

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DAR ES SALAAM CITY COMMISSION  
THE UNITED REPUBLIC OF TANZANIA

**THE STUDY  
ON  
THE SOLID WASTE MANAGEMENT  
FOR  
DAR ES SALAAM CITY**

**FINAL REPORT  
VOLUME IV**

**ANNEX**

**SEPTEMBER 1997**

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**The Study on  
The Solid Waste Management for  
Dar es Salaam City**

List of Volumes

- Volume I     Executive Summary
- Volume II    Main Report for the Master Plan
- Volume III   Main Report for the Feasibility Study
- Volume IV    Annex
- Volume V     Data Book

***This is the Annex.***

In this report, the project cost is estimated using the February 1997 prices and at an exchange rate of 1US\$ = 120.85 Japanese Yen = 597.8 Tanzanian Shilling



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# Annex 1

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*Data for Infectious Diseases,  
Accidents and all other Diseases*





# 1 Data for Infectious Diseases, Accidents and all other Diseases

The data in Table 1-1 and Table 1-2 was obtained from the DCC Health Department and lists the number of cases of infectious diseases, accidents and other deaths (excluding Aids) and the number of deaths from such causes respectively for government health institutions in DSM (hospitals, health centres, etc.) excluding Muhimbili. No corresponding data was obtained from the voluntary, parastatal and private sectors. The data is not complete as data from government institutions in all districts was not obtained for some diseases. However, the data still gives a useful picture of the general situation concerning diseases in DSM. Some of the data trends and conclusions are set out in the "Public Health" sections of the Study Reports.

Table 1-1: Number of Cases of Infectious Diseases, Accidents and all other Diseases in DSM

Diseases	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Cholera	569	92	0	46	518	2093	730	674	1	6
Diarrhoea	57352	6925	12753	24652	4569	7392	44862	112715	116879	208645
Dysentery	5490	1920	489	1217	113	385	2732	869	3427	376
Meningitis	NI	NI	NI	NI	NI	NI	NI	83	20	52
Measles	NI	NI	NI	NI	NI	NI	NI	1249	380	1106
TB	NI	NI	NI	NI	NI	NI	NI	5214	126	138
Skin Diseases	NI	NI	NI	NI	291	424	16039	54870	66465	129816
Schistosomiasis	NI	NI	NI	NI	909	537	3699	4966	12610	36244
Malaria	82779	27538	56903	83716	25599	51832	261290	262635	365682	613434
URTI	NI	NI	NI	NI	NI	NI	NI	83233	158702	293858
Typhoid	1	173	31	1	7	0	2	0	9	91
Dog Bites	NI	NI	NI	NI	NI	NI	NI	NI	2	1
Eye Diseases	NI	NI	NI	NI	NI	NI	NI	NI	41540	80955
Accidents	NI	NI	NI	NI	NI	NI	NI	29081	36184	74621
All other	NI	NI	NI	NI	NI	NI	NI	NI	180335	291175
<b>TOTAL</b>	<b>146191</b>	<b>38648</b>	<b>70176</b>	<b>109632</b>	<b>32006</b>	<b>62663</b>	<b>329354</b>	<b>575589</b>	<b>982362</b>	<b>1730518</b>

Table 1-2: Number of Deaths from Infectious Diseases, Accidents and all other Diseases in DSM

Diseases	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Cholera	0	4	0	9	52	181	60	60	0	1
Diarrhoea	0	17	15	37	34	18	9	23	38	16
Dysentery	0	6	2	0	7	3	1	0	30	5
Meningitis	NI	NI	NI	NI	NI	NI	NI	23	0	1
Measles	NI	NI	NI	NI	NI	NI	NI	0	0	0
TB	NI	NI	NI	NI	NI	NI	NI	2	7	11
Skin Diseases	NI	NI	NI	NI	0	0	0	0	0	0
Schistosomiasis	NI	NI	NI	NI	0	0	0	NI	0	0
Malaria	NI	18	36	46	55	39	33	16	51	17
URTI	NI	NI	NI	NI	NI	NI	NI	NI	0	0
Typhoid	0	0	4	0	0	0	0	0	0	0
Dog Bites	NI	NI	NI	NI	NI	NI	NI	NI	0	1
Eye Diseases	NI	NI	NI	NI	NI	NI	NI	NI	NI	0
Accidents	NI	NI	NI	NI	NI	NI	NI	NI	NI	4
All other	NI	NI	NI	NI	NI	NI	NI	NI	93	0
<b>TOTAL</b>	<b>0</b>	<b>45</b>	<b>57</b>	<b>92</b>	<b>148</b>	<b>241</b>	<b>103</b>	<b>124</b>	<b>219</b>	<b>56</b>

Table 1-3: The districts for which data returns were received for the number of cases and deaths

Diseases	Number of Cases			Number of Deaths		
	1993	1994	1995	1993	1994	1995
Cholera	All	All	All	All	All	All
Diarrhoea	All	All	All	I	I	I
Dysentery	All	All	TI	I	IK	TI
Meningitis	All	All	TI	All	All	TI
Measles	All	All	All	I	I	I
TB	All	IK	TI	I	IK	I
Skin Diseases	TI	TI	All	I	I	All
Schistosomiasis	T	TI	All	N	I	All
Malaria	All	All	All	I	IK	All
URTI	TI	TI	All	N	I	I
Typhoid	All	All	All	All	I	All
Dog Bites	All	I	K	N	I	K
Eye Diseases	All	All	All	N	N	I
Accidents	TK	TI	All	N	N	I
All other	All	All	All	N	K	I

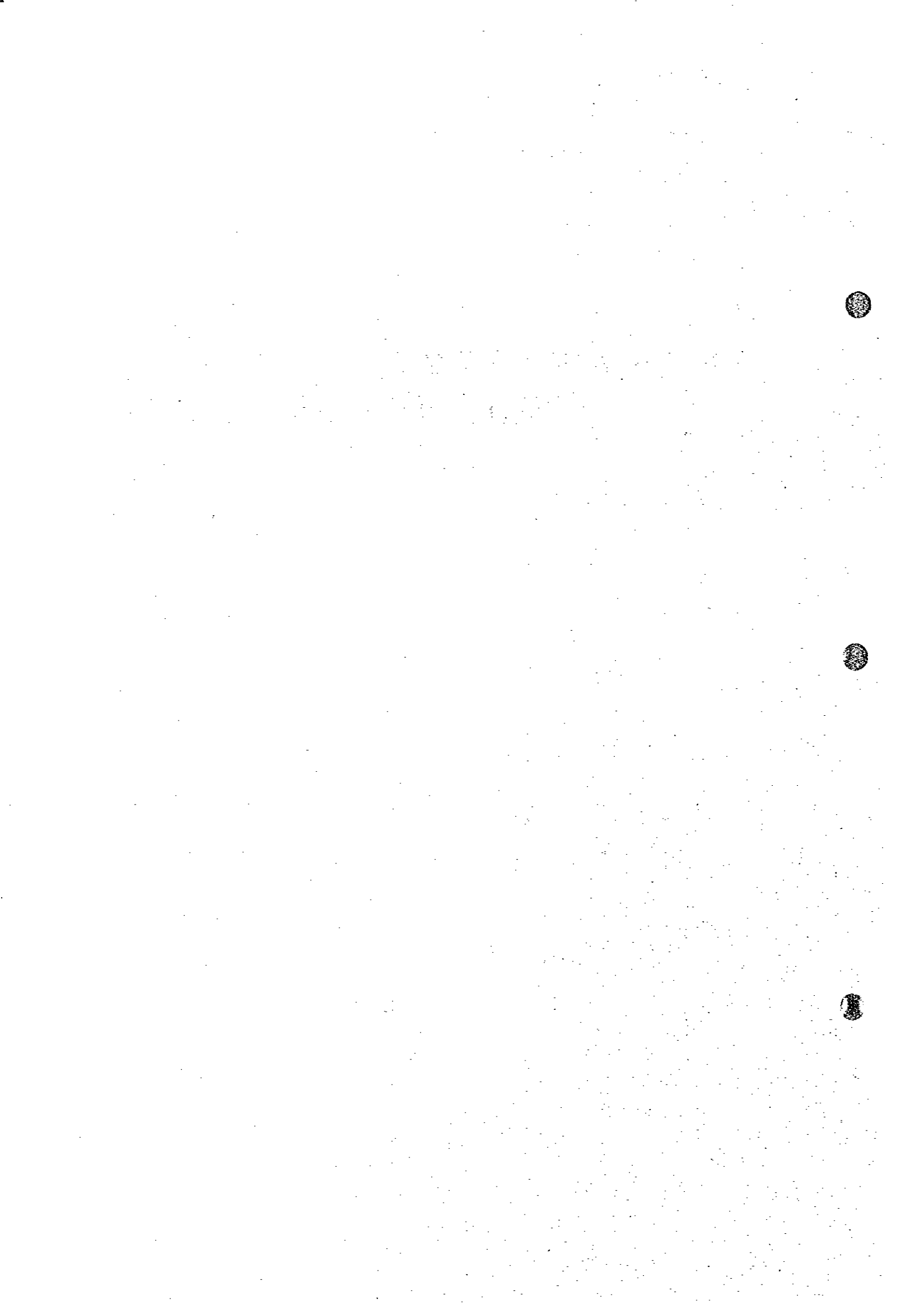
Notes:

1. The data in Table 1-1 and Table 1-2 is for government health institutions only (hospitals, health centres, etc.) excluding Muhimbili.
2. Data returns were not received from all districts in many cases. Table 1-3 shows which districts data was received from. In this table, T = Temeke, I = Ilala and K = Kinondoni, N = none. For example, TI means data was received from Temeke and Ilala districts but not from Kinondoni district. All means data was received from all districts.
3. No information on data returns was obtained for 1986-92 inclusive.
4. Data for 1986-92 in Table 1-1 and Table 1-2 was obtained for water related diseases only.
5. Data in Table 1-1 and Table 1-2 covers all cases (both admitted and outpatients).
6. "All other" refers to all other diseases excluding Aids and not just other infectious diseases.
7. No data for Aids is included here.
8. Ni = no information was obtained.
9. URTI = Upper Respiratory Tract infections.
10. TB = Tuberculosis.

# Annex 2

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## *Market Conditions Survey*



## 2 Market Conditions Survey

A survey of the environmental conditions in 19 markets in DSM was carried out between 8-16 May 1996. The selection of markets, survey methodology and results are presented in detail here.

### 2.1 Market Selection

#### 2.1.1 List of all Markets in DSM<sup>1</sup>

There are currently 68 official markets in DSM. Kinondoni, Ilala and Temeke districts have 35, 17 and 16 markets respectively as shown in Table 2-1 to Table 2-3. The number of unofficial markets (i.e. markets not registered with DCC) is not known.

Table 2-1: Markets in Kinondoni District

Market	Stalls	Restaurants	Shops	Butchers	Total
1. Magomeni	450	20	15	10	495
2. Msasani	60	--	--	3	63
3. Sinza I & II	70	15	40	12	137
4. Mwenge	50	--	8	--	58
5. Binti Matola	70	--	--	--	70
6. Kawe	25	--	--	--	25
7. Tandale	210	--	--	6	216
8. Mikocheni	--	--	--	--	--
9. Mabibo	51	--	6	3	60
10. Mburahati	35	6	10	4	55
11. Upogoroni	14	--	6	--	20
12. Kapera	25	5	--	1	31
13. Kagera	25	5	--	2	32
14. Makumbusho	40	--	6	4	50
15. Mwananyamala Map	150	--	8	6	164
16. Hananasifu	25	--	--	--	25
17. Mtambani	225	6	10	4	245
18. Mkunguni Moscow	45	--	--	2	47
19. Manzese	200	--	8	10	218
20. Mwananyamala Kisiwani	20	--	3	2	25
21. Mwananyamala Msufini	30	--	--	2	32
22. Ubungo Mizani	75	2	3	5	85
23. Shekilango	91	8	50	6	155
24. Kibo	35	--	--	--	35
25. Baruti	19	--	--	--	19
26. Kimara	20	--	--	2	22
27. Mbezi Kijijini	--	--	--	--	--
28. Kunduchi Mtongani	--	--	--	--	--
29. Kunduchi Tegeta	--	--	--	--	--
30. CCM Uwanjani	10	--	--	--	10
31. Marui Grocery	--	--	--	--	--
32. Kigogo A	20	--	--	--	20
33. Kigogo B	6	--	--	--	6
34. Kigogo C	12	--	--	2	14
35. Kinondoni Tx	--	--	--	--	--
Total	2,108	67	173	86	2,434

<sup>1</sup> Source: DSM City Market Superintendent

Table 2-2: Markets in Ilala District

Market	Stalls	Restaurants	Shops	Butchers	Total
1. Ilala	400	20	285	6	711
2. Buguruni	438	30	9	3	480
3. Kisutu	364	20	5	1	390
4. Kivukoni Ferry	67	100	5	6	178
5. Majumba Sita Vijana	25	--	2	--	27
6. Majumba Sita Wazee	29	--	--	--	29
7. Gongo la Mboto	35	--	--	--	35
8. Ukonga	27	2	--	2	31
9. Kigilagila	25	1	3	1	30
10. Kiwalani	24	1	5	2	32
11. Migombani	20	--	--	1	21
12. Vingunguti I	35	6	--	1	42
13. Karakata	10	--	--	--	10
14. Msichoke	17	--	--	--	17
15. Vingunguti II	27	3	--	--	30
16. Tambuka Reli	--	--	--	--	--
17. Ogelea	--	--	--	--	--
<b>Total</b>	<b>1,543</b>	<b>183</b>	<b>314</b>	<b>23</b>	<b>2,063</b>

Table 2-3: Markets in Temeke District

Market	Stalls	Restaurants	Shops	Butchers	Total
1. Tandika	590	1	17	13	621
2. Mbagala Zakhaim	40	3	6	2	51
3. Mbagala Kizuiani	178	5	8	4	195
4. Keko: Magurumbasi &					
5. Keko Mwanga	195	6	10	4	215
6. Mtoni	170	--	1	4	175
7. Madenge	90	6	12	9	117
8. Temeke Sterio	20	20	4	3	47
9. Temeke Mwisho	40	10	14	5	69
10. Kigamboni Urasaa	45	2	2	2	51
11. Kigamboni Kilimani	21	2	--	--	23
12. Kigamboni Ferry	20	2	7	3	32
13. Kigamboni Mahfudhi	15	4	2	--	21
14. Maguruwe	15	--	--	--	15
15. Rangi Tatu	20	6	4	--	30
16. Kurasini/Keko Machungwa	103	6	3	10	122
<b>Total</b>	<b>1,562</b>	<b>73</b>	<b>90</b>	<b>59</b>	<b>1,784</b>

### 2.1.2 Selection of Markets

19 markets were selected for surveying according to the following criteria:

- the number of markets visited in each district should be approximately the same. However, more markets should be visited in Kinondoni district as it has the highest proportion of markets in DSM.
- the markets visited should range in size from around 50 stalls (small markets) to over 400 stalls (large markets). Very small markets should be excluded.
- the survey should include "problematic markets", where traders are often complaining to DCC about sanitary conditions, particularly the collection of waste from the market.
- the survey should include markets where there is a reasonable possibility for vehicle access and waste collection from the market (and possibly from residents in the immediate vicinity of the market as well).

These markets are listed in Table 2-4 and their locations are shown in Figure 2-1.

Table 2-4: Selected Markets for Surveying by District

Ilala	Kinondoni	Temeke
1. Kariakoo	6. Magomeni	14. Mbagala
2. Kisutu	7. Manzese	15. Yombo
3. Kivukoni Ferry	8. Ubungo	16. Mtoni
4. Ilala	9. Kinondoni Tx	17. Temeke
5. Buguruni	10. Mwananyamala	18. Keko
	11. Mtambani	19. Tandika
	12. Tandale	
	13. Mwenge	

All of these 19 markets were in the 21 markets listed in the JICA Preparatory Study Team report<sup>2</sup>. The remaining two markets were not surveyed as explained below:

- Drive Inn, Msasani: There is no formal market here; merely a collection of 15-20 stalls selling mainly fresh produce/used clothing and some cooked food.
- Oyster Bay (Morogoro Store): There is no market here. This area consists of a small shopping complex of over 10 shops and 20-30 stalls selling various art work, particularly paintings.

## 2.2 Terminology

1. WCP = Waste Collection Point.
2. "Household Items" refers to kitchenware, soap, matches, saucepans, etc.
3. "Permanent Building" refers to a building with a concrete floor, concrete pillars, open sides and corrugated iron roof, usually with drainage channels in the floor.
4. "Shop" refers to semi-permanent/permanent structures that are part of the market. This includes small wooden sheds and kiosks and larger wooden and concrete structures that are used by butchers or for the sale of household items, tools, building materials and even furniture.
5. "Stall" includes: i) all temporary table-like structures selling fresh produce and grains/cereals; ii) wooden/concrete tables/platforms housed in permanent buildings; iii) small restaurants ('mamantilie' and 'migahawa') selling freshly cooked food.
6. "Staples" refers to flour, sugar, salt, beans, cooking oil, etc.
7. "Traders" refers to all the people carrying out business activities within what is officially designated as the market. In effect, this means all stall and shop holders who pay tax and licence fees to the Council and/or other market management bodies. It excludes the often large number of petty traders who have set up business in the immediate vicinity of many markets and who often contribute waste to the market WCPs.
8. "Waste" refers to all types of organic/non-organic waste deposited at the WCP.

<sup>2</sup> JICA Preparatory Study Team Report concerning Solid Waste Management in DSM, Oct 1995

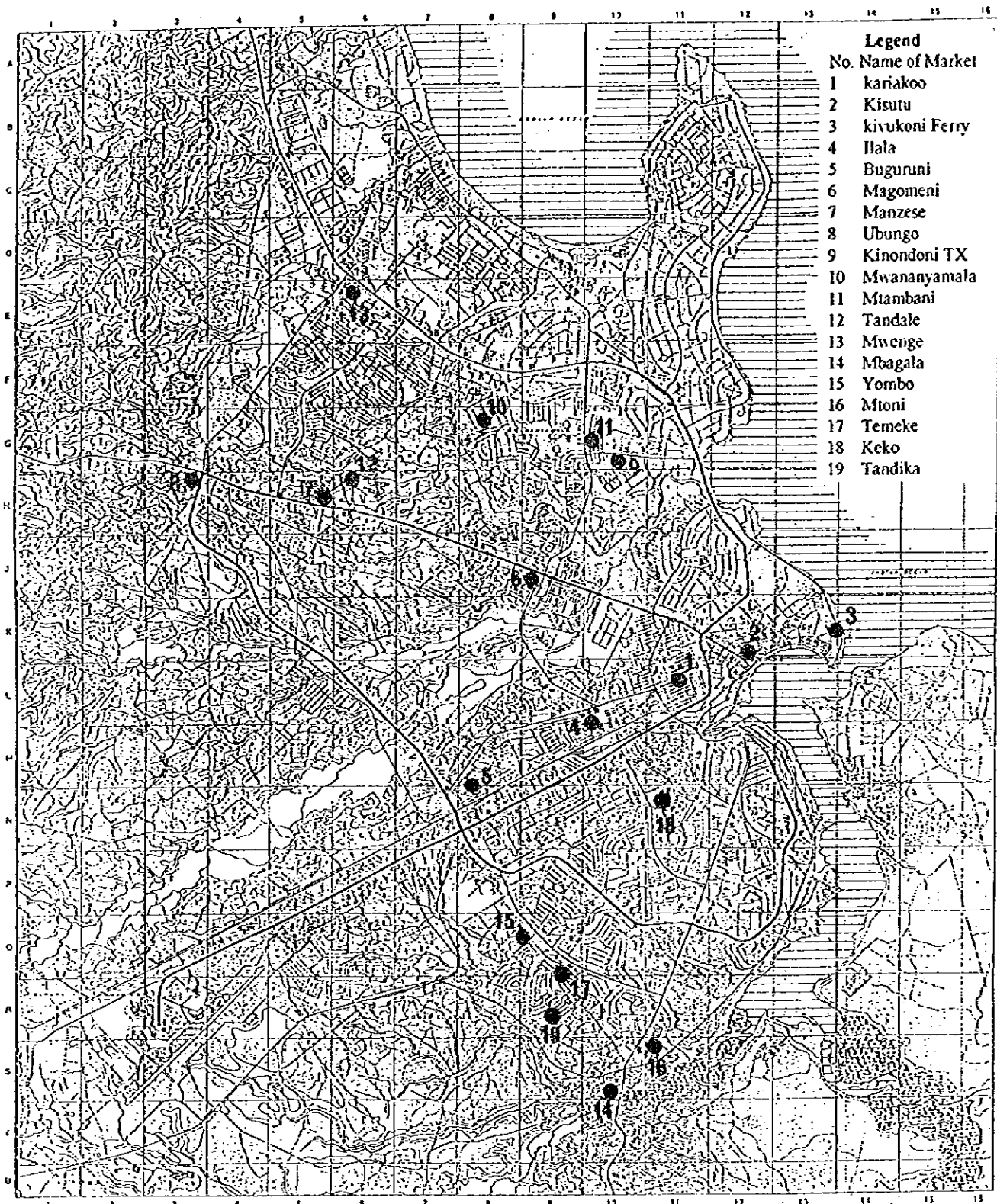


Figure 2-1 : Location Map of Markets



## 2.3 Survey Focus

This survey focused on three areas.

1. Physical data, including specifying the location, nature and area of each market, the number of stalls and shops and the range of goods sold. Some of this information was collected in order to determine the waste generation rates from each market. Parameters of importance in this respect are:
  - Nature of the market. Some markets are classified as **wholesale** markets if they primarily act as wholesale centres for goods transported to DSM from other areas of the country being sold in bulk to traders (who then sell them in other markets, shops or at the roadside) or to businessmen operating hotels, restaurants, etc. Such markets have retail sections within them as well. Other markets are classified as **retail** markets if they consist largely of retail operations.
  - Area of the market. This was estimated by physical inspection of the markets.
  - Number of stalls and shops (as defined in section 2.2). This differentiation was made as the type and possibly the amount of waste produced from each source will differ.
2. Sanitary Conditions. Sanitary conditions in the markets were assessed by investigating the market infrastructure according to the following categories: water supply, toilets, drainage, waste collection, shelter, vehicle access, electricity and general cleanliness. Particular attention was paid to the problem of waste collection and the frequency and efficiency of the waste collection service provided by the DCC.
3. Management and administrative systems of each market. It was considered important to collect some information for the various administration and management systems used in the markets visited in order to understand how the markets are organised, operated, and how traders participate in market management and in the maintenance of sanitary conditions.

## 2.4 Market Assessment

### 2.4.1 Development of Criteria

Markets were assessed on two levels:

- sanitary conditions.
- level of trader participation in market management and in maintaining sanitary conditions.

#### 2.4.1.1 Sanitary Conditions

Sanitary conditions were assessed by looking at the market infrastructure: water supply, toilet facilities, drainage, waste collection, shelter, vehicle access and electricity supply. A subjective assessment of general cleanliness was also made.

A preliminary set of criteria was developed to assess market infrastructure in each of the above categories. The markets selected were then visited and evaluated by personal observation and through interviews with DCC market personnel and/or the

chairman/secretary of the market committee. The criteria used were then refined and a number of questions were formulated for each infrastructure category with points being allocated for YES answers (see below) in order to give a semi-quantitative assessment of the infrastructure. Some markets were revisited to obtain further information if needed.

The total number of points that can be scored in each category represents the weighting given to that category:

- Water, toilets, drainage and waste collection were all given equal and heaviest weightings of 4 points as these services were considered essential for maintaining sanitary conditions in the market.
- Shelter, in the form of some permanent buildings, was given a weighting of 3 points. This was considered important as permanent buildings make a significant contribution to maintaining sanitary conditions as well as contributing to improving the aesthetic surroundings.
- Vehicle Access when considering the market environment is generally less important except for the wholesale markets which are frequented by many vehicles bringing produce for sale. In other markets, most traders and customers arrive on foot or by bicycle. However, in the context of this study, access for refuse collection vehicles is important to facilitate the removal of market waste and hence a weighting of 2 points was allocated to this category.
- General cleanliness was also allocated 2 points as although this is a subjective criteria, it does reflect the environmental state of the market and the attitudes of the market traders to their own shops/stalls and the market itself. It will also affect customers' opinions of the market.
- A low priority was given to electricity supply by most traders and hence only 1 point has been allocated to this category.

The maximum number of points that may be scored is 24. In determining the number of points for a market to attain "acceptable sanitary level" status, an acceptable number of points was first decided upon for each category and these scores were then summed to give 21 points for acceptable sanitary level status. On this basis markets are classified as follows:

Points	Status
0-10	very poor
10-20	poor
21-24	acceptable

#### a. Water Supply

A reliable water supply is essential for maintaining hygienic conditions, especially as all the markets visited included sections where freshly cooked food is sold. Water is needed for preparation of food, cooking and by customers for washing their hands as generally in Tanzania most food is eaten using the hands. In the course of our investigation, it was found that some markets do not have their own water supply. It should be noted however, that in this case, traders do obtain water according to individual needs,

obtaining/buying it from water carriers or from nearby houses/businesses. Rainwater collection was not considered as a water supply source.

Other markets may have a water supply but with only one tap for the entire market. Nearly all markets having a water supply are connected to the City Mains water supply. This is in poor condition with the water supply in many parts of the city being subject to rationing. Under the rationing system, water may be supplied for 3-4 days a week according to a schedule. Other parts of the city do not receive any water due to pump or other equipment failure.

On the basis of these observations, 4 criteria were used to assess the water supply:

1. One point was awarded if each market has its own independent water supply in working order.
2. One point was awarded if there was at least 1 water tap/outlet per 100 stalls/shops.
3. One point was awarded if the market received water for 3-4 days per week.
4. One point was awarded if water was available every day.

The water supply was considered to be acceptable if **3 points** were scored. 3 points means the market has an adequate water supply in working order with water being supplied 3-4 days per week. Ideally, water should be available every day but this is not possible due to the infrastructural problems of the city water supply network described above, the solution of which lies outside the power of the market authorities themselves. In practice, if water is supplied 3-4 days per week, traders are able to store sufficient water in containers to provide for their needs for at least 2 days and hence overcome this problem.

#### **b. Toilets**

The provision of toilet facilities for market traders and customers is essential to maintain hygienic conditions. In the process of our investigation it was found that some markets had no toilet facilities while others had toilet facilities that were no longer used for a number of reasons. Some pit latrines were full and needed emptying; some toilets were literally falling down due to lack of maintenance; other toilets were so dirty that traders refused to use them. In some cases, toilets were located in poorly drained areas, prone to flooding, with surface water draining away from the toilets towards stalls, shops or restaurants. Note that private toilets (e.g. in bars, etc.) near the market that market traders and customers use have not been included as market toilet facilities.

These findings led to the following four criteria being used to evaluate toilet facilities in each market:

1. One point was awarded if there were any working toilet facilities in the market that were used by traders regardless of their condition.
2. One point was awarded if the toilet facilities were clean, well maintained with a water supply. The latter is important as generally in Tanzania, people clean themselves after going to the toilet using water.
3. One point was awarded if the toilets were located in a well drained area not in immediate proximity of traders' stalls/shops.

4. One point was awarded if there was at least 1 working toilet per 50 traders.

The toilet facilities were considered to be acceptable if 4 points were scored.

#### **c. Drainage**

Each market should have an adequate drainage system in working order including drainage (i) from toilet facilities (where relevant), (ii) for activities in the market involving the use of water such as food preparation and cooking and (iii) for stormwater. In the process of our investigation it was found that many markets had a limited drainage system if any. Most of the drainage channels present were open drains, the majority of which were blocked with water collecting in the drains leading to poor sanitary conditions. Some drains were prone to contamination from domestic sewage. As the markets were visited during the rainy season they were seen at their worst, with some areas in many markets being flooded. Other markets were more fortunate in having good natural drainage being located on a slope or due to the soil type. The following 4 criteria were used to assess drainage in each market:

1. One point was awarded if there were any drains installed in the market that were in working order or capable of being rehabilitated.
2. One point was awarded if this drainage system was adequate to service the entire market.
3. One point was awarded if the installed drainage system works (not blocked or damaged).
4. One point was awarded if the market had good natural drainage, based on observation of the gradient and soil types of the land on which the market was located.

The drainage system was considered to be acceptable if 4 points were scored. Good natural drainage in itself is sufficient to minimise the effects of stormwater on sanitary conditions but not water from sources (i) and (ii) stated above.

#### **d. Waste Collection**

A considerable amount of waste is produced in a market which must be disposed of in an acceptable manner. Typically markets use two systems involving WCPs.

The first system is more commonly used and is based on traders depositing their waste at a specific WCP located in or nearby the market. Some of these sites are poorly chosen being in poorly drained areas or nearby traders' shops/stalls. DCC refuse collection trucks then remove the waste from here loading the waste by hand (labourers with baskets, forks, etc.) or using a wheel loader.

The second system involves traders storing waste in baskets under their stalls and bringing it out to DCC trucks which stop at set collection points when they come to collect waste. With both systems, the frequency of collection by DCC varies from every day to less than once per month, depending upon the market.

In DSM market waste, which essentially is organic matter, decomposes very quickly, particularly during the rainy season. Ideally waste should be collected daily or if this is not possible at least every two days.

Based on these observations, the following criteria were used to assess waste collection:

1. One point was awarded if there was a waste collection system in the market (e.g. WCP, storage of waste in baskets under table, etc.).
2. One point was awarded if the WCP was located in a well drained area and not in the immediate proximity of traders' stalls/shops or 0.5 points was awarded if the waste is stored in baskets under traders stalls as the latter system is not considered to be very hygienic.
3. One point was awarded if waste was collected from the market by DCC/private contractors at least once every week or 0.5 points was awarded if the collection frequency was greater than 1 week but less than 3 weeks.
4. One point was awarded if waste was collected at least once every two days.

Waste collection was considered to be acceptable if **4 points** were scored.

#### **c. Shelter**

The nature of the shelter found in markets was assessed. The climate in DSM makes it vital that proper shelter is provided for all traders to protect them, their customers and their produce from the elements (sun and rain). Many of the markets have one or more permanent buildings surrounded by a large number of temporary stalls and restaurants with no ground cover and improvised roofs (corrugated iron, sacking, tarpaulins, etc.) and a lesser number of shops. Some of these permanent buildings include permanent concrete stalls for use by traders, often used for the sale of fish. A well maintained, permanent building of this nature greatly facilitates the maintenance of sanitary conditions in the market, especially during the rainy season. On the other hand, temporary stalls and restaurants can become very muddy underfoot during the rains.

The following criteria were used to assess the shelter in the markets.

1. Points were awarded for the fraction of the market occupied by permanent buildings as follows: 0-25% - 0.5 points; 25-50% - 0.5 points; 50-75% - 0.5 points; 75-100% - 0.5 points; giving a maximum score of 2 points.
2. One point was awarded if the permanent buildings present were well maintained. If any markets had two or more buildings, each building was assessed separately and awarded a fraction of 1 point as appropriate.

Shelter was considered acceptable if **2 points** were scored. This means that 25-50% of the market is comprised of permanent buildings which are all well maintained.

#### **f. Vehicle Access**

In the context of this study, ease of access for waste collection trucks to the market is important to facilitate the removal of waste. Some market are located alongside tarmaced roads in good condition with waste collection points being locate down a short dirt road, directly off the main road. At the other end of the scale we have markets accessed via narrow dirt roads with many potholes. Traders stalls may also line the sides of the road, making the road even narrower. Many markets are situated in areas where the road also serves as the main pedestrian thoroughfare and pedestrian density can be very high. Accessibility to the WCP must also be considered in markets using this

system. In some markets stalls must be moved in order for DCC vehicles to gain access to the WCP.

Based on these observations, the following criteria were used:

1. One point was awarded if the main road to the market was tarmaced and in good condition.
2. One point was awarded for good ease of access to the WCP or 0.5 points was awarded if there were 1-2 problems with access. Distance from the main road to the refuse collection points, access road width and nature (straight?, bends?, etc.), pedestrian density, blocked access due to petty traders presence were all considered here.

Vehicle Access was considered acceptable if **2 points** were scored.

#### **g. Electricity Supply**

The priority put on the provision of electricity by market traders was relatively low. In most markets electricity is only supplied to some shops and the market/committee office. Traders interviewed commented that the provision of electric lighting at nights would help to deter petty theft from the market. Although many markets sell fresh fish and meat, generally there are no refrigeration facilities. In fact, many traders would go out of business if they were required to provide such facilities. Instead, animals are slaughtered each morning and the freshly slaughtered meat is then hung under shelter in shops for sale. The criteria used are as follows. Note that in this case 0.5 points is awarded in each category due to the low priority attached to this service.

1. Half a point was awarded if there is an installed electricity supply serving at least part of the market.
2. Half a point was awarded if electricity is currently supplied.

The electricity supply was considered acceptable if **1 point** was scored.

#### **h. General Cleanliness**

Finally, a subjective assessment of general cleanliness of each market was made on a scale of 0-2 where 0 = very poor, 0.5 = poor, 1 = reasonable, 2 = very good. Cleanliness in this respect is directly related to the efforts of the traders themselves in keeping their respective stalls, shops and immediate surroundings clean and thus the market itself and indirectly to the level of service provision. Cleanliness is considered acceptable if **1 point** is scored.

### **2.4.1.2 Trader Participation in Market Management**

A crude assessment was made of the level of trader participation in market management and in maintaining the sanitary conditions in the markets. All markets have committees which represent the traders' interests. In some markets, traders have organised themselves into a Co-operative Society. Most of the interviews carried out during this survey were conducted with these committees' chairman or secretary.

Some of these committees appear to be well organised with their own office, a formal organisational structure, list of regulations and with workers such as security guards and sweepers employed by them. Some committees have carried out one or more projects to

improve the sanitary conditions in their markets. Based on these observations the following criteria were used:

1. One point was awarded if there was a market committee representing the traders.
2. One point was awarded if this committee appears to be well organised (e.g. membership records, organisational structure, regulations, office, employment of security guards, etc.).
3. One point was awarded if the committee has carried out 1 project to improve the sanitary conditions in the market. 2 points were allocated if they had carried out more than 1 such project.

General cleanliness was also included in this assessment (see (h) above).

On this basis, total scores for trader participation may be interpreted as follows:

Total	Status
0-3	poor
3.5-6	acceptable

#### **2.4.2 Survey Questionnaire**

The questionnaire used for the assessment of sanitary conditions and trader participation is shown in Table 2-5 and Table 2-6 respectively.

#### **2.4.3 Market Assessment Results**

These results are tabulated in Table 2-7 and Table 2-8. In these tables:

1. N/A = not applicable.
2. The criteria are identified by A1-J5, corresponding to the numbers used in Table 2-5 and Table 2-6.
3. The markets are identified by the number 1-19, corresponding to the third number in the sub-section headings in section 2.5. (i.e. 1 = Kariakoo; 2 = Kisutu, 3 = Ferry Kivukoni, etc.).

Table 2-5: Criteria/Questions for Assessment of Market Infrastructure

CRITERIA	YES
<b>A. WATER SUPPLY</b>	
1) Is there is an installed water supply in working order?	1
2) Is there at least 1 tap/outlet per 100 stalls/shops?	1
3) Is water available from the water supply for 3-4 days per week inclusive?	1
4) Is the water supply reliable with water available every day?	1
<b>SUB-TOTAL</b>	<b>4</b>
<b>B. TOILETS</b>	
1) Are there any working toilets in the market?	1
2) Are the working toilets clean, well maintained and with a water supply?	1
3) Are the working toilets well located (consider drainage, location relative to stalls and shops)?	1
4) Is there at least 1 toilet per 50 traders?	1
<b>SUB-TOTAL</b>	<b>4</b>
<b>C. DRAINAGE</b>	
1) Are there any drains installed in the market?	1
2) Does the installed drainage system service the entire market?	1
3) Does the installed drainage system work (i.e. is it blocked/damaged)?	1
4) Is natural drainage from the market good (i.e. consider soil, slope)?	1
<b>SUB-TOTAL:</b>	<b>4</b>
<b>D. WASTE COLLECTION</b>	
1) Is there a waste collection system (e.g. WCP, baskets under tables, etc.)?	1
2) Is this well located (consider drainage, location relative to stalls/shops)?	1
3) Is waste collected from here at least once per week?	1
4) Is waste collected from here at least once every two days?	1
<b>SUB-TOTAL</b>	<b>4</b>
<b>E. SHELTER</b>	
1) Allocate 0.5 points for each quarter (25%) of the market occupied by permanent buildings.	2
2) Are the permanent buildings well maintained?	1
<b>SUB-TOTAL</b>	<b>3</b>
<b>F. VEHICLE ACCESS</b>	
1) Is the main road to the market tarmaced and in good condition?	1
2) Is access easy? (consider distance to WCP, accessibility, width, no of bends, congestion, etc.)	1
<b>SUB-TOTAL</b>	<b>2</b>
<b>G. ELECTRICITY SUPPLY</b>	
1) Is there an installed electricity supply serving at least part of the market?	0.5
2) Is electricity currently supplied?	1
<b>SUB-TOTAL:</b>	<b>1.5</b>
<b>H. GENERAL CLEANLINESS</b>	
1) Evaluate the general cleanliness of the market on a scale of 0-2.	2
<b>TOTAL</b>	<b>24</b>

Table 2-6: Criteria/Questions for Assessment of Level of Trader Participation

CRITERIA	YES
J1) Is there a committee?	1
J2) Is it well organised? (records, organisational structure, rules, employment of workers, etc.)	1
J3) Has it carried out 1 project to improve the sanitary conditions in the market?	1
J4) Has it carried out 2 or more projects to improve the sanitary conditions in the market?	1
J5) Evaluate the general cleanliness of the market on a scale of 0-2.	2
<b>TOTAL</b>	<b>6</b>



Table 2-7: Results of the Assessment of Market Infrastructure

Criteria	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
A1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0
A2	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0
A3	1	1	1	1	.5	0	1	0	1	1	1	.5	1	0	0	0	0	0	0	0
A4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub-tot	3	2	2	2	1.5	1	2	0	3	3	2	1.5	3	1	0	0	0	0	0	0
B1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1
B2	1	0	0	0	0	1	1	0	1	1	1	.5	0	0	0	0	0	0	0	0
B3	1	1	1	1	1	1	1	1	1	.5	.5	.5	0	0	0	1	0	0	0	0
B4	1	1	0	0	0	1	.5	0	1	.5	1	0	0	0	0	0	0	0	0	0
Sub-tot	4	3	1	2	2	4	3.5	1	4	3.5	3.5	2	1	0	0	2	1	1	1	1
C1	1	1	0	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0
C2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C4	0	1	1	.5	0	1	0	0	.5	1	0	0	0	1	0	0	0	0	0	0
Sub-tot	3	3	1	1.5	1	2	1	0	0.5	1	0	1	1	1	0	1	0	0	0	0
D1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
D2	1	1	0	.5	0	.5	1	.5	1	1	.5	.5	1	1	1	1	1	1	1	0
D3	1	1	1	.5	1	1	.5	.5	0	.5	0	1	0	0	1	0	1	.5	1	0
D4	1	.5	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1
Sub-tot	4	3.5	2	2	2	3.5	2.5	2	2	2.5	1.5	2.5	1.5	2	3	2	4	2.5	2	2
E1	2	.5	.5	1	0	.5	.5	0	1.5	.5	0	.5	0	.5	0	.5	0	1	.5	.5
E2	1	.5	.5	1	0	.5	.5	0	.5	.5	0	.5	0	.5	0	1.5	0	.5	1	1.5
Sub-tot	3	1	1	2	0	1	1	0	2	1	1	1	0	1	.5	.5	1	1.5	1.5	1.5
F1	1	1	1	1	.5	1	1	1	1	.5	1	0	1	.5	.5	.5	1	1	1	0
F2	1	1	1	1	0	1	.5	1	1	1	1	0	1	.5	.5	0	1	1	1	0
Sub-tot	2	2	2	2	0.5	2	1.5	2	2	1.5	2	0	2	1	1	0.5	2	2	2	0
G1	.5	0	.5	.5	.5	0	.5	0	.5	0	.5	.5	.5	0	.5	0	.5	.5	.5	.5
G2	.5	0	.5	0	.5	0	0	0	.5	0	0	.5	.5	0	.5	0	.5	.5	.5	.5
Sub-tot	1	0	1	0.5	1	0	0.5	0	1	0	0.5	1	1	0	1	0	1	1	1	1
H1	1	0.5	0	1	0.5	1	0.5	0.5	1	0.5	0	0	0.5	0.5	0.5	1	0.5	0.5	0.5	0
Total	21	15	10	13	8.5	14.5	12.5	5.5	15.5	13	10.5	9	10	6.5	5.5	8	8.5	8.5	8.5	5.5

Table 2-8: Results of the Assessment of the Level of Trader Participation

Criteria	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
J1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
J2	N/A	1	1	0.5	1	1	1	0.5	1	1	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5
J3	N/A	1	1	0	1	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0
J4	N/A	0.5	0	0	0	0	1	0	1	1	1	0	0.5	0	0	0	0	0	0	0
J5	1	0.5	0	1	0.5	1	0.5	0.5	1	0.5	0	0	0.5	0.5	0.5	1	0.5	0.5	0	0
Total	N/A	4	3	2.5	3.5	3	4.5	2	5	4.5	4	1.5	4	2	3.5	2	2.5	2	1.5	1.5

## 2.4.4 Observations

### 2.4.4.1 Transportation of Market Produce into DSM

Three of the markets visited have been classified as wholesale markets and receive most of the produce coming into DSM. However, most of the other markets surveyed do also receive a small amount of wholesale goods. Grasses and other organic materials are used to protect produce during transportation and this "transportation waste" increases the amount of waste normally produced in a market. It is important to be able to estimate the amount of waste contributed from this source and some relevant points concerning this issue are stated below.

It is estimated that around 95% of the produce sold at markets in DSM is brought in from outside of the city<sup>3</sup>. The main regions feeding DSM are Morogoro, Iringa, Mbeya, Kilimanjaro, Arusha and Tanga. Produce grown locally includes spinach, coconuts and from October-December tomatoes and mangoes.

Most of the produce brought into the city is transported in trucks with grasses being put on the bottom of the truck to prevent produce from damage while in transit. Different types of produce may also be separated from each other by a layer of grasses and another layer of grasses may be placed on top of the truck to protect the produce from the elements. Alternatively, the produce may be loaded into bamboo baskets with a layer of grasses as cushioning on the bottom and around the sides and a further covering on top (Figure 2-2). It is estimated that these grasses constitute around 30% of the total volume of organic matter being brought into the city and around 70% of the total waste generated<sup>4</sup>. Moreover, this method of produce storage during transit is quite inefficient with significant spoilage occurring during transit.

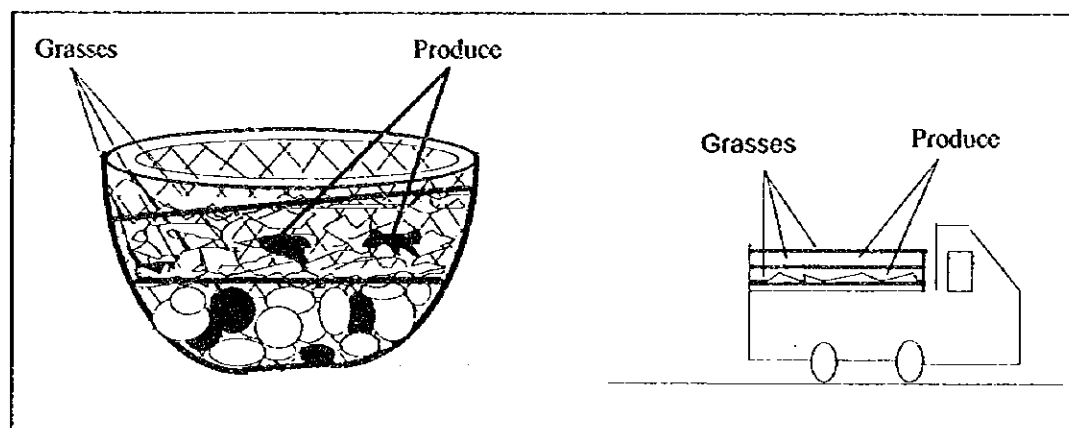


Figure 2-2: Transportation of Produce by a) Bamboo basket, b) Truck

A more conservative estimate of the amount of transportation waste can be made using Haskoning's data<sup>5</sup>. Haskoning used figures of 2,000 wholesale and 4,500 retail stalls in the markets in DSM and a waste generation rate of 30 kg/stall/day and 20 kg/stall/day

<sup>3</sup> Kariakoo Market Corporation Cleaning Department Superintendent

<sup>4</sup> Kariakoo Market Corporation Cleaning Department Superintendent

<sup>5</sup> Masterplan on Solid Waste Management for Dar es Salaam, Vol 1: Main Report, Haskoning & M-Konsult Ltd, Mar. 1989

for wholesale and retail markets respectively. This gives a transportation waste generation rate of 10 kg/stall/day and overall figures of 20,000 kg/day transportation waste and 130,000 kg/day market waste so that transportation waste represents 13.3% of total market waste.

These two predictions differ significantly, making it difficult to estimate the percentage of market waste made up by transportation waste. However, it is obvious that the contribution of transportation waste is significant and it may be worthwhile to consider ways of reducing the amount of waste generated from this source. For example, special containers, that slot into each other and which are currently used in Arusha and Moshi towns, could be used to protect produce during transit thus eliminating the need for grasses<sup>6</sup>. Another solution would involve DCC passing a by-law to make inspection of all produce bearing vehicles coming into the city mandatory. Inspection points would be sited along main roads coming into the city and trucks containing significant quantities of spoiled produce could be rejected<sup>7</sup>.

#### **2.4.4.2 Physical Data**

Information on the number of stalls and shops in a market was obtained from the people interviewed. Official figures for different markets were also obtained from DCC (see section 2.1) and there were a considerable number of discrepancies between the two sets of data. These discrepancies were resolved as explained in annex 6.

#### **2.4.4.3 Council Management and Administration**

The DCC management and administrative structure of all the markets surveyed is similar. There are some City Council employees at all markets consisting of at least one revenue collector, one or more market sweepers and in some cases one or more security guards. Revenue collectors are responsible for the collection of the appropriate fees from all traders. Generally at least one revenue collector is permanently stationed at each market. In the larger markets there is a "Market Master" who is in charge of these staff. Some Market Masters have responsibility for DCC staff stationed at more than one market.

The DCC fee structure consists of two types of payments:

- i) a monthly tax ('ushuru') that covers the provision of the City Council staff and services provided by the Council including the collection of waste from the market. Stall traders pay 200/- per month while shops, butchers, chicken traders and restaurants pay 500/- per month.
- ii) an annual licence fee ('leseni') that permits the trader to have a stall/shop in the market. The licence fee is the same for all traders and is currently set at 500/- per year.

It has been proposed to increase the market licence fee and monthly tax to 1,500/- and 500/- respectively in 1997<sup>8</sup>. These proposals have yet to be approved.

<sup>6</sup> Kariakoo Market Corporation Cleaning Department Superintendent

<sup>7</sup> Kariakoo Market Corporation Cleaning Department Superintendent

<sup>8</sup> DSM City Market Superintendent

In some markets, traders pay additional contributions at rates set by the market committee. The nature of these payments and the present rates are described in section 2.5.

## **2.5 Summary of Market Survey Data**

### **2.5.1 Kariakoo**

**Interviewee:** Mr J.W.Swai, Superintendant of the Market Cleaning Department of Kariakoo Market Corporation (KMC).

#### **2.5.1.1 Physical Data**

- Location:** in central Kariakoo area on block No. 32 Zone III bounded by Nyamwezi, Mkunguni, Sikukuu and Tandamuti Streets.
- Nature:** wholesale market and a secondary retail market
- Area:** 17,780 m<sup>2</sup>. This area is the total floor space of the two buildings together with the underground link block.
- No of wholesale operators:** 2,235 (registered for 1995/96)
- No of stalls:** 232 (in secondary market)
- No of shops:** 73 (in main building)

#### **Description**

Kariakoo is the most well known of all the markets in DSM. It was designed and built by local architects and contractors in the early 1970s and was officially opened in 1975. The Kariakoo market complex is made up of two buildings joined together by a common basement. The market features three types of shopping facilities: a wholesale market located on the basement level; retail shops on the ground and first floors of the main building and a secondary retail market in the other building.

The shops in the main building can be divided into two categories. One category found on the ground floor includes retail shops selling fresh fruits, vegetables, meat and fish. Fish are stored in large freezers in the fish section. In contrast, meat is hung freely in the open air in the meat section although cold storage facilities (run on a commercial basis by individuals) for meat, fish and other produce is available on the basement level of this building. A restaurant is also located on the ground floor.

The other category of shops are found on the first floor and includes shops selling dry goods comprising of processed and packaged foods, household goods, textiles, shoes, furniture, farm tools and chemicals, handicrafts and carvings, etc. Most of the market staff have offices on this level.

The secondary retail market is typical of other markets in DSM.

The wholesale market monitors the wholesale business of green vegetables, fruits, dried fish, coconuts and other fresh edibles in the city. All wholesale goods brought to the city should pass through the Kariakoo Wholesale market. However, some wholesale goods are now taken to other markets instead, particularly Tandika and Tandale.

Some recycling is carried out here. For example, some grasses are taken for cattle feed, cabbage leaves for pig feed; tins and boxes are reused. The staff working in the refuse

collection room do some sorting of the waste themselves, removing items such as large sacks which they can subsequently sell to interested parties.

### **2.5.1.2 Management and Administrative Structure**

This market was established in 1974 under the Kariakoo Market Corporation Act No. 36 of 1974. The overall management is vested in a Board of Directors while its daily activities are controlled by the General Manager. 51% of KMC Shares are held by the central government while DCC holds the remaining 49%. KMC is an autonomous organisation although the City Director is a member of the Board of Directors. The committee of traders also has two representatives on the Board. Other Board members are appointed by the Prime Minister's office in consultation with KMC. Presently, the government is seeking to sell its entire stake in KMC.

KMC is divided into four departments:

1. General Manager. This is subdivided into four sections; namely: (i) General Manager; (ii) Security, (iii) Internal Audit and (iv) Market Maintenance.
2. Market Cleaning.
3. Planning and Commercial Operations.
4. Finance.

The Market Cleaning department is further sub-divided into four sections: (i) sweeping; (ii) drainage; (iii) toilets and (iv) waste removal.

There are 168 employees in total with 36 of these being in the Market Cleaning Department.

KMC generates its own funds, the market financial year running from 1 July - 30 June. There is a two tier fee structure:

1. Wholesale: Producers sell their produce to groups of traders who have joined together into specialised organisations which operate as partnerships, co-operatives or limited liability companies. KMC regulates prices by fixing the maximum and minimum prices for all produce sold by producers to these traders. After selling their produce the farmers or producers have to pay a commission of 6% of the value of their produce to KMC based on the minimum price set by KMC for such produce. For the 1995/96 financial year the registration fee is set at 2,000/- per operator. This applies to the wholesale market only.
2. Market User Fees: There are two fees paid by market users: The first is an annual registration fee, currently set at 2,000/- per operator for the 1995/96 financial year. This applies to the wholesale market only. The second is a market user fee payable on a monthly basis with the amount depending upon the type of business ranging from 1,500-6,000 per month per stall.

Revenue averages 800,000/- to 1,200,000/- per day, the large range in revenue being due to seasonal variations in the amount of produce brought in. Over 90% of the revenue comes from the wholesale market, the remaining 10% is made up of rents and market fees. Annual operational expenditure continues to increase; salaries being the major expense followed by market cleaning costs.

## **Market Committee**

There is a committee of market traders with representatives from the different sections of the market. Trader participation in market management and the maintenance of sanitary conditions is primarily through their two representatives on the KMC Board and no independent assessment can be made in this case.

### **2.5.1.3 Sanitary Conditions**

#### **a. Water Supply**

Water is supplied to different points around the market including toilets from the City Mains supply, the frequency of supply being approximately 3-4 days per week.

The roof of the main building is unusual in design but there is a practical reason for this with each pillar opening out at the top to form a rainwater collection area. Water is then conveyed from here by a pipe in the pillar itself to a rainwater collection tank located below ground level. Gravity flow from this tank is not possible and hence the water is pumped from it according to demand to various points around the market where it is used solely for cleaning purposes. When rainwater is not available, mains water stored in a smaller tank adjacent to the rainwater tank, is used instead.

#### **b. Toilets**

There are three toilet blocks on the first, ground and basement levels of the main building. Each toilet block consists of 8, 8 and 12 units respectively; half of these being for male and half for female. There is also a shower on the basement level. There is a further toilet block of 8 units in the secondary market. These toilet facilities are maintained in good condition by KMC workers who get paid an extra allowance for such work. Use of the toilets is free.

#### **c. Drainage**

There is a drainage system that works effectively, servicing the entire market. However, this system drains into the basement from where water is pumped to the ground level and then to the public sewer. If the pump fails, the basement area becomes overloaded quickly. Natural drainage in the Kariakoo area is poor with the area being prone to flooding.

#### **d. Waste Collection**

During the 1970s KMC had its own fleet of tractors for the removal of waste. At that time waste disposal was relatively efficient; the volume of waste generated being relatively small, traffic volume on the roads being light and the Tabata dump site was relatively close. However, this system broke down in the 1980s and private contractors have been used since then for the collection and disposal of waste. Presently, three different contractors collect waste from the market. 7 ton trucks are used and the contractors receive 12,000/- per trip. Normally, contractors are paid on the completion of every 30 trips. Each truck carries approximately 2 tons of waste from Kariakoo to the Dump at Vingunguti. The dumping of waste is charged at 800/- per ton. DCC staff there record the amount of waste dumped per day and at the end of each month an account is sent to KMC for payment to DCC. A register is kept by KMC staff of all trucks coming

to collect waste. This register is checked with DCC records periodically and any discrepancies discussed with the contractor.

Waste is collected daily with 5-8 trips per day being required to remove all the waste. The peak period for the market is March until late June during which time there is a big influx of goods and hence the production of waste increases. The occurrence of the rains also makes it particularly important to maintain hygienic conditions during this time. Some KMC staff are assigned to cleaning the market. Waste is collected from stalls and taken to a waste collection room on the basement level where other staff are responsible for loading it on to contractors' trucks using forks and wheelbarrows. Trucks come down a ramp and back on to a platform leading out from the refuse collection room so that wheelbarrows can tip directly into the truck without any lifting being necessary. Waste from the ground and first floor levels are dropped via a chute to the basement level.

**e. Shelter**

Virtually all of the official market is housed in the permanent buildings previously described. These are in good condition although expenditure on maintenance has not kept pace with depreciation of the building stock due to the very heavy use the market is subjected to.

An interesting feature of the original building design concerns ventilation of the basement. Every second pillar houses an air vent and extraction fan for supplying fresh air to the basement level. This helps to maintain the air quality in the basement. Despite this, ventilation in this area is poor. Vehicle fumes can not escape and during the hot season, it is very unpleasant to work here.

**f. Vehicle Access**

A regular stream of vehicles arrives at KMC from early morning to late evening. Substantial improvements to the roads in the Kariakoo area have been carried out in the past 18 months and access to the market is via tarmaced roads in good condition. Access for vehicles to the basement level of the market, including the refuse collection room, is also very good.

**g. Electricity**

All areas of the market are supplied with electricity, primarily for lights (all buildings) and fans (in the basement). Traders are charged for electricity according to their use (e.g. cold rooms, freezers, etc.).

**h. General Cleanliness**

Reasonable. A lot of thought went into the design of this market and the maintenance of hygienic conditions. The market is relatively clean, especially inside the buildings. In the past, petty traders doing business in the immediate vicinity of the market increased the amount of waste generated and caused a deterioration in the environmental conditions outside the market buildings. However, in March this year, all the petty traders were removed from the streets around Kariakoo and security guards were deployed to prevent them returning. To date, this approach has been successful and the environmental conditions around the market have consequently improved.

## 2.5.2 Kisutu

Interviewee: Chairmen of each of the three market committees.

### 2.5.2.1 Physical Data

**Location:** directly off Bibititi Mohamed Rd (east side), approximately 200m south of the Morogoro Rd intersection.  
**Nature:** retail + specialty sections dealing in the sale and slaughter of chickens.  
**Area:** 2,500m<sup>2</sup>  
**No of slaughterhouses:** 1  
**No of stalls:** 26 (retail); 66 (chicken trading)  
**No of shops:** 1 (retail)

#### Description

This market is unique in DSM, being divided into three sections, one a normal retail market; the second, a large chicken trading area; the third, a chicken slaughterhouse operation. The retail section sells fruit, vegetables, meat, fish, staples and charcoal.

### 2.5.2.2 Management and Administrative Structure

#### City Council employees

1 revenue collector for the entire market and 3 sweepers (2 for the retail section and 1 for the chicken trading section).

#### Market Committee

Each section of the market must be considered separately:

1. The slaughterhouse is run as a Co-operative, named the Kisutu Poultry Co-operative Society. This has 54 members, most of whom are slaughterers, who each pay a contribution of 300/- per day. The Co-operative pays tax and licence fees out of this money of 27,000/- per month and 6,000/- per year to DCC. Recently, Multinet has been contracted at a rate of 54,000/- per month to collect waste from the slaughterhouse. After extensive discussions with members it was agreed to increase their daily contributions to 350/- per day in order to finance this service. The number of chickens slaughtered per day varies between 600-1,000. Busy days correspond to hotels placing large orders (e.g. the Kilimanjaro hotel may order 200 chickens at a time), religious festivals, etc.
2. The chicken trading area contains a large number of pens housing exotic and local chickens. There are 66 different individual traders doing business in this area. Their interests are represented by their own market committee. They pay tax and licence fees of 500/- per month and 500/- per year to DCC respectively.
3. The retail section of the market has its own market committee. Traders pay the normal fees to DCC and also make contributions to their committee in order to employ three night security guards in the market.

These committees were well organised. As well as contracting Multinet to collect chicken waste, the Co-operative is presently seeking DCC approval to renovate their office and slaughterhouse while the retail section committee have submitted a request to



DCC to build a more permanent structure in which to house their stalls. If DCC is not able to finance the latter project, they hope to be able to do it themselves. As these building projects are in the planning stage, 0.5 points were awarded for criteria J4.

### **2.5.2.3 Sanitary Conditions**

#### **a. Water Supply**

The only water supply for the whole market is in the chicken slaughterhouse section and consists of a single outlet connected to the City Mains supply with water being supplied 3-4 days per week.

#### **b. Toilets**

There is one toilet block for all sections of the market which consists of three toilets, all in very poor condition.

#### **c. Drainage**

There is only one drain in the entire market which takes water from the slaughterhouse. Water is used in large quantities here and a small but steady flow is maintained in this drain. The drain conveys water to a nearby public sewer. Natural drainage is reasonable as the market is located on a slight slope.

#### **d. Waste Collection**

There are two WCPs in this market: one for the slaughterhouse and chicken trading area; the second for the retail section of the market.

Waste from the slaughterhouse operation is highly objectionable, decaying rapidly and can begin to smell after only 12 hours. However, this waste is often not collected by DCC for up to 5 days. Trader dissatisfaction with this service led them recently to contract Multinet to collect this waste. Multinet began working in early May 1996 and are collecting waste almost every day. It is too early to assess the reliability of the Multinet service. [Note: The chicken waste generation rate may be estimated from the information received that it would take approximately 15 days to collect sufficient chicken waste to fill 1 DCC truck].

The waste from the chicken trading section is removed from the pens and ground and stored in a large pile near to the slaughterhouse waste. A large proportion of this waste is taken at no cost by people to use as fertiliser. There is a high demand for this fertiliser amongst spinach growers during the growing season. At other times of the year, people generally take the fertiliser to put on their gardens. The remaining waste is removed by Multinet.

Waste is collected by DCC from the retail section of the market once or twice per week.

As there are two WCPs, the 1 point for criteria D4 was split in half and the frequency of waste collection from each WCP considered separately, giving a total of 0.5 (0.5 from chicken WCP; 0 from retail WCP).

#### **e. Shelter**

The slaughterhouse is located in a permanent building in poor condition. The environment is very unpleasant to work in with at least 30 people being crowded into the

relatively small enclosed building with some windows and a large front door which constitutes the slaughterhouse. Water is heated in the middle of this slaughterhouse, the hot water being used to facilitate the removal of feathers from the chickens, making the working environment even more difficult. The major problem here is maintaining a clean and hygienic slaughter operation. There is one permanent building in the retail section of the market which has not been well maintained.

**f. Vehicle Access**

Good.

**g. Electricity**

There is no electricity supply for any section of the market. Water is heated on charcoal stoves in the slaughterhouse.

**h. General Cleanliness**

Poor. The market is cramped and quite dirty. The collection of waste, lack of drainage and construction/rehabilitation of buildings were considered to be the most serious problems facing this market by the people interviewed.

### **2.5.3 Ferry Kivukoni**

**Interviewee:** members of the two committees representing the interests of the fish market, member of the retail section committee, Chairman of the restaurant section committee.

#### **2.5.3.1 Physical Data**

**Location:** directly off Ocean Road and next to the ferry terminal at Kivukoni.  
**Nature:** Wholesale (fish only) and retail (fish and other).  
**Area:** 7,000 m<sup>2</sup>  
**No of stalls:** 204 (fish), 70 (retail), approximately 100 (small restaurants)  
**No of shops:** 20-30

#### **Description**

This market is known locally as the Fish market and receives all saltwater seafood coming into DSM. Local fishermen bring their catches here as do boats from as far away as Zanzibar, Bagamoyo and Mafia. The market is busy from 6am-6pm, frequented by over 6,000 people each day and with an average figure of 5 tons of fish being brought here for sale each day.

As well as the sale of fish, there are a large number of skilled workers involved in various stages of fish processing. These people set up operation either on the beachfront (when the tide permits) or further inland around the fish market. They include people who specialise in one or more of the following skills: scaling; cleaning, offal removal, frying/roasting and preparation of dried fish. Some recycling is also carried out as described below. Most of the waste produced in these processes, but not taken for recycling, is carried away by the tide.

The market is divided into three sections. The first is the Fish market described above; adjacent to this is a relatively small retail market and next to this is a large area of small restaurants, known throughout DSM for the variety of its cooked food.

The market has "temporary" status. Temporary in this sense means that it has been established on Tanzania Harbour Authority (THA) land without the permission of THA, and hence could be demolished at any time.

Some recycling is carried out here. Offal from the fish gutting process is collected/brought by some people, washed, dried and sold for chicken and pig food. Some traders even grind this waste and mix with other organic waste such as rice husks to make fishmeal which is then sold for animal feed. Superficial examination of the market waste revealed very little fish waste.

### **2.5.3.2 Management and Administrative Structure**

#### **City Council employees**

17 City Council employees, divided into four sections: weighing, revenue collection, fish sales and revenue collection.

#### **Market Committee**

There are 4 committees. Two of these represent the interests of the fishermen. One of these, "Bwabwaza", is a registered society and its membership consists of 150 traders. The second is not registered and has a membership of 54 traders. Apparently the registration procedure is expensive and time consuming plus the benefits of registration are dubious. Hence, it was decided by the fishermen to form two groups and register one and then to observe what tangible benefits registration brought. To date, the fishermen are very unsatisfied with the benefits of registration and do not intend to register the other association.

Fishermen pay two kinds of levies. The first is a fishing commission, currently set at 5% of the sales value of the fish. The second is a fishing licence fee currently 5,000/- per year. In addition, fish traders pay an average of 30/- per day which is used by the fish market committees for market maintenance and the employment of sweepers and security guards and payment of electricity. Other sections of the market pay no levies to the Council for political reasons. If the Council forced them to do so, then DCC would to an extent be legalising the market. By not collecting levies the market retains its temporary status and hence can be demolished at any time.

The committees appear to be reasonably well organised. Being a temporary market, everything has been built by the traders themselves.

### **2.5.3.3 Sanitary Conditions**

#### **a. Water Supply**

There is only 1 water tap in the restaurant section of the market. This is connected to the City Mains supply with water being supplied 3-4 days per week.

#### **b. Toilets**

There are some toilet facilities in very poor condition. Many people use the sea instead.

**c. Drainage**

There is no installed drainage system. The market is located on the sloping seafront and hence has reasonable natural drainage.

**d. Waste Collection**

Waste is dumped in an area that is part of a shallow depression and hence gets easily waterlogged. Most of the waste observed at the WCP is vegetable matter but some waste does originate from the fish gutting process which rots very quickly. However, refuse collection is usually done once per week by DCC with 3-4 trucks coming together with a wheel loader on Friday or Saturday.

**e. Shelter**

The fish market has three permanent buildings, all in poor condition. Two of these are used by traders; the third is used to weigh fish on arrival by DCC staff.

**f. Vehicle Access**

Vehicle access to the market is via a tarmaced road in good condition although the traffic volume is heavy with the market being a bus stop and the ferry terminal being its neighbour on one side. The WCP is a short distance off the tarmaced road.

**g. Electricity**

An electricity supply has been installed in the fish market and to some small shops.

**h. General Cleanliness**

Very poor. The fish market is a very busy, congested place. Environmental conditions and general cleanliness is poor. Near the seafront maggots were observed crawling amongst the sand. They were also present in the water near the waste collection site.

**2.5.4 Ilala**

Interviewee: City Market Superintendent

**2.5.4.1 Physical Data**

**Location:** directly off Uhuru St (southern side) between Morogoro and Utete Sts.  
**Nature:** retail.  
**Area:** 6,300m<sup>2</sup>  
**No of stalls:** 726 including 32 chicken traders, 34 restaurants and 200 used clothes traders.  
**No of shops:** approximately 20 including 8 butchers.

**Description**

This is a large, tidy market that was built in the 1930's. There are many traders selling fruit, vegetables, meat, fish, chickens, staples, household items and charcoal. There are also a large number of used clothes traders operating and a few tailors on the Uhuru St side of this market. A small number of small goods vendors (doughnuts, rice cakes, etc.) pay a fee of 30/- per day which permits them to carry out business near to the market restaurants.

## **2.5.4.2 Management and Administrative Structure**

### **City Council employees**

The City Market Superintendant is stationed here. He supervises all the markets in DSM. In addition there is 1 Market master, 1 revenue collector and 8 sweepers.

### **Market Committee**

Present. This committee is not very active and the traders have carried out no sanitary projects itself. However, the DCC staff are presently discussing with the committee about improving the toilets in the market.

## **2.5.4.3 Sanitary Conditions**

### **a. Water Supply**

There is a water supply with one working tap in the restaurant area of the market. This is connected to the City Mains supply and water is supplied to the market 3 days per week.

### **b. Toilets**

There are 4 toilet blocks. Three of these are flush toilets of which only one is in working order and still used. There is 1 pit latrine with 4 cubicles which is still used although it is in poor condition.

### **c. Drainage**

A drainage system was originally installed in the market but this has been blocked for some time and no longer functions. Natural drainage from the permanent buildings in this market is good while from other sections, it is poor. Hence 0.5 points was allocated to criteria C4.

### **d. Waste Collection**

Formerly, there was a WCP in the market for the dumping of waste by traders but this is no longer used for hygienic reasons and to discourage nearby residents, who were bringing their waste and dumping it here, from continuing this practice. Two informal dumping sites were also observed; one, near the main toilet block and the second next to one of the permanent buildings at the roadside. These are still used by some traders and nearby residents even though dumping waste here has been prohibited.

Traders now store waste in baskets under their stalls and bring it out to the DCC truck when it arrives. Waste is collected by the DCC on an irregular basis and the frequency of collection can range from a few days to over 2 weeks. A truck sometimes comes together with a wheel loader for the loading of rubbish.

### **e. Shelter**

Approximately 50% of this market consists of permanent buildings. There is a permanent building dating to 1938, which is usable but requires some rehabilitation, and two other large permanent buildings, built more recently in 1966 and in good condition. There is another smaller building which was built to function as a bar. This sells the locally commercially brewed "kibuku".

**f. Vehicle Access**

Vehicle access to the market is very good as it is directly off Uhuru St (tarmaced) and bounded by roads on all four sides.

**g. Electricity**

An electricity supply is installed but the supply has been cut by Tanesco due to non-payment of the electricity bill by DCC.

**h. General Cleanliness**

Reasonable. This market is generally quite clean and tidy.

**2.5.5 Buguruni**

Interviewee: Chairman and Secretary of the Co-operative committee.

**2.5.5.1 Physical Data**

- Location:** about 500m by road off Uhuru St (southern side) and located on a road running parallel to Uhuru St, approximately 500m to the east of the intersection of Uhuru St and Nelson Mandela Rd.
- Nature:** retail with a small amount of wholesale goods.
- Area:** 3,000 m<sup>2</sup>
- No of stalls:** 200
- No of shops:** 30

**Description**

This is a medium sized market with at least 50% of it allocated to the sale of produce. There is also a large number of small restaurants selling freshly cooked food. There are a small number of shops. The market has a narrow access road in the middle of it which serves as a delivery point for produce and access road to the waste collection point for City Council trucks. The produce stalls are on one side of this road; the restaurants on the other. Vegetables, fruit, meat, fish, chicken, staples, and household items are sold here.

**2.5.5.2 Management and Administrative Structure**

**City Council employees**

1 revenue collector, 4 sweepers and 2 security guards.

**Market Committee**

This market is run as a Co-operative: Wambu Co. Ltd. The Co-operative has 85 members. As there are 230 stalls and shops, there are a large number of traders operating in the market who are not Co-operative members.

This market has a different fee system. All traders bringing bulk goods for sale pay 50/- per sack/basket. All traders pay an annual licence fee of 500/- to DCC as per other markets. However, traders do not pay the monthly tax here. This is because the market was built by themselves without any Council help in 1982 and hence traders have been

exempted from the monthly tax by the Council. However, the Council is still responsible for the provision of services such as drainage and waste collection.

### **2.5.5.3 Sanitary Conditions**

#### **a. Water Supply**

There is one tap in the whole market near to the toilet block, connected to the City Mains supply. However, water is only available from this 1 day per week due to water rationing.

#### **b. Toilets**

There is a small toilet block behind the office. This has been poorly maintained and is very dirty but continues to be used.

#### **c. Drainage**

There is one drain only in the entire market and this has been blocked for some time. The market has poor natural drainage and after heavy rain it can take up to 4 days for the market to dry out again. We were able to verify this as it had rained reasonably heavily two days prior to our visit and the WCP was still a small pond. Already insect movement and gas bubbles could be seen in the pond.

#### **d. Waste Collection**

The WCP is badly located, being in a natural depression and hence subject to flooding and close to the restaurant area of the market. The one drain from this point is blocked. A DCC truck and wheel loader usually come once per week at the end of the week to collect market waste. 4-5 trips are required to remove all the waste from the market.

#### **e. Shelter**

This market had no permanent buildings apart from the Co-operative office.

#### **f. Vehicle Access**

The access road to the market is off a tarmaced road (Uhuru St) and involves travelling around 500m along a potholed, unpaved road which includes three 90° bends to reach the waste collection point. The road is poorly drained and also used by trucks bringing bulk goods to the market. Hence it is prone to flooding and muddy conditions.

#### **g. Electricity**

The entire market is supplied with electricity.

#### **h. General Cleanliness**

Poor. According to the people interviewed, the most serious environmental problems at this market were in order of decreasing priority: i) the WCP and ii) drainage.

### **2.5.6 Magomeni**

**Interviewee:** Chairman of the market committee.

### **2.5.6.1 Physical Data**

<b>Location:</b>	directly off Morogoro Rd (southern side) about 100m to the west of the intersection with Rashidi Kawawa Rd.
<b>Nature:</b>	retail.
<b>Area:</b>	8,000 m <sup>2</sup>
<b>No of stalls:</b>	2,000
<b>No of kiosks:</b>	200

#### **Description**

This is a large market with the stalls and shops all intermingled. The market sells a wide range of goods including fruit and vegetables; meat, fish and chicken; household items, building materials, tools, charcoal and used clothes. Cooked food is sold in many small restaurants.

### **2.5.6.2 Management and Administrative Structure**

#### **City Council employees**

2 revenue collectors and 2 sweepers.

#### **Market Committee**

Present. This employs four night security guards. Every stall and shop holder pays a contribution of 20/- per day to the market committee to cover the costs of employing these guards. No sanitary projects carried out by the traders were mentioned.

### **2.5.6.3 Sanitary Conditions**

#### **a. Water Supply**

There is 1-2 water taps installed in the market, connected to the City Mains supply. However the water supply was cut off about 2 years ago by NUWA due to non-payment of the water bill.

#### **b. Toilets**

There are 2 toilet blocks. The first consists of 4 toilet cubicles which are free to use. However, these toilets are in very poor condition. The second block consists of separate sections for men and women with 4 toilets (with a water supply) in each section. The mens' section also contains a urinal. This toilet block is run as a business, on contract to the City Council. The contractor pays the City Council 500,000/- per year for rent of the toilet block. The collection of fees, cleaning and maintenance of the toilets is the responsibility of the contractor. One person is stationed outside the only entrance to this toilet block and collects a fee of 20/- from each user.

#### **c. Drainage**

There is one drain to service the entire market, which is blocked. There is good natural drainage in this area.



**d. Waste Collection**

Market waste was previously deposited in one area, near the back at one side of the market. However this practice has been discontinued as this location is immediately next to a courthouse. There are 2 DCC waste skips still at this site which are no longer used and have been turned upside down to prevent further waste being dumped in them. Traders store their waste in baskets under their stalls. The present waste collection system involves a single DCC truck which comes once per day in the morning. This stops for a short time at two points around the market and stall/shop holders bring their waste out themselves for loading on to the truck.

**e. Shelter**

There is only one permanent building in this market which is quite old.

**f. Vehicle Access**

Good. There is a large open space along one side of the market allowing vehicles good access to the market.

**g. Electricity**

There is no electricity supply.

**h. General Cleanliness**

Reasonable. The chairman commented that many of the traders carry out sweeping in and around their respective stalls.

**2.5.7 Manzese**

Interviewee: Chairman of the market committee.

**2.5.7.1 Physical Data**

**Location:** directly off Morogoro Road (northern side) approximately 100m to the east of the Konoike overbridge.  
**Nature:** retail.  
**Area:** 2,500m<sup>2</sup>  
**No of Stalls:** 220  
**No of Shops:** 8

**Description**

Most of the market consists of produce stalls. Chicken traders are located on one side of the market and small restaurants on the side adjacent to Morogoro Road. Vegetables, fruit, meat, fish, chickens, freshly cooked food, household items and used clothes are sold here. The total number of traders is approximately 250.

**2.5.7.2 Management and Administrative Structure**

**City Council Employees**

1 revenue collector and 2 sweepers.

## **Market Committee**

Present. The water supply and drainage were installed by the traders.

### **2.5.7.3 Sanitary Conditions**

#### **a. Water Supply**

There is a water supply with one tap connected to the City Mains supply with water being supplied 3-4 days per week.

#### **b. Toilets**

There are two toilet blocks, only one of which is used. This was constructed privately and is run on a user pays basis with users paying 30/- to use the toilet and 120/- to bathe.

#### **c. Drainage**

The traders installed one drain themselves but this is blocked. Natural drainage from the market is poor.

#### **d. Waste Collection**

There is a WCP in one corner of the market, adjacent to Morogoro Road. Waste is dumped here both by market traders and many residents living in the area. Approximately 3 DCC trucks come with a wheel loader every 1-2 weeks to remove waste from the WCP. We were informed that there is a plan to build a street chairman's office on the WCP.

#### **e. Shelter**

There is one permanent building but it is in poor condition.

#### **f. Vehicle Access**

Access to the market itself is good. However, there is a line of stalls selling used clothes between the WCP and Morogoro Road. Some of these must be moved every time DCC vehicles come to provide access for the wheel loader to the WCP.

#### **g. Electricity**

There is an installed electricity supply. However, the electricity has been cut by TANESCO due to non-payment of the electricity bill by DCC.

#### **h. General Cleanliness**

Poor. This market is cramped and rundown.

### **2.5.8 Ubungo**

Interviewee: Chairman of the market committee.

#### **2.5.8.1 Physical Data**

**Location:** directly off Morogoro Road (southern side) approximately 250m east of the intersection with Nelson Mandela Road.

**Nature:** retail.

**Area:** 2,200m<sup>2</sup>  
**No of Stalls:** 142-147  
**No of Shops:** 10-15

### **Description**

Vegetables, fruit, meat, fish, chickens, staples and charcoal are sold here with there being a lot of chicken traders at the back of the market. Adjacent to the roadside is a small reception area for sacks and baskets of produce.

### **2.5.8.2 Management and Administrative Structure**

#### **City Council Employees**

1 revenue collector, 2 sweepers and 1 security guard.

#### **Market Committee**

Present. This employs an additional two security guards. No sanitary projects carried out by the traders were mentioned.

### **2.5.8.3 Sanitary Conditions**

#### **a. Water Supply**

None.

#### **b. Toilets**

There are 2 pit latrines in poor condition.

#### **c. Drainage**

None. Natural drainage is poor.

#### **d. Waste Collection**

There is no WCP in this market and traders keep their waste in baskets under their stalls. DCC trucks collect waste from the market irregularly (usually at least once per month).

#### **e. Vehicle Access**

Good. There is a large open area to one side of the market providing good access for DCC vehicles to collect waste from traders.

#### **f. Shelter**

None.

#### **g. Electricity**

None.

#### **h. General Cleanliness**

Poor. This market looked rundown with quite a few empty stalls.

## 2.5.9 Kinondoni Tx

**Interviewee:** Chairman and Secretary of the Co-operative committee.

### 2.5.9.1 Physical Data

**Location:** directly off Kinondoni Road (southern side) approximately 600m after the intersection with Rashidi Kawawa Road.  
**Nature:** retail.  
**Area:** 2,700m<sup>2</sup>  
**No of Stalls:** approximately 80  
**No of Shops:** 10 (including 2 large shops)

#### Description

This market is divided into two sections; namely, the expatriate and local sections. The expatriate section centres on a large permanent building where fresh produce is sold. In front of this is a parking area with a number of small shops and larger specialty shops (including a butchers and bakers catering for expatriates' tastes) around the periphery of the parking area and produce market itself. In addition there are about 9 stalls selling shells and 3-4 selling plants. The local section is off to one side, housed in a smaller permanent building and sells mainly produce.

Only half of the expatriate produce market is presently occupied by stalls. The Co-operative would like to build more stalls to fill the other half but presently are lacking funds. They would also like to obtain some wheelbarrows to facilitate the transfer of waste to the WCP.

### 2.5.9.2 Management and Administrative Structure

#### City Council Employees

1 revenue collector and 1 sweeper.

#### Market Committee

The traders have organised themselves into a co-operative: Juhudi Kinondoni Co-operative Groceries Society, which was started in 1985. There are about 80 members. The Co-operative employs two security guards and a part-time sweeper. The water supply, toilets and buildings were all constructed by the traders themselves.

### 2.5.9.3 Sanitary Conditions

#### a. Water Supply

There is a water supply with one tap, connected to the City Mains supply with water being supplied 3-4 days per week.

#### b. Toilets

There is one toilet block consisting of 3 pit latrines and 1 urinal.

**c. Drainage**

none. Natural drainage is poor in this area of the city. However, because most of the market is located under permanent shelters, giving stalls good protection from rain, 0.5 points has been awarded to criteria C4.

**d. Waste Collection**

There are two WCPs behind this market. It appears as though one serves the expatriate section while the other serves the local section. The expatriate WCP was observed to contain a much higher proportion of paper and plastics than in the WCPs in other markets visited. Collection by DCC is rare. Typically the traders burn waste when a significant amount has accumulated.

**e. Shelter**

Permanent buildings (including the shops) make up over 75% of this market. There is one large (60m x 12m), relatively new permanent building in the expatriate section and a smaller permanent building in the local section which is older and in need of maintenance. As both buildings have dirt floors, they have been classified as "permanent but not completed" and for this reason, 0.5 points has been deducted from criteria to give a score of 1.5 rather than 2.

**f. State of Access Road**

Good. Access to the WCP is via the rear of the market.

**g. Electricity**

Only the shops have an electricity supply.

**h. General Cleanliness**

Reasonable. The expatriate section of the market is relatively clean and tidy while the local section is not as clean but still in reasonable condition.

**2.5.10 Mwananyamala**

Interviewee: Secretary of the Co-operative committee.

**2.5.10.1 Physical Data**

**Location:** located directly off Malanga St (western side) and off Makunduchi St (northern side), immediately behind and on the opposite side of the road from the DCC Mwananyamala depot.

**Nature:** retail.

**Area:** 4,000m<sup>2</sup>

**No of Stalls and shops:** 338

**No of Shops:** ?

**Description**

This is a moderately sized market selling vegetables, fruit, meat, fish, chickens, staples, household items, tools, freshly cooked food, charcoal and used clothes. There is a total of 404 traders.

## **2.5.10.2 Management and Administrative Structure**

### **City Council Employees**

1 revenue collector and 2 sweepers.

### **Market Committee**

This market is run as a co-operative: Mfavesco Ltd. The co-operative began in 1990 and appears well organised, having an office complete with organisational chart and a list of regulations on the walls. All traders are members. In addition to the normal DCC fees, traders contribute fees to the Co-operative, the amount contributed depending upon the size of the individual business. For example, a stall selling fruit and vegetables will pay 40/- per day while restaurants and used clothes shops will pay 60/- per day. The water supply and toilets were constructed by the Co-operative.

## **2.5.10.3 Sanitary Conditions**

### **a. Water Supply**

There is a water supply with 4 taps, one next to the toilet block and three at various locations within the market. These are connected to the City Mains supply with water being supplied around 3-4 days per week.

### **b. Toilets**

There are 3 pit latrines, located across the road from the market, next to the WCP.

### **c. Drainage**

None. However, natural drainage in this area is good.

### **d. Waste Collection**

Waste is dumped at the WCP next to the toilet block on the other side of Malanga St from the market on the corner of a very large open area, part of which is a graveyard. Formerly there was a waste skip placed here and a DCC container truck provided regular service. A waste skip is no longer present, having been removed some time ago and taken to the DCC depot. Presently, DCC trucks collect waste from the WCP. Despite being so close to the DCC refuse collection truck depot, waste collection from this market is irregular, the collection frequency varying from once per week to once per month. When waste has not been collected for some time, this can make access to the toilets difficult and the conditions very unsanitary. Traders from the market regularly visit the DCC depot to request DCC to collect the market waste more regularly but to no avail.

In addition to market waste being dumped at the WCP, it is suspected that nearby residents also tip their rubbish here. This is also a large metal scrap heap next to the WCP, this originating from several small metalworking workshops present on the opposite side of the road from the market in front of the WCP.

### **e. Shelter**

There is one permanent building but this is in poor condition.

**f. Vehicle Access**

Although the road is not tarmaced, the WCP is adjacent to the DCC depot and hence vehicle access is good.

**g. Electricity**

None.

**h. General Cleanliness**

Poor. The Co-operative secretary thought that the biggest problem facing the market was dirtiness, primarily due to the inadequacy of the waste collection system.

**2.5.11 Mtambani (Kinondoni centre)**

Interviewee: Chairman of the market committee.

**2.5.11.1 Physical Data**

**Location:** directly off Rashidi Kawawa Road (eastern side) and Karago St (northern side).

**Nature:** retail.

**Area:** 4,000m<sup>2</sup>

**No of Stalls:** 300

**No of Shops:** 20

**Description**

This is a medium sized market. Approximately 70% of the market sells produce, 20% freshly cooked food and shops make up the remaining 10%. Vegetables, fruit, meat, chicken, fish, household items, some building materials, tools and charcoal are sold here. There are over 350 traders working here. The market seems to be busy and well organised. It has a healthy and expanding customer base with customers coming to it from as far away as Oyster Bay and Mikocheni.

**2.5.11.2 Management and Administrative Structure**

**City Council Employees**

1 revenue collector and 2 sweepers.

**Market Committee**

Present. The market committee employs 5 security guards who patrol the market at night. The water supply, toilets and electricity supply were installed by the traders themselves.

**2.5.11.3 Sanitary Conditions**

**a. Water Supply**

There is a water supply connected to the City Mains supply, with water being supplied 3-4 days per week.

**b. Toilets**

The original toilet block was built in the 1960s in an area that is subject to being waterlogged, but due to faulty design/construction once the waste in the septic tank reached a certain level, backflow occurred. The toilet block was subsequently closed and the market has had no toilet facilities for the past 12 years. The traders have recently paid to have the septic tank connected to the public sewer so that the backflow problem is eliminated and the toilets can be used again. This work cost them 200,000/- (construction costs) and 36,000/- (public sewer connection fee). There are 4 toilets for men and 4 for women and they will be open for use soon. It is planned to run these on a user pays basis but charges have yet to be fixed.

**c. Drainage**

There is no drainage system for the market. There is one open sewer which passes directly through the market, conveying sewage from nearby houses to the city sewerage system. The water table is high in this area and natural drainage is poor.

**d. Waste Collection**

There is a WCP in one corner of this market. Collection of waste from this market by DCC trucks is very poor with waste last being collected over 3 months ago. Consequently, the market committee has banned the dumping of any waste at this site. To enforce this ban, a waste skip, still present at the WCP, has been turned upside down to prevent people from dumping waste in it; notices have been put up; a warning has been painted on the wall of an adjacent building and one of the security guards employed by the market committee patrols this area at night. They have complained many times to DCC about the poor waste collection service. Presently, most people store waste under their stalls and then discard of it nearby but outside the immediate vicinity of the market itself. Ideally, the traders would like a return to the waste skip/container truck system.

**e. Shelter**

There are no permanent buildings.

**f. Vehicle Access**

Good.

**g. Electricity**

Electricity supply lines have been installed for the toilet block and to provide some lighting at night. Electricity itself has yet to be supplied.

**h. General Cleanliness**

Very poor. In particular, the presence of an open sewer running down the middle of the market is shocking.

**2.5.12 Tandale**

**Interviewee:** DCC staff.



### **2.5.12.1 Physical Data**

<b>Location:</b>	about 500m by road off Morogoro Road (northern side). The turnoff to Tandale market is next to Manzese market.
<b>Nature:</b>	wholesale and retail.
<b>Area:</b>	7,000m <sup>2</sup>
<b>No of Wholesalers:</b>	100
<b>No of Stalls:</b>	264
<b>No of Shops:</b>	20

#### **Description**

This market is a wholesale market particularly for rice, cereals, beans, corn and also tomatoes, oranges and fruit. It was constructed by the traders themselves. It is very cramped with wholesalers, stalls and shops being intermingled along with some houses which have been built illegally within the market area. Fruit, vegetables, meat, chicken, fish, household goods, freshly cooked food, charcoal and wholesale goods are sold here. Used clothes are sold by many traders but these stalls are not officially part of the market.

### **2.5.12.2 Management and Administrative Structure**

#### **City Council Employees**

1 market master, 5 revenue collectors and 7 sweepers.

#### **Market Committee**

Present. No sanitary projects carried out by the traders were mentioned.

Stall and shop holders in the retail section of the market pay DCC tax and licence fees as normal. Variable rates are charged for wholesale produce. For example, the rates for sacks of rice and beans are 50/- per sack. Producers must pay on arrival with DCC staff counting the number of sacks in all consignments of produce.

### **2.5.12.3 Sanitary Conditions**

#### **a. Water Supply**

There is a water supply but the number of taps is inadequate. This is connected to the City Mains supply with water being supplied on average about once per week.

#### **b. Toilets**

Toilet facilities are present. All toilets are pit latrines some of which are not used due to being full or to lack of maintenance. The number of toilets remaining in working order is not sufficient for the number of traders.

#### **c. Drainage**

Some drains have been installed throughout the market but these are all blocked. The area has poor natural drainage and during the rainy season mud can be 8"-12" deep in places.

**d. Waste Collection**

There is a WCP in the market but it is located very close to stalls and some houses surrounding the market. Usually 1 DCC truck and a wheel loader come once per week to collect waste. Typically, at least 6 trips are required to remove all market waste. Nearby residents also dump their rubbish at the WCP.

**e. Shelter**

There is at least one permanent building which houses the DCC office and is in poor condition.

**f. State of Access Road**

Poor. The road from Morogoro Road to the market is narrow, potholed and undulating. There are many used clothes stalls along the roadside making it even narrower and the road is a very busy pedestrian area. Access to the WCP is difficult with some stalls having to be moved in order for a wheel loader to enter.

**g. Electricity**

Present.

**h. General Cleanliness**

Very poor. This market is very cramped, crowded and dirty.

**2.5.13 Mwenge**

**Interviewee:** Secretary and Chairman of Market Partnership committee.

**2.5.13.1 Physical Data**

**Location:** directly off Sam Nujoma Rd (southern side), approximately 150m after the intersection with Bagamoyo Rd.  
**Nature:** retail.  
**Area:** 1,400 m<sup>2</sup>  
**No of stalls:** 58  
**No of shops:** 0

**Description**

This is a smaller market that was built in partnership with DCC in 1982. Although there are a number of small restaurants to one side of the market and shops around the perimeter, these are not officially part of it. Fruit, vegetables, meat, fish, chickens, staples and charcoal are sold here.

**2.5.13.2 Management and Administrative Structure**

**City Council employees**

1 revenue collector and 1 sweeper.

### **Market Committee**

This market operates like a co-operative, but is called a partnership in this case. The partnership has a committee and seems well organised. Every trader pays 50/- per day to the Partnership. At the end of each month the DCC revenue collector collects tax for all traders from the Partnership secretary and similarly the annual licence fee for all traders is paid by the secretary (tax and licence fees as per other markets). Surplus money from traders' contributions is used to employ one clerk, 1 sweeper and 2 night security guards, to pay the market's electricity and water bills and they plan to build a toilet block (0.5 points for criteria J4 as this project is in the planning stage).

#### **2.5.13.3 Sanitary Conditions**

##### **a. Water Supply**

There is one water tap which is connected to the City Mains supply with water being supplied approximately 3-4 days per week.

##### **b. Toilets**

There are 2 pit latrines but both are full and not used. People relieve themselves nearby.

##### **c. Drainage**

There is one drain running down the centre of the market but this is blocked. When it rains heavily, this drain is subject to backflow into the central market area. Natural drainage is poor.

##### **d. Waste Collection**

Traders store their waste in baskets under their stalls and there is no actual WCP in the market. 1 DCC truck collects waste from this market on average about once per month. When the truck does not come for a long period, people dispose of their waste themselves. They do not wish to arrange for private waste collection as this would result in a significant increase in the traders' contributions.

##### **e. Shelter**

There are no permanent buildings apart from the small office of the Market Partnership.

##### **f. Vehicle Access**

Good.

##### **g. Electricity**

Present.

##### **h. General Cleanliness**

Poor. The market is rundown and quite a few stalls were empty.

#### **2.5.14 Mbagala**

Interviewee: Chairman of the market committee.

### 2.5.14.1 Physical Data

**Location:** approximately 300m by road off Kilwa Rd (western side) about 2km south of the intersection with Mbagala Rd.  
**Nature:** retail.  
**Area:** 2,400m<sup>2</sup>  
**No of Stalls:** 210-215  
**No of Shops:** few (15 estimated)

#### Description

Fruit, vegetables, meat, fish, chicken, staples, household items, tools, charcoal and firewood are sold here with about 80% of the market selling produce, 10% cooked food and 10% other goods. Some of the surrounding small shops on the periphery of the market were built and are run by market traders and hence have been included as part of the market.

### 2.5.14.2 Management and Administrative Structure

#### City Council Employees

1 revenue collector and 4 sweepers.

#### Market Committee

Present. No sanitary projects carried out by the traders were mentioned.

### 2.5.14.3 Sanitary Conditions

#### a. Water Supply

A water supply is present with one tap, connected to the City Mains supply. However, the pump supplying water to this part of the city is not working.

#### b. Toilets

None. Formerly there was a toilet block here but this has been knocked down. The chairmen thought that if a new toilet was built and run on a user pays basis, the traders would be willing to pay for this service.

#### c. Drainage

None. Natural drainage is facilitated by the slight slope on which the market is built, with rainwater running downhill away out of the market.

#### d. Waste Collection

There is a WCP on the edge of the market. Waste is collected from here by DCC approximately once per month although sometimes waste has not been collected for periods of up to 2-3 months. Loading is done by hand/baskets with 1-2 trucks being used making one trip each.

#### e. Shelter

There is one permanent building in reasonable condition. This houses a fish market and DCC office.

**f. Vehicle Access**

Reasonable. The road from Kilwa Rd to the market is sandy and rutted.

**g. Electricity**

None.

**h. General Cleanliness**

Poor. This market is not very clean and poorly serviced. The chairman thought that the main problems in order of decreasing priority were: i) toilets, ii) electricity, iii) water and iv) waste collection/cleanliness.

**2.5.15 Yombo**

Interviewee: Chairman of the Co-operative committee.

**2.5.15.1 Physical Data**

**Location:** directly off Yombo St (southern side), approximately 300m to the south of the intersection with Mbagala Rd.

**Nature:** retail.

**Area:** 3,000 m<sup>2</sup>

**No of Stalls:** 119

**No of Shops:** approximately 18

**Description**

This is a small market with about 80% of traders selling produce, 15% cooked food and 5% other goods. Vegetables, fruit, meat, fish, chicken, staples and household items are sold here.

**2.5.15.2 Management and Administrative Structure**

**City Council Employees**

1 revenue collector and 5 sweepers.

**Market Committee**

This market is run on a co-operative basis. The Co-operative is named Mwamko Co-operative Society and has been in existence for over 8 years. They have their own office and elected committee. In the early years, membership stood at around 200 but has dropped to its current level of around 60. The shops around the periphery of the market are not part of Mwamko. The Co-operative constructed its own office and a toilet block for the market.

**2.5.15.3 Sanitary Conditions**

**a. Water Supply**

None.

**b. Toilets**

None. DCC started to build a toilet block several years ago but this was never finished. The Co-operative constructed its own toilet at the rear of the market backing on to the WCP but this was subsequently accidentally knocked down by a DCC wheel loader.

**c. Drainage**

None. The market is located on flat ground and natural drainage is poor.

**d. Waste Collection**

There is a WCP at the rear of the market. Waste is collected from here once or twice each week. Loading is either manually or by wheel loader. Normally, one truck is required, making one trip only.

**e. Shelter**

There are no permanent buildings apart from the Mwamko office.

**f. Vehicle Access**

Poor. The road from Mbagala Rd to the market is sandy and very potholed. Access to the WCP itself is good.

**g. Electricity**

Some shops in the market are supplied with electricity.

**h. General Cleanliness**

Poor.

**2.5.16 Mtoni**

**Interviewee:** Chairman of the market committee.

**2.5.16.1 Physical Data**

**Location:** approximately 250m by road off Kilwa Road (eastern side). The turnoff to the market is approximately 650m south of the intersection with Mbagala Rd.

**Nature:** retail.

**Area:** 2,400 m<sup>2</sup>

**No of Stalls:** 200

**No of Shops:** 0

**Description**

Fruit, vegetables, meat, fish, chicken, staples, charcoal and firewood are sold here. About 80% of the traders sell produce, 10% cooked food and 10% other goods. Some recycled material is also sold here with 1 stall selling recycled paper and another miscellaneous glass bottles.

## **2.5.16.2 Management and Administrative Structure**

### **City Council Employees**

1 revenue collector and 4 sweepers.

### **Market Committee**

There is a market committee. This employs 4 security guards for patrolling the market at night. No sanitary project carried out by the traders was mentioned.

## **2.5.16.3 Sanitary Conditions**

### **a. Water Supply**

None.

### **b. Toilets**

There is one toilet block. This is very dirty and in a bad state of disrepair. If a new toilet block is constructed, the chairmen thought traders would be willing to pay 20-50/- for toilet use.

### **c. Drainage**

None. The market is on a slight slope which facilitates natural drainage of rainwater from it, rainwater running off to the rear of the market.

### **d. Waste Collection**

There is a WCP at the side of the market near to the toilet. Collection by DCC trucks is irregular and waste may not be collected for several months at a time.

### **e. Shelter**

There is one large permanent building which houses a number of produce stalls and the DCC office. This is in reasonable condition.

### **f. State of Access Road**

Poor. The road off Kilwa Rd to the market is sandy, narrow, windy with some potholes. Vehicle access to the WCP itself is difficult as the vehicle entrance is very narrow but apparently a wheel loader is able to pass through this gap.

### **g. Electricity**

None.

### **h. General Cleanliness**

Reasonable. However, this market has very few services. The environmental problems ranked in order of decreasing priority by the market chairman were: i) toilets, ii) water and iii) drainage.

## **2.5.17 Temeke**

**Interviewee:** Chairman of the market committee.

### 2.5.17.1 Physical Data

<b>Location:</b>	directly off Mbagala Road (southern side), next to the bus stand, approximately 50m to the west of the intersection with Temeke St.
<b>Nature:</b>	retail.
<b>Area:</b>	3,060 m <sup>2</sup>
<b>No of Stalls:</b>	approximately 50
<b>No of Shops:</b>	10

#### Description

Approximately 80% of this market deals with the sale of freshly cooked food, presumably due to the market's proximity to the bus stand. Vegetables, fruit, meat, fish, staples, charcoal and firewood are also sold here. Household items and some used clothes are sold in shops near the market and flanking the rear and one side of the bus stand. These shops are not part of the market.

### 2.5.17.2 Management and Administrative Structure

#### City Council Employees

1 revenue collector and 2 sweepers.

#### Market Committee

Present. This employs two security guards who patrol the market at nights, their salaries being paid by the traders who each contribute 20/- per day. No sanitary project carried out by the traders was mentioned.

### 2.5.17.3 Sanitary Conditions

#### a. Water Supply

None. However, in the middle of this market is an elevated water tank and underground tank which are part of the milk processing facilities for a shop situated at the front of the market.

#### b. Toilets

A toilet block is present but has been closed due to its poor condition. Poverty Africa, a NGO intends to build a toilet block at the market provided it can procure funding. Presently, most people go to a small canteen at one end of the market the owner of which will allow people to use the toilet there if they buy something (food or drink). The chairman thought that people would be prepared to pay up to 100/- to use a toilet if a new toilet block was built and run on a user pays basis. Many bus passengers would also make use of such a facility.

#### c. Drainage

None. The market is located on level ground and natural drainage is poor.



**d. Waste Collection**

There is a WCP at the opposite end of the market to the bus stand. Some local residents also dump their rubbish there. Presently, DCC trucks come every 1-2 days and remove waste from this point.

**e. Shelter**

None.

**f. State of Access Road**

Good. Mbagala Rd is tarmaced and there is good access to the WCP.

**g. Electricity**

Some shops are supplied with electricity.

**h. General Cleanliness**

Poor. This market has little infrastructure; the lack of drainage and toilets being considered to be the biggest problems.

**2.5.18 Keko**

**Interviewee:** two members of the market committee.

**2.5.18.1 Physical Data**

- Location:** This market is situated directly off Changombe Road (eastern side) about 400m to the north of the intersection with Maendeleo St.  
**Nature:** retail.  
**Area:** 3,200m<sup>2</sup>  
**No of Stalls:** approximately 350  
**No of Shops:** approximately 50

**Description**

This market is notable for the large number of furniture workshops (30-40) that are found at the front of the market. Approximately 70% of the market is concerned with the sale of produce, 20% furniture and 10% cooked food. Fruit, vegetables, meat, fish, chicken, staples, charcoal, furniture and freshly cooked food are sold here. There are an estimated 500 people working in the market.

**2.5.18.2 Management and Administrative Structure**

**City Council Employees**

1 revenue collector and 2 sweepers.

**Market Committee**

Present. No sanitary project carried out by the traders was mentioned.

### **2.5.18.3 Sanitary Conditions**

#### **a. Water Supply**

None.

#### **b. Toilets**

DSSD built 3 toilets in 1987 but these are no longer in working condition. DCC began building another toilet at some stage but this has never been completed. People go to nearby hotels/bars to use their toilets or simply go outside. It was thought that if a toilet block was provided, people would be willing to pay 20-50/- to use it.

#### **c. Drainage**

None. The market has a slight slope and water drains to the lowest point at the rear of the market where there are some small restaurants and the disused toilet block. Natural drainage from this point is poor and the area gets waterlogged very easily. There is a manhole cover located approximately in the centre of this section of the market as an industrial sewer passes beneath the market. It was explained to us how it may be possible to utilise this sewer by building drainage channels from both sides of the market that would drain into the manhole and solve the waterlogging problem.

#### **d. Waste Collection**

There is a WCP near the front of the market. Waste is dumped here from the market, furniture workshops and by some local residents. Waste is collected from here every 2-3 weeks by DCC and loaded on to trucks via wheel loader. On average, at least 10 trips are required to remove all the waste. Traders take their waste to the WCP themselves. In the past the Council provided a waste skip for market refuse but local residents also used to utilise the skip so that it filled up quickly. The traders prefer the use of a skip compared to using a rubbish heap.

#### **e. Shelter**

Most of the furniture workshops are well maintained, permanent buildings.

#### **f. State of Access Road**

Good.

#### **g. Electricity**

Some shops are supplied with electricity.

#### **h. General Cleanliness**

Poor. This market is very poorly serviced.

### **2.5.19 Tandika**

Interviewee: DCC Market Master.

#### **2.5.19.1 Physical Data**

**Location:** approximately 1.7km from Mbagala Rd along Mahunda St and in the vicinity of Masoko St and Matumba St.

**Nature:** wholesale and retail.  
**Area:** 7,000m<sup>2</sup>  
**No of Stalls and shops:** 400

### **Description**

This is a large market which acts as a wholesale market for vegetable and fruit produce from outside DSM. Cereals are not delivered here. Traders buy goods here and sell in other markets, shops or at roadsides. At this time of year, a lot of fruits are being brought in. Vegetables, fruit, meat, fish, chicken, staples, household items, tools, bicycle spares, and freshly cooked food are all sold here. Wholesale and retail produce accounts for about 80% of the market, cooked food 10% and other goods 10%. Used clothes traders operate nearby. Although they are not officially part of the market, they and some other shop operators do contribute waste to the WCP. There are approximately 1000 people working at this market. The busiest period of the day at this market is in the morning when many trucks are arriving and people are buying wholesale produce.

Some recycling of paper was being done at a few stalls. Paper is bought for 100/- per kg and sold at 200/- per kg. Some local residents collect some of the grass used in protection of the produce during transport and food remains (old cabbages, corn, cassava) to use for animal feed.

### **2.5.19.2 Management and Administrative Structure**

#### **City Council Employees**

1 Market Master, 2 revenue collectors and 5 sweepers.

#### **Market Committee**

Present. No sanitary projects carried out by the traders were mentioned.

### **2.5.19.3 Sanitary Conditions**

#### **a. Water Supply**

None.

#### **b. Toilets**

There is a one toilet block located in the produce reception area which is often flooded during the rainy season. The toilet facilities provided are not sufficient for all the traders.

#### **c. Drainage**

None. Natural drainage is poor. The produce reception area is prone to flooded.

#### **d. Waste Collection**

There is a WCP near to the toilet block in an area which is prone to flooding. Waste is collected from here by DCC every Saturday. A wheel loader and 3 trucks come. Each truck needs to make approximately 6 trips each to remove all waste. On one occasion in the recent past, traders refused to pay their monthly taxes as waste had not been collected for over 2 weeks.

The trucks bringing produce in from outside DSM contribute additional waste to the WCP; namely, grasses and maize stalks used during transportation to protect the produce from damage. In the past, the market management decided that all trucks should take the covering material they brought away with them. However, this approach did not work as trucks were going a short distance down the road and disposing of this material in the surrounding neighbourhood. Hence it was decided that this material should be placed together with the other market waste.

**e. Shelter**

There is one permanent building in good condition and the DCC office is located at one end of this.

**f. State of Access Road**

Poor. The market is located approximately 1.7km off the nearest tarmac road. The area has poor natural drainage and is prone to flooding/muddy conditions.

**g. Electricity**

Electricity is supplied to the permanent building.

**h. General Cleanliness**

Very poor. The provision of services at this market is very poor, with the lack of cleanliness and provision of toilets considered to be the major problems.