criteria are provide as guidance. A proposed landfill site can be selected even though it does not meet each of the screening criteria. Engineering design can mitigate inadequate site conditions but at a cost. When selecting site which does not meet all of the screening criteria, possible engineering solution which would bring the site into conformance to with the intent of the unmet criteria shall be incooperated in the design. Criteria which shall be addressed as part of a screening process include, but are not limited to, the following:

- 1) Adequate land area and volume to provide sanitary landfill capacity to meet the projected need for at least 10 years.
- 2) A site accessible within 30 minute travel time (a function of road and traffic conditions) is to be sought, even if it means buying land, because of the need to avoid adversely affecting the productivity of the collection vehicles. At distance greater than 30 minute travel, for collection operation to be economic, investment in either large capacity collection vehicles (5 tonne per load or greater) or transfer stations with large capacity vehicles (20 tonnes or greater) would be necessary.
- 3) If transfer stations are necessary, accessible within 2 hours travel time one-way from the transfer station, unless transfer by rail or barge directly to the landfill site is possible and location of the rail or barge transfer sites within the refuse collection area is possible.
- 4) Groundwater's seasonally high table level (i.e, 10 years high) is at least 1.5 meters below the proposed base of any excavation or site preparation to enable landfill cell development.
- 5) Soils above the groundwater's seasonable high table level are relatively impermeable (preferably, less than 10⁻⁹ meters/second permeability when undisturbed).
- 6) No environmentally significant wetlands of important bio-diversity or reproductive value are present within the potential area of the land fill cell development.
- 7) None of the areas within the landfill boundaries are part of the 10-year groundwater recharge area for existing or pending water supply development.
- 8) No private or public drinking, irrigation or livestock water supply wells within 500 meters downgradient of the landfill boundaries, unless alternative water supply sources are readily and economically available and the owner(s) gives written consent to the potential risk of the well abandonment.
- 9) No known environmentally rare or endangered species breeding areas or protected breeding areas are present within the site boundaries.
- 10) No significant protected forests within 0.5 km of the landfill cell development area.
- 11) No major lines of electrical transmission or other infrastructure (i.e, gas, sewer, water lines) are crossing the landfill cell development area, unless the landfill

operation would clearly cause no concern or rerouting is economically feasible.

- 12) No underlying limestone, carbonate or other porous rock formation which would be incompetent as barrier to leachate and gas mitigation, where the formation are more than 1.5 meter in thickness and present as the uppermost geologic unit.
- 13) No underlying underground mines which could be adversely affected by surface activities of landfilling, or minable resource which could be rendered less accessible by landfilling, unless the owner(s) gives explicit consent.
- 14) No residential development within 0.25 km from the perimeter of the proposed landfill cell development.
- 15) No visibility of the proposed landfill cell development area from residential neighbourhood within 1 km. If residents live within 1 km of the site, landscaping and protective berms would need to be incorporated into the design to minimize visibility of operations.
- 16) No perennial stream within 0.03 km downgradient of the proposed landfill cell development, unless culverting or channeling is economically and environmentally feasible to protect the stream from potential contamination.
- 17) No significant seismic risk within the region of the landfill which could cause destruction of berms, drains or other civil works, or require unnecessary costly engendering measures.
- 18) No fault lines or significant fractured geologic structure within 0.5 km of the perimeter of the proposed landfill cell development which would allow unpredictable movement of gas or leachate.
- 19) Topographic amenable to development of sanitary landfill by the cell (Bund) and/or Trench method. The area method is not preferred because of its high energy and soil cover requirements.
- 20) Available on-site of suitable soil cover material to meet the need for intermediate (minimum of 30 cm depth) and final cover (minimum of 60 cm depth), as well as bund construction (for the cell method of landfill). Preferably the site would have adequate soil to also meet daily cover needs.

IV. Preparatory activities in the designing and construction of a new landfill

- a) Determine the service area, waste quantities and land requirements for siting of a sanitary.
- b) Identify and asses at least 2 sites that appear to be meet most of the site selection criteria, based on available data, or could be engineered economically to address the intent of the most of the criteria.

- c) Conduct preliminary site investigation (including but not limited to test pits, boring, ground water observation wells, and preliminary topographic measurements of the 2 candidate sites to confirm whether the available data is accurate, whether the site meet most, if not all, of the site selection criteria, and what design requirements would enable the intent of the criteria to be met.
- d) Asses whether site acquisition is feasible and whether social-political acceptance is potently obtainable at each of the 2 candidate sites.
- e) Develop preliminary engineering layout and civil works quantities at the 2 candidate sites to develop budgetary cost estimates for capital and recurrent costs.
- f) Provide an environmental impact report for 2 candidate sites, including public participation activities and addressing resettlement issues.

V. Scope of works

a) *Preliminary study*

Task (1) Review of available information

Review relevant feasibility studies and reports concerning solid waste management, particularly the studies conducted for Dar es Salaam by the Sustainable City Project in 1992 through 1995. Review environmental studies conducted st the existing disposal site, particularly those conducted by Ardhi Institute in 1993. Review siting studies already conducted by the city's special Task force on solid waste disposal.

Task (2) Development Baseline for landfill planning

Determine the service area to be covered by the sanitary landfill facility, develop updated waste quantities based on available information and determine the volume capacity requirements for a landfill to provide a minimum of 10 years of life.

Task (3) Development of site selection criteria

Develop site selection criteria to evaluate environmental, safety economic, engineering and social political feasibility.

Task (4) Identification of potential sites

Review regional information available from private and public sources which will allow the identification and evaluation of potential sites, including topographic maps, borings and well logs, soil surveys, geological studies, climatic data, wind data, drainage and sanitation infrastructure maps, water resources and water supply development maps, storm water quality data, transmission and power supply maps, road maps, transportation studies, existing and proposed land use plans, possible development plans for the area, proximity to the residential area, land ownership and

land value.

Task (5) Selection of candidate sites

Identify 2 sites which can best meet the established set of criteria and appear to be the most politically and publicly acceptable and, preferably are closest to the collection service area so that refuse hauling times and refuse collection costs are minimized.

b) *Final study*

Task (1) Development of site specification Data

Perform property survey, topographic survey, geophysical survey, soil borings, and groundwater level measurements for the 2 candidate sites, as needed to be assured that the sites would be suitable for sanitary landfill.

Task (2) Develop preliminary Designs

Develop preliminary design to a level detail adequate to develop quantities and budgetary cost estimate, as well as to comparatively assess the environmental impact issues for each of the 2 sites.

Task(3) Conduct preliminary Environmental impact report

Prepare a preliminary environmental impact report for each of the site to comparatively assess the potential environmental consequences of landfill development. Include impact on traffic, noise odor, dust, aesthetic, air quality, surface water, and ground water quality, aquatic and terrestrial life, cultural and archaeological resources, and social conditions.

Resettlement issues will need to be addressed within the environmental impact report, including a survey to determine the number of people and households needing to be moved, their crops, and facilities for which they need to be compensated, and any social-cultural issues with regards to disruption of what may be an integrated community for residential and work life support.

Task (4) Budgetary cost estimates

Prepare investment (including civil works, vehicles, landfill equipment, spares, custom duties sales taxes), annualized capital (including debt service) and recurrent (including operational personnel, overhead, benefits, consumable, insurance, maintenance, and repair) cost estimate to within 30% accuracy for purposes of comparative cost evaluation of the 2 candidate sites. Include in the cost estimates, the economic effect of each site's travel distance from refuse collection service area and road and traffic conditions on the overall costs of solid waste collection and transport.

Task (5) Public participation

Through the use of surveys of the general populace and or public workshops with community representatives, provide education, obtain information and solicit opinions with regard to: (a) preference for sanitary landfill versus other options for disposal or treatment (such as incineration, composting, and materials recovery), (b) demand for safe disposal with regards to willingness and ability to pay enough to cover costs, (c) issues and concerns with regards to the proposed site locations and designs and (d) reaction to the preliminary environmental studies.

Task (6) Recommend 1 site for project development

Based on best professional judgement and upon the efforts conducted above, evaluate the 2 candidate site and recommend which one appears to be the best from environmental, economic, and public acceptance perspectives.

VI. Costing of the preparatory work

It is envisaged that the preparatory work will be carried out by a team of experts made up of the following professionals:

- 1) Environmental engineer
- 2) Land surveyor
- 3) Sociologist
- 4) Civil engineer
- 5) Environmental planner
- 6) Valuer

The proposed team of 6 experts can be expected to perform the preparatory activities elaborated in the scope of works above for a period of 3 months. The costs related to this task are proposed to be as follows:

Engagement of 6 experts for 3 months @ appr. 3,000 US \$ per month	= \$ 54,000
Materials (purchase and/or hiring of some materials and equipments)	= \$ 5,000
Sub total	= \$ 59,000
+ 10% for reports, maps and other miscellaneous items	= \$ 5,900
Grand total	= \$ 64,900

SUGGESTED PROFILE OF IMPLEMENTING AGENCY

Overall management requirements

The Integrated Waste Management Strategy requires a strong and multidisciplinary leadership. The team or agency to implement the programme will have to deal with many different stakeholders who all have their own interest in the waste sector. Therefore, the agency should be autonomous and independent.

A multidisciplinary capacity is indicated in view of the various technical and organizational issues involved. The (re-)construction of the landfill, for example, requires sound engineering know-how, whereas the financing aspects like pricing, revenue collection and cost control of services necessitates high-standing accounting expertise.

It is clear that no single agency can offer all the competence required. The design of the Programme reflects this notion and, therefore, consist basically of a range of subcontracts. The essential role of the implementing agency is to formulate, prepare, supervise and evaluate these subcontracts, and to ensure the appropriate phasing and overall coherence of the strategy.

A crucial characteristic of the agency to be entrusted with the implementation of the Programme, is, consequently, its ability to deal with a wide variety of issues and people in such a manner that a more durable partnership is established. This, essentially, is an issue of human resource management. But the successful implementation of the Programme will also depend much on a) the available financial resources to realize the integrated strategy and b) the co-operation and collaboration of the municipal government, the central partner to the Programme.

Critical areas of competence

Given these considerations, the most important criteria for the selection of the implementing agency are:

1. *the agency's capacity to manage issues of a wide technical variety*
2. *its capacity to establish contacts and collaboration between people with different backgrounds and interests (from the public and the private sector)*
3. *the potential to generate and mobilize additional financial resources;*
4. *the agency's acceptability for the municipal authorities.*

International NGO's or consultancy firms with either development funds of their own or with well-established donor contacts are, consequently, most eligible. They must also have proven record of good relations with municipal institutions.

Complementary role of the Sustainable Dar-es-Salaam Programme (SDP)

In Dar es Salaam, SDP is actively supporting the managerial role of the municipality in the regulation and provision of public services. Therefore, their input and collaboration is indispensable for those segments of the Programme which relate to the role of the City Council (Output 1.2, 1.3 and 1.4, part of Output 2.3., Output.5.1.). If this support is assured

and sustained, capacities of the Programme's implementing agency in this area will be less important. Evidently, this presumes an excellent working relation among the two Programme's.

The mandate of the SDP falls entirely within one of the institutional objectives of the Programme, which is to strengthen the capacity of the municipality to coordinate and monitor solid waste collection and dumping in the city. The Programme is designed to provide learning opportunities and to support the DCC in this task, and a delegated responsibility for SDP in this area of the Programme could contribute to the desired strong link with SDP.

The role of SDP can be equally supportive in relation to the objective of employment creation and income-generation of the Programme, but should be less pronounced in operational sense. This area remains primarily the responsibility of the private sector (including NGO's and CBO's). The Programme should, for example, render support to strengthen local capacities for the handling and recycling of waste. Here, the municipality's role - with SDP support - is to promote, facilitate and regulate the effective participation of private sector entities in a city-based waste strategy.

Other competencies

Other critical areas of competence of the implementing agency are:

- private sector mobilization
- public information and outreach
- formulation and negotiation of institutional arrangements
- strengthening of local research capacity and establishment of international networks
- community-participation and gender roles
- environmental issues, including occupational safety and health
- financial systems
- international experience in waste management, especially in Africa

Suggested composition of the Management Team

The team in charge of implementation should be headed by a Programme Manager responsible for the overall and timely delivery of outputs as spelled out in the Programme Document. He/She should be responsible for the establishing and maintaining good institutional relations of the Programme, both with the public and partners involved in programme implementation and with donors and financial partners. In this capacity, the Manager should chair the proposed Advisory Committee which assembles all important stakeholders. The required background of the Manager could be that of environmental or civil engineering, with a strong added competence in institutional development and human resource management.

A Contract Supervisor should assist the Programme Manager in all operational aspects of the Programme. In a sense, he/she will act as the executive director, being in charge of the realization of the sub-contracts to be established. The profile for this post is much more technical and practical (engineering, business administration/management), to be assisted by national or international experts where required (e.g. legal matters, financial systems, community-development, gender, occupational safety and health).

The implementing agency should be able to support their team in Dar-es-Salaam by direct and timely advisory services. It is imperative that the agency has past or ongoing programmes of similar nature in other cities, and is willing and capable to make available that experience to the Programme in Tanzania.

Complementary support by ILO

The role of ILO and other relevant international agencies like UNCHS is to support NIGP in executing the Programme through periodic joint review and consultations.

Secondly, they should assist the implementing agency in those areas where competence might be inadequate. Areas for possible complementary ILO support are: micro- and small enterprise development, labour-based infrastructural upgrading, occupational safety and health, organization-building.

UNITED NATIONS DEVELOPMENT PROGRAMME

Technical Support Services at the project level (TSS-2)

No. & Title : URT/96/
Integrated Solid Waste Management Strategy

Executing agents : NIGP

Revision :

UN agency : International Labour Organization (ILO)
(providing technical services)

TSS contribution : \$ 191,000

Consisting of: \$ 123,500 (11 workmonths)
\$ 67,500 (mission costs)

On behalf of	Signature	Date	Name/Title
UNDP:	_____	_____	_____
UN Agency:	_____	_____	_____

Description	TOTAL	YEAR 1	YEAR 2	YEAR 3
63.01 Technical support	11 w/m	4	4	3
64.01 Evaluation	2 w/m	-	1	1
Mission Costs	22,500	22,500	22,500	22,500

DESCRIPTION OF TECHNICAL SUPPORT SERVICES	
ILO will provide the following technical support services:	
Project monitoring, including:	
<ul style="list-style-type: none"> • periodic technical advise, report reviewing and commenting • permanent access to information and dissemination network • support from interregional programmes. 	<i>subtotal 11</i>
Project evaluation, including:	
<ul style="list-style-type: none"> • assessment of mid-term project progress and final results • organizing participatory planning workshop for future support • report writing and dissemination 	<i>subtotal 2</i>
<i>TOTAL workmonths</i>	<i>13</i>

FISEXT/BPS	International Labour Organisation	GENEVA
10.08.95	Technical Support Services TSS-2	Page 1/1
		Rp 303

Country : United Rep.of Tanzania

Project No : URT.96. . .

Title : Integrated Solid Waste Managment Strategy

Budget Line		Total		1996		1997		1998		
Code	Title	L.A.	W/M	\$	W/M	\$	W/M	\$	W/M	\$

60. Technical Support Services

60.01	Technical Support	ILO	11.0	104500	4.0	38000	4.0	38000	3.0	28500
64.01	Evaluation	ILO	2.0	19000			1.0	9500	1.0	9500
66.01	Mission Costs	ILO		67500		22500		22500		22500

99. Total TSS-2 Contribution :			13.0	191000	4.0	60500	6.0	70000	4.0	60500
---------------------------------------	--	--	------	--------	-----	-------	-----	-------	-----	-------

109. Net TSS-2 Contribution :			13.0	191000	4.0	60500	6.0	70000	4.0	60500
--------------------------------------	--	--	------	--------	-----	-------	-----	-------	-----	-------

Authorized by :

Resp. Officer : Kees van der Ree

Prepared by : O.MESLI

Checked by :

