

PN-ABH-741

**Nairobi's Informal  
Settlements:  
An Inventory**

**March 1993**

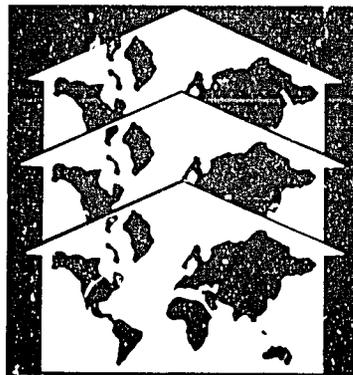
**PN-ABH-741**

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OFFICE OF  
HOUSING AND URBAN  
PROGRAMS

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U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT



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**Nairobi's Informal Settlements:**

**An Inventory**

**March 1993**

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Prepared for:

USAID/REDSO/ESA

Prepared by:

Matrix Development Consultants  
Nairobi, Kenya

*The views herein are those of the authors and do not necessarily reflect those of the Office of Urban Programs or the U.S. Agency for International Development.*

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# CONTENTS

■ Introduction	
Executive Summary	1
Organization	2
Methodology	2
■ Overview	4
■ Definition of informal settlements	5
■ Population	5
■ Economic survival	6
■ Basic Urban Services	9
■ The Environment: Implications for health	11
■ Education	12
■ The Inventory by Division	
Makadara	13
Langata	15
Kasarani	18
Dagoretti	21
Embakasi	24
Pumwani	26
Parklands	29
■ Annexes	
References used	30
Description of aerial mapping procedure	31
List of NGOs working in informal settlements	33
Maps (unpaged attachment)	

## FOREWORD

This inventory has been prepared with funding from the United States Agency for International Development. The inventory was produced by Matrix Development Consultants. Aerial photography and photographic interpretation was undertaken by the Department of Resource Surveys and Remote Sensing. These who contributed to the production of the inventory are:

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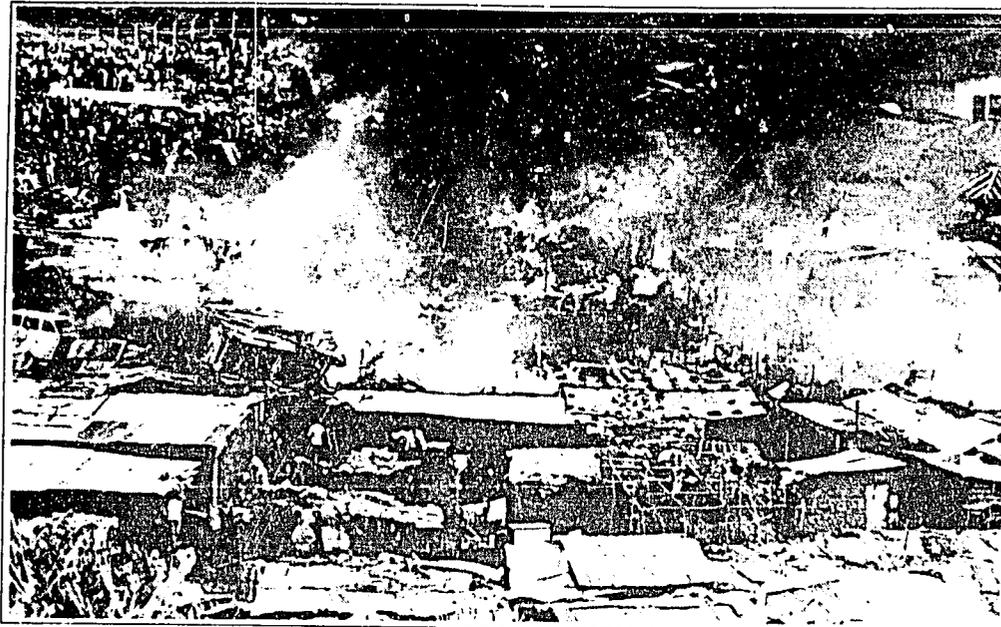


Photo: Daily Nation

*Crowding is a serious problem often leading to fires.  
Below: an innovative resident makes maximum use of land by building a second storey.*



# INTRODUCTION

The objective of this inventory is to provide accurate information on the location and characteristics of informal settlements in Nairobi. It is intended to be used as a basis for formulating policies and strategies for the City of Nairobi, and in particular for informal settlements. The original work presented is based largely upon aerial photography and interpretation carried out in 1993, thus providing up-to-date information on the size, location and densities of informal settlements. The inventory also uses research previously carried out by a number of other agencies. It is intended that the inventory will be used by a number of organisations including:

- Nairobi City Council
- Central Government
- Non-Governmental Organisations
- Community Based Organisations
- Donor and Lending Agencies

## Executive Summary

The population of Nairobi has grown rapidly and particularly since independence in 1963. The population has swelled from 350,000 then to an estimated 1.35 million in 1989. An increasing number of the city's residents live in Informal Settlements.

Fifty-five per cent of the total population of Nairobi, i.e. nearly three quarters of a million people live in these settlements,

However, the land area of the city covered by informal settlements is just over 5 per cent of the total area used for residential purposes. This means that over half of the city's population live in 5 per cent of the residential land area.

Informal settlements are characterised by:

- Structures (houses) are constructed largely of temporary materials and do not conform to existing official minimum standards.
- The majority of house-owners have some form of quasi-legal tenure through temporary occupation licences or letters from Chiefs on public land, or agreements with land-owners on private land. There is very little true "squatting". However, in some settlements there is no form of tenure and residents have no rights.
- The majority of residents are renters and most structures are let on a room-by-room basis with most households occupying a single room or part of a room.
- Densities are high, typically 250 units per hectare, compared to 25 per hectare in middle income areas and to 15 per hectare in high income areas.
- Physical layouts are relatively haphazard making it difficult to introduce roads, pathways, drainage, water and sanitation.
- The majority of households have low or very low incomes, normally less than K.Shs. 2,000 per month.
- A majority of households are female headed.
- Urban services are non-existent or minimal. Water is only provided to a few standpipes if it is provided at all: 85 per cent of households obtain water from kiosks at a price 4-5 times higher per litre than that

paid by residents in other areas. Sanitation is inadequate: 94 per cent do not have access to adequate sanitation. Roads, pathways and drainage channels are earth and flooding is common. Refuse is not collected and is found in insanitary piles and blocking drainage channels. Sanitation is usually provided by pit-latrines shared by many users. Educational and health services are also highly inadequate although NGOs and CBOs do make a significant contribution.

- Morbidity and mortality rates caused by diseases stemming from environmental conditions are significantly higher than in other areas of the city, owing to poor sanitation, lack of potable water, poor drainage, uncollected refuse and overcrowding.

- The majority of the residents of informal settlements earn their living in the informal economic sector, in small businesses ranging from hawking to service and production enterprises. Of the approximately 40,000 small businesses in Nairobi the great majority are in informal settlements. In other words, informal settlements are an integral part of the economy of the city yet, in terms of services, place few demands upon it.

## Organisation of the Inventory

The inventory is structured as follows:

The overview which summarises the main findings of the inventory.

The inventory for each Division; the settlements have been grouped into seven sections corresponding with the administrative Divisions within the boundary of Nairobi City Council. These are:

- Makadara
- Langata (Kibera)
- Kasarani
- Dagoretti
- Embakasi
- Pumwani
- Parklands

For each division the inventory presents the following information:

- Location and history
- Population
- Housing Conditions
- Infrastructure
- Economic Activities of Residents
- Social Facilities and Community Organisations

The final section consists of maps showing the following:

- Location of all informal settlements in Nairobi at a scale of 1:50,000
- Maps of five typical settlements in Nairobi at a scale of 1:10,000 showing public amenities, roads, footpaths and drainage. These are Kibera, Mukuru-Kaiyaba (Industrial Area), Kariobangi-Korogocho, Soweto and Kawangware-Kangemi.

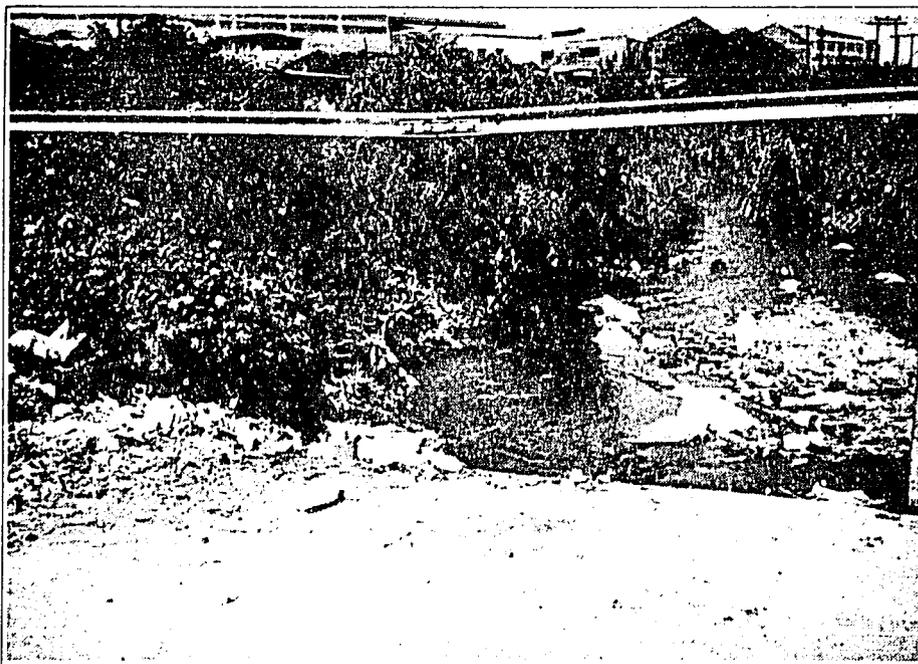
## Methodology

The inventory draws upon work previously undertaken by a number of individuals and organizations which are listed in Annex 1. In particular, the inventory built upon the "Survey of Informal Settlements in Nairobi" undertaken by NACHU in 1990 with support from US AID. It is however evident that there are sometimes significant discrepancies in the data presented by various surveys. This inventory utilises data from surveys where the research methodology appears to be the soundest (e.g. with a larger sample size) and has confirmed the findings with field verification where possible.

The scope of this document encompasses all informal settlements in Nairobi, many of which have never before been identified and described. Given the temporary nature of some settlements there can never be a totally contemporary presentation and this inventory presents the location and characteristics of the settlements in January 1993. In fact, subsequent to the data collection an informal area near Wilson Airport was demolished in April 1993 and fire razed a settlement in Mathare Valley in June 1993.

The methodology used in preparing the inventory was as follows:

1. A survey was made of the literature on informal settlements in Nairobi (see Annex 1).
2. Preliminary identification of settlements was made using an existing map of Nairobi.
3. Aerial photography was carried out of the whole of Nairobi within the boundaries of Nairobi City Council, at a scale of 1:10,000.
4. Through photographic interpretation all possible settlements were identified on a 1:50,000 map.
5. Ground visits were made to any site for which it was uncertain from the photography whether an informal settlement actually existed and to settlements where the name was unknown.
6. Visits were also made to a sample of three old and two new settlements. These were classified by age, size and location. The visits were to verify information on household densities, service infrastructure, social services and the activities of Community Based Organisations (CBOs) and Non-Governmental Organisations (NGOs). In addition, data from secondary sources was used to complete information on each settlement. The methodology used is described in more detail in Annex 2.



*This is a natural stream flowing through several settlements in the eastern part of the city. A combination of household waste and industrial effluent has turned it into a serious health hazard. Children and adults sometimes have to wade across.*

## OVERVIEW OF NAIROBI

Nairobi has experienced a rapid increase in both physical expansion and population growth since it became a settlement in 1901. It has grown in area from 3.84 km<sup>2</sup> to 680 km<sup>2</sup>, and from a population of 118,976 in 1948 to approximately 1.35 million in 1989. (Census data). Physical expansion has been due to the extension of metropolitan area boundaries, notably in 1963 when the area was increased from 83 km<sup>2</sup> to 690 km<sup>2</sup>. Population expansion has been due to rural-urban migration and natural increase.

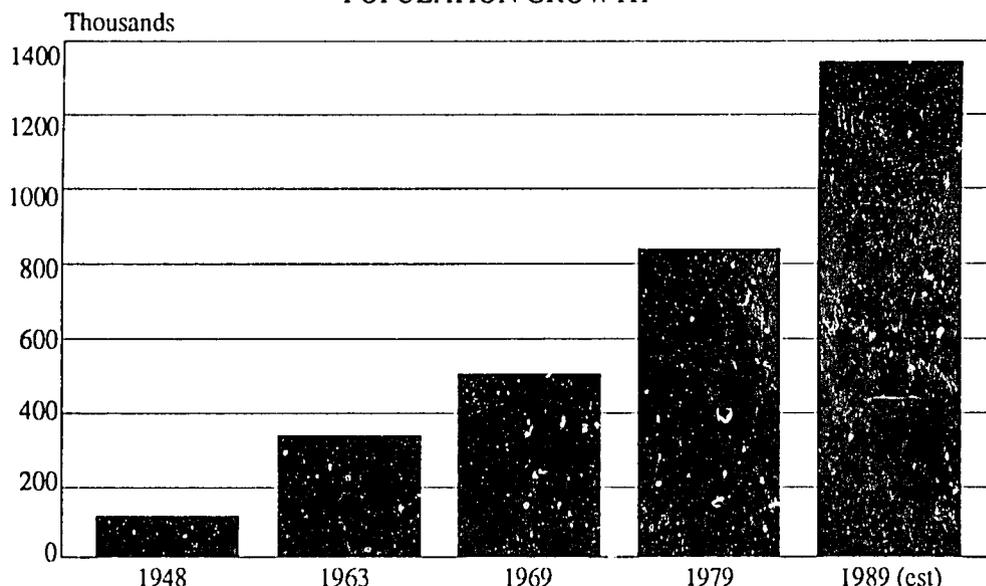
The supply of affordable housing built to even minimum standards<sup>1</sup> has not matched the rapid growth of the population. The majority of households in the city have low-incomes which are insufficient to enable them to afford housing built to Grade 1 standards and, for some very low income households, for housing built to Grade 2 bye-laws. Consequently urban migrants are housed in informal settlements which have been constructed using temporary materials such as timber off-cuts, mud and wattle. Urban services, if they are provided at all, are extremely basic with earth roads and paths, earth drains, communal water points and shared sanitation.

The land occupied by the settlements is either public or private, depending upon location, and the "owners" of the structures normally have a legal or quasi-legal status which has enabled them to build. On public land they normally have temporary occupation licences (TOL) obtained from the Local Authority or a letter from the Chief (an administrative post). On private land the land owner has normally given permission to build and collects rents. The majority of the informal settlements are therefore not composed of "squatters". It is also noticeable that the trend in new settlements is for owner occupation combined with sub-letting, rather than the "traditional" absentee landlordism which was previously the dominant pattern.

From independence in 1964 up until the late 1970s official policy was to demolish informal settlements in Nairobi and other urban centres. Subsequently there was a trend towards tacit acceptance of informal settlements. However, a major departure from this trend occurred in 1990 when two large settlements, Muoroto and Kibagare, were razed by the city authorities. It is estimated by the National Council of Churches of Kenya (NCCCK) that approximately 30,000 people were displaced by these demolitions.

Generally, smaller settlements are at greater risk of demolition than the larger settlements. For example, the Belle Vue (Mitumba) settlement adjacent to Wilson Airport appears on the maps forming part of this report. It was demolished by the City Inspectorate on 20 April 1993 following instructions from the Ministry of Transport that the settlement was interfering with the operations of Wilson Airport.

### POPULATION GROWTH



<sup>1</sup> Minimum standards refer to Grade 2 bye-laws. These are only being introduced at the moment and the Nairobi City Commission has almost invariably insisted that housing is constructed using Grade 1 bye-laws.

## DEFINITION OF "INFORMAL SETTLEMENTS"

The term "informal" is an attempt to encapsulate the characteristics of such settlements, found in many urban areas world-wide. However, there are some attributes of Kenyan informal settlements which are distinctive. For the purposes of this inventory the term "informal settlement" refers to an urban area which has the following characteristics:

"Owners" of structures have either (1) a quasi-legal right of occupation or (2) no rights at all.

Structures (houses) are constructed largely of temporary materials and do not conform to minimum standards;

The majority of structures are let on a room-by-room basis and the majority of households occupy a single room or part of a room.

Densities are high, typically 250 units per hectare compared to 25 per hectare in middle income areas and to 15 per hectare in high income areas.

Physical layouts are relatively haphazard making it difficult to introduce roads, pathways, drainage, water and sanitation.

The majority of the inhabitants have low or very low incomes.

Urban services such as water and sanitation are non-existent or minimal.

Morbidity and mortality rates caused by diseases stemming from environmental conditions are significantly higher than in other areas of the city (owing to poor sanitation, lack of potable water, poor drainage, uncollected refuse and overcrowding).

Not all settlements exhibit all of these characteristics or to the same degree but the above broadly characterizes informal settlements in Nairobi.

## POPULATION

The population of informal settlements has grown rapidly, with the growth of Nairobi. The total population of Nairobi has grown as follows:

Year	Total	Intercensal Growth Rate (% pa)	Pop. Density per sq. km.	Land Area No. sq. km.
1948	118,976		1,433	83
1963	350,000	7.5	515	680
1969	509,286	6.5	745	680
1979	827,775	5.0	1,210	680
1989	1,346,000 (estimate)	4.8	1,911	680

(Source: Census Data - Government of Kenya.)

Despite reservations on the accuracy of the census data there is nevertheless a steady increase in the overall population with an average rate of growth of over 5 per cent. It is generally felt that the population is now well over 1.5 million.

The growth in population of the informal settlements over the same period is more difficult to estimate

as no comprehensive attempts had been made to make population estimates until the late 1980s and even these estimates had a wide margin of error, mainly owing to limited access to appropriate tools.

This inventory provides the most accurate estimate of total population of informal settlements to date. It is based on recent (January 1993) aerial photography which was used to estimate the number of structures and rooms in each settlement.

The population densities were calculated using average household size and density per room data from previous studies and also using ground verification through field visits to five selected settlements. The data is given in the inventory for each division and settlement.

The estimated population and area of informal settlements by Division is as follows:

Administrative Division	Population	Area covered by informal settlements (Hectares)
Makadara	102,480	85
Langata (Kibera)	251,040	229
Kasarani	158,115	227
Dagoretti	186,250	373
Embakasi	31,890	73
Pumwani	11,890	14
Parklands	7,326	24
Total	748,991	1,025

This constitutes 1.51 per cent of the total area of Nairobi. Accounting for the fact that 75 per cent of Nairobi land area is used for non-residential purposes (the game park, recreation, infrastructure, industry, commerce, agriculture) the following striking conclusion is reached: In the aggregate, informal settlements occupy 5.84 per cent of all the land area of Nairobi that is used for residential purposes, but they house 55 per cent of the city's population.

Average density of informal settlements:  
250 dwelling units per hectare.  
750 persons per hectare

Density of middle upper income areas:  
10-30 dwelling units per hectare  
50-180 persons per hectare

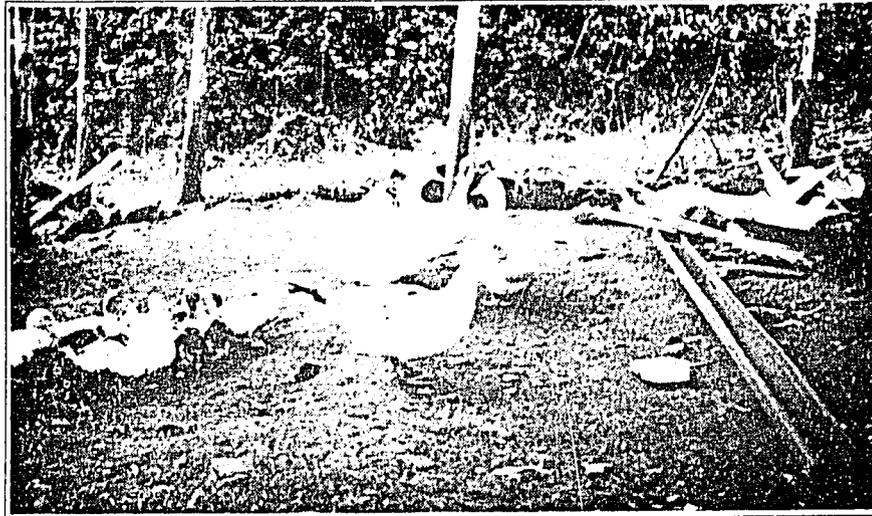
## ECONOMIC SURVIVAL

### Income levels

Determination of income is difficult in informal settlements as has been found by many surveys in Nairobi and in other urban centres world-wide. Most of the residents are engaged in informal sector activities which do not always generate a regular income. When asked to state income and expenditure, respondents in these areas almost always give higher figures for household expenditure than for their declared income. Income is also commonly understated as people do not wish officials to know their true earnings.

A review of income data contained in various existing surveys in Nairobi indicates that the majority of households in informal settlements have a monthly income of less than K.Shs. 2000 per month. (For example, Kibua 1990). This amount is far below the estimated median household income for Nairobi as a whole in 1991 of K.Shs. 3000 per month, (Housing Indicators, World Bank). In 1990 it was

estimated by Action Aid that the minimum expenditure required to feed and house a family of five was K.Shs. 980. It will have increased considerably since then with steep rises in the price of basic necessities.



*Many residents keep small livestock mostly for food, but also for sale.*

## Income Generation

It is worth making a distinction between informal settlements (defined above) and the informal/small-scale business sector. The latter refers to informal economic activities which are undertaken in various locations, including within informal settlements.

There is no general agreement on a definition of the small-scale business sector. The word "small-scale" refers to the number of employees and level of economic activity and is often preferred to "informal" which refers to the fact that some but by no means all of these enterprises operate without licences and do not conform to other regulations. Also, there is a great diversity within the sector; a vegetable hawker has different needs and constraints from those of a welder. There is a recognition that the principal characteristics of the sector are the following:

- There are few barriers to entry, as capital and skill requirements are low;
- Most entrepreneurs learn through informal apprenticeships in the sector and few have received vocational training;
- Most entrepreneurs have limited access to formal credit and capital needs are met informally from family and friends, informal money lenders and to some extent transfers from rural areas;
- The sector generally operates outside official rules and regulations and entrepreneurs therefore largely avoid taxes, licence fees and requirements to conform to standards. On the other hand they lack security, especially regarding tenure to land.

Formal employment is still a significant source of employment but informal self-employment is growing at a more rapid rate. Informal self employment in Nairobi grew by 27.7 per cent p.a. between 1980 and 1984 whereas formal wage employment grew by 18 per cent. p.a. within the same period. It is now estimated that informal self employment is growing at 40 - 60 per cent annually (National Development Plan 89-93).<sup>2</sup> By 1990 it was estimated that 110,347 people were engaged in some sort of informal sector activity.<sup>3</sup>

Informal retailing,<sup>4</sup> otherwise referred to as hawking, is an important source of income in Nairobi. Most of the participants trade in perishable goods i.e. vegetables and fruits as well as sweets, cigarettes, charcoal, cooked food, fish, meat and soft drinks.

<sup>2</sup> The rate of the growth of the informal sector has not been well documented. The Economic Survey (Government of Kenya) estimated 13.6% in 1990.

<sup>3</sup> The Economic Survey 1991 estimates that the informal sector grew from engaging 75,279 in 1987 to engaging 110,347 in 1990 (p46).

<sup>4</sup> Hawking as a Survival Strategy for the Urban Poor in Nairobi, W. Mitullah, 1990, Ford Foundation.

Hawking is largely a response to a harsh urban socio-economic environment. Many of the participants are household heads with no other sources of employment, formal or informal. One study found that over half of the hawkers are below 32 years of age, another 30 per cent between 33 and 40 years old. Over half are married women. Hawking therefore plays a central economic role in a significant number of households in Nairobi. In general this sub-sector operates on a subsistence basis.

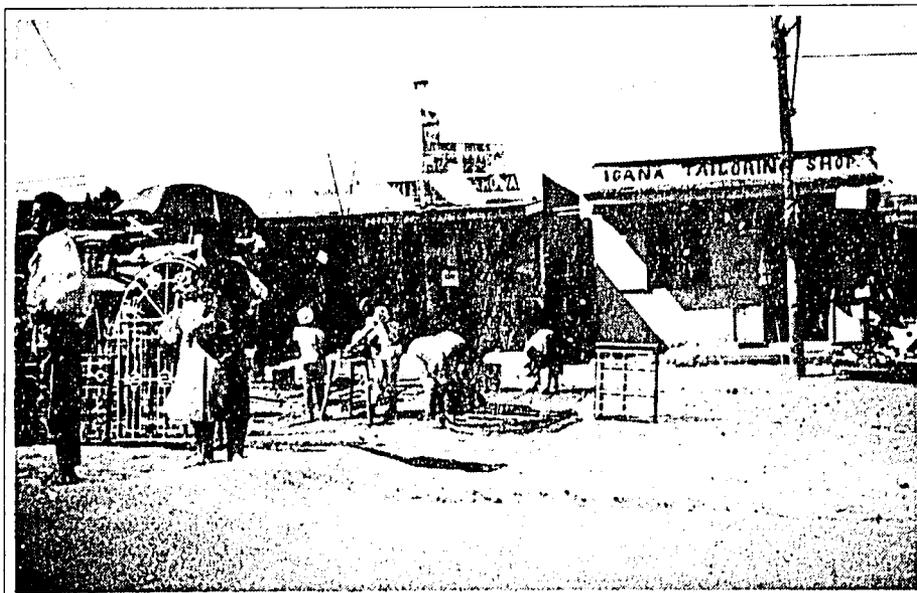
The informal "productive" sub-sector, often known as "jua kali", plays a significant economic role in the city. It is involved in manufacturing, repair and providing services. Trades include welders, metal workers, mechanics, carpenters and construction workers. The jua kali generate significant value added and provide goods and services both to residents of informal settlements and to residents of "formal" housing areas. For example, construction workers who began by building houses in informal settlements have graduated into providing construction services to all housing areas. Again, many vehicle owners go to jua kali mechanics based in informal settlements. There are therefore economic linkages between informal settlements and other areas in Nairobi and between small businesses in informal settlements and formal business and commerce.

The settlement of Kibera, for example has a small business sector with over 7,300 enterprises; a third of all households have a small business. The main categories of small enterprises in Kibera are manufacturing, construction, commerce, transport, rental property and personal services. Just under 70 per cent are involved in petty retailing of food, fuel and water.<sup>5</sup>

Overall, there are an estimated 40,000 small businesses in Nairobi, most of them located in informal settlements.<sup>6</sup> There is no doubting the significance of the sector in terms of providing employment at low capital cost and in generating an economic output which contributes to the economy of Nairobi as a whole.

Female headed households almost always earn less than their male counterparts. This disparity can be explained by the fact that males have better chances of getting employment as unskilled labourers, construction workers, watchmen, etc. Women are also constrained by the fact that they have to take care of young children and are therefore confined to income-generating activities that can be carried out close to the home, usually vegetable selling and petty commodity trade.

Children contribute to family income in almost all of Nairobi's low income housing areas according to the Metropolitan Housing Survey. The report indicates that the highest contribution per child was K.Shs. 1,298 and this was at Kawangware. Nairobi's average child income stood at K.Shs. 409. Children are employed in petty trade and hawking, waste recycling (as scavengers), shoe-shine stands and newspaper vending, among others.



*Informal sector employment accounts for the incomes of a large percentage of residents. Metal door and window frames made in the informal sector being sold in Kawangware.*

<sup>5</sup> K-REP study on Kibera

<sup>6</sup> Matrix, World Bank, Jua Kali Enterprise Development Proposal, 1993

## BASIC URBAN SERVICES

Informal settlements in Nairobi are characterised by a lack of basic urban services. The level of services and the state of the living environment differ slightly from settlement to settlement, depending on the age of the settlement, the type of land tenure, geographical location, the vibrancy of the informal sector and access to wage employment. Settlements on private land are on the whole less crowded, have better houses and cleaner environments.

### Water Supply

A major problem in informal settlements is the unavailability, inadequacy and unreliability of water supply systems. In a number of larger settlements the Nairobi City Council provides stand pipes. These are metered and franchised to kiosks operated either by private individuals or, in some instances, by community-based organisations. Water vendors, who deliver by wheelbarrow, normally retail water at three or more times the tariff charged by the council.<sup>7</sup>

In informal settlements 11.7 per cent of the plots have water available directly to the plot. The majority of the population (85.6 per cent) obtains its water from kiosks. (UNICEF/GoK, 1990 and MHS). The other main sources of water are roof catchment, boreholes and river water. The MHS found that 80 per cent of households complained of water shortages and pipes often running dry.

According to the basic needs survey carried out in 1992 by the Kenya Consumers Organisation in Mathare, Kawangware, Soweto and Kibera. 74.7 per cent of the people purchase water from vendors while 20.5 per cent have access to water through communal piping. There are more piped private sources in Kibera than in Mathare.

In Kibera the Kenya Water for Health Organisation (KWAHO) has assisted in the development of at least 14 public water kiosks supplied by elevated galvanised steel tanks with a capacity of about 9m<sup>3</sup>. These are connected to the main Nairobi system through a meter. These kiosks are run by women's water committees.

### Sanitation

Sanitation is grossly inadequate in the majority of informal settlements. It was estimated by the Metropolitan Household Survey that 94 per cent of the population of informal settlements do not have access to adequate sanitation. Only a minority of the dwellings have toilets, for example 60 per cent of the households in Kibera and Korogocho have no direct access to a toilet. They usually share a pit latrine with approximately 50 other people. (Kibua, 1991)

Pit latrines are the major method of excreta disposal as there are virtually no water borne sewerage systems in informal settlements. Water borne sewerage requires adequate supplies of piped water which is not available in informal settlements. It also requires considerable investment in physical infrastructure - pipes, pumping stations, sedimentation ponds etc. As the majority of residents are low-income there is insufficient capacity to pay for such investments. Moreover, the dense physical layouts of the settlements and the "temporary" nature of structures have also precluded the introduction of water-borne sanitation.

While in many urban areas in Africa well designed and constructed pit-latrines are highly suitable, in Nairobi, because of high densities, they pose a considerable health hazard in many settlements.

Many settlements have no provision for baths or showers. The KCO study in 1992 found that 95.4 per cent of the population in informal settlements have "doubtful sanitation facilities". A large number of

<sup>7</sup> The poor invariably pay more per unit of water consumed because they pay for it at a water kiosk and pay between 30 cents and 70 cents for a 20 litre container whereas those with water meters pay only about 17 cents per 20 litres.

households in the same survey had no bathing facilities (37.8 per cent). In Mukuru, 85 per cent of the population do not have access to showers and baths; in Korogocho, 65 per cent in Kawangware 55 per cent and in Kibera, 54 per cent. Where there are pit latrines, people also use them as bathing facilities.

One example of attempts to tackle sanitation problems has been that of community efforts supported by KWAHO, an NGO which has assisted in the provision of V.I.P latrines, usually built and used by the immediate community. KWAHO has also been assisting with management and support for latrine evacuation in Kibera.

## Drainage

Drainage in the majority of areas is very poor and there is frequently no provision at all, leading to pools of stagnant water. Where drainage is present it is largely in the form of open earth drains. These are frequently choked with refuse. One area in Korogocho has had cement lined drains installed through assistance from the Undugu Society, but even these are often blocked by garbage.

## Garbage collection

For some years the Nairobi City Council has been unable to provide regular garbage collection to all areas of the city. Recently, high income groups have tended to make private arrangements for garbage collection. In the informal settlements the NCC does not collect garbage on a regular basis and limits collection to clearing large piles of refuse when they become a health hazard. Even this is not undertaken regularly. Areas in most settlements are littered with refuse and are contaminated with rotting waste with the attendant health risks.



*Garbage management is a serious problem throughout the city, and more so in informal settlements. Children rummage through this dump, looking for re-usable scrap. The dump is from the neighbouring industrial area.*

## THE ENVIRONMENT OF INFORMAL SETTLEMENTS: IMPLICATIONS FOR HEALTH

As described above, informal settlements are generally characterised by inadequate services, poor housing conditions and overcrowding. This leads to high morbidity and infant mortality rates caused principally by diarrhoea and respiratory diseases. Disease also reduces productivity, and shortens the life-span of the residents.

The health of those that live in informal settlements in Emb. kasi and Kasarani are in addition affected by industrial pollution. These settlements are seriously polluted by effluent and fumes from the neighbouring industrial area. Pollution control is difficult to deal with because residents are ignorant about the effects of pollution, and of their rights as residents. The attitude of the industries is that the people should not be there in the first place. [It is worth noting that some of these people were "officially" relocated to these settlements after their previous settlements were demolished by the authorities].

Residential environmental conditions in most of the low income areas have deteriorated to the extent that they can be considered hazardous to health. The most common dwelling unit is one roomed and accommodates an average household of 4-5 persons.

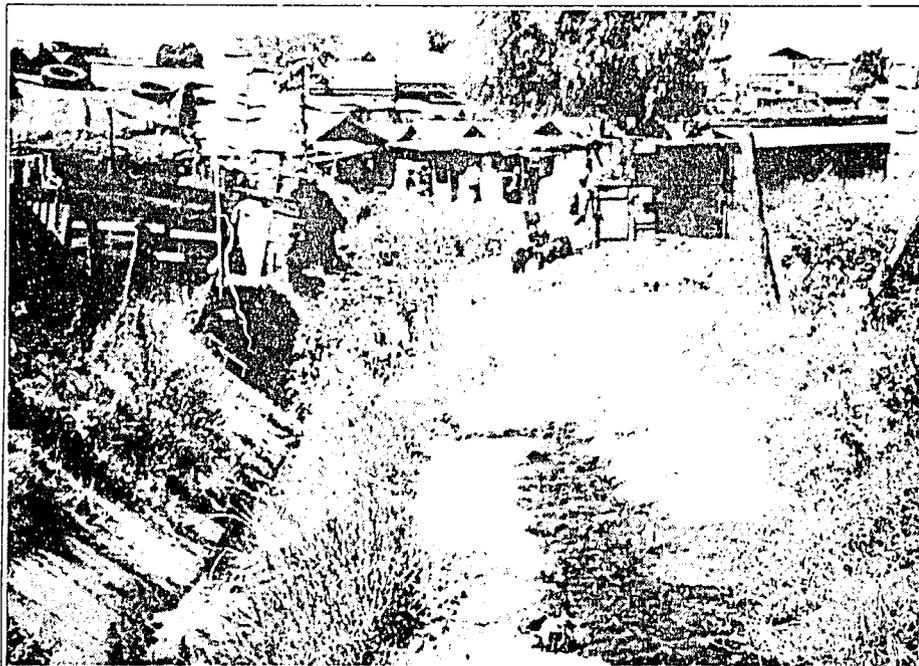
Kitchen locations and cooking fuels also have implications on health. Most households use paraffin and or charcoal. On average:

94% of the population use paraffin and/or charcoal, with the greater number using paraffin only.

16% use charcoal only (KCO study)

The implications for respiratory health, risk of fires, and environmental degradation are therefore quite serious.

It is clear that there is a link between poverty, morbidity and mortality. The urban poor, especially children suffer from periodic infections, chronic diseases, and parasite infestation. Studies indicate that in the high and very high density areas of Kibera, Mukuru, Soweto and Langa Langa the diarrhoea



*Industrial effluent flows through a settlement near the industrial area. Many children here can be observed to have skin diseases and running noses.*

episode rate is between 3.5 and 4.5 per child per annum. The high incidence of diarrhoea is caused mainly by poor sanitation, and poor water supply. Other studies have shown that 52 per cent of the children in Nairobi's informal settlements are stunted (Urban Nutrition Survey) and this phenomenon seems to be particularly prevalent in the very low income areas of Grogon, Highridge and Korogocho, all in Kariobangi North Division. The recurrent problems of worm infestation and recurrent diarrhoea, can all be linked to the living environment.

## EDUCATION

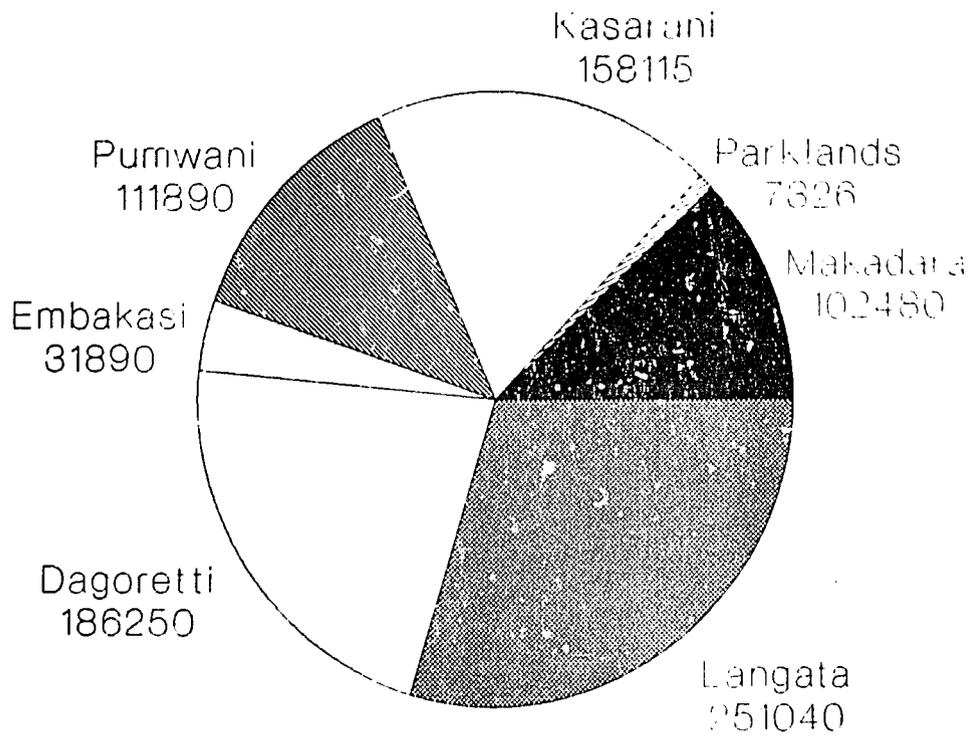
Most low income areas lack educational facilities. This is reflected in considerably lower levels of education, with only 14 per cent of the population finishing high school and 33 per cent not going beyond primary school. Only 2 per cent have post high school education. (Kenya Consumers Organisation, 1992). However, a number of community organisations and NGOs are providing educational facilities at nursery, primary and secondary levels.



*This boy lives in Kangemi and works as a scavenger, collecting paper in Westlands, to sell to recycling firms. Many families have one or more children working. This is partly because they have to contribute to the family's income, and partly because educational facilities are grossly inadequate.*

# ■ THE INVENTORY

## POPULATION BY DIVISION



## MAKADARA DIVISION

**Makadara** is located in the Eastern side of Nairobi and is the oldest African housing area. It is approximately 6 km from the city centre.

Makadara was originally an industrial zone. Previously the City Council demolished slums in the area as they appeared. The settlements in the area do not date back further than 1981, when the City Council stopped these periodic demolitions. Most of the settlements have grown in vacant lots behind large factories, or below heavy power lines where no conventional construction can take place. They mostly run parallel to Enterprise and Lunga Lunga roads. This is one division in which settlements are established literally overnight.

Name of Settlement	Total area in hectares	Average No of dwelling units per hectare (1)	Average No of persons per unit (2)	Estimated population
Mariguini	14.2	300	4	17,040
Express	16.8	300	4	20,160
Mukuru	54.4	300	4	65,280
TOTAL	85.4			102,480

Source: (1) Calculated from aerial photography, Jan. 1993.  
(2) Secondary sources and field verification.

### Housing Conditions

Mostly rows of wooden rooms with an average of 6-8 rooms per row. Rooms are usually 3m. sq. and each has external access. Most are in poor condition. There is such high demand for houses in an this area, which borders the industrial area, that landlords do not always respond to requests for maintenance. Thirty per cent of the structures have cement floors. These are mainly in Lunga Lunga and fetch a higher rent. Seventy per cent of all structures are built of temporary materials - such as plastic, card board etc. Average monthly rent: K.Shs. 200; range: K.Shs. 100 - 300 (NACHU Study 1990).

### Infrastructure and Services

**Water:** Is available from water points (or kiosks) at K.Shs. 0.40 - K.Shs. 1.00 per 20 litres. The area also benefits from water pipes connecting to South B and Plainsview Estates (especially for Mariguini and Mukuru Kaiyaba).

**Sanitation:** Most people use a pit latrine, sharing with 30 - 40 other people. In most cases there are no showers or bathing facilities, but where they exist, each is again shared by 30 - 40 people. Otherwise most people use their rooms or take a bath outside at night when the neighbours have gone to sleep.

**Electricity:** There is no electricity in the settlements.

## Access

**Roads:** This is largely through footpaths and unpaved roads. Being so close to the city centre, there is no problem of access to the rest of Nairobi. The roads to the industrial area, the main Jogoo Road and the road to South B also adequately serve the area.

## Facilities

**Education:** There is one primary school at Mukuru/Kayaiba and some nursery schools run by churches and individuals (total number not known). There are no secondary schools in the area. The residents use schools in neighbouring South B estate.

**Health:** There are no health centres but the area is bordered by the Mater Misericordiae Hospital run by Catholic nuns.

**Churches:** Redeemed Gospel Church, Akorino, Salvation Army, Church of God and the Catholic Church. The Catholic Church has welfare schemes for the very poor as do the Catholic nuns from Mater Hospital.

## Organizations

**CBOs:** There are four women groups which operate mainly as savings and credit societies. These are: Mukuru Kaiyaba, Nyakinyua (own water points), KANU Women Group (rear poultry) and Akamba Dancing group (dance for an income).

**NGOs:** AMREF (health), Catholic Church (health and education), Edelvale Trust (welfare and education), SOS Children's Village (education and welfare), Soul Winning Evangelistic Church (vocational training), Undugu Society (housing, welfare and education), World Vision (nutrition).

## Economic Activities and Sources of Income

**Household Incomes:** Range from K.Shs. 600 to 1,200 per month.

**Wage Employment:** Many residents work as clerks, security guards, messengers and machine operators. These jobs are mainly located in the adjacent industrial area. The formal sector also provides casual employment.

**Informal Sector:** There is petty trading on the road side and in kiosks. Kiosks sell both manufactured products for home use and groceries. Because of the proximity to the industrial area many kiosks provide food and beverage to the people who work in the area. There are also small manufacturing businesses such as furniture workshops.

## LANGATA DIVISION: (KIBERA)

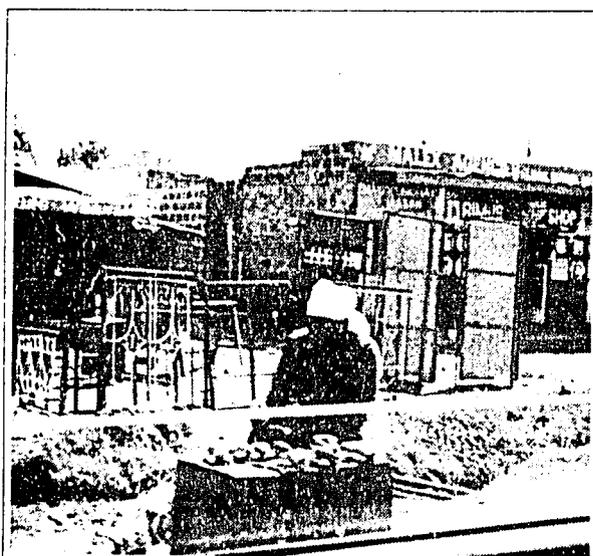
Langata is located to the south-east of Nairobi, approximately 7 Km from the city centre.

The Kibera group of settlements is the largest informal settlement in Nairobi. Kibera was originally used as a settlement for Nubian soldiers who were part of the Kings African Rifles, and was established during the 1940s.

Langata Division has three major informal settlements.

Name of settlement	Total area in hectares	Average No of dwelling units per hectare (1)	Average No of persons per unit (2)	Estimated Population
Kibera	225.6	220	5	248,160
Mitumba	1.5	200	4	1,200
Bomas	2.1	200	4	1,680
TOTAL	229.20			249,360

Source: (1) Calculation from aerial photography, Jan. 1993  
(2) Secondary Sources and Field Verification



*Hawking of fruits and vegetables by the road-side is often done by women and children.*

### Housing Conditions

Most houses are constructed of mud and wattle and have corrugated iron roofs. They are usually built in rows. Most rooms are 3m. sq.

Average monthly rent: K.Shs. 340. Range K.Shs. 80-600.

Because of the high rents, as well as an insufficient supply of units, in many instances two households share one room.

## Infrastructure and Services

Since Kibera is government land with temporary occupation licenses, the City Council does not provide services for the area.

**Water:** Obtained from kiosks at a cost of between Shs. 0.30 - 0.70 for 20 litres. Many of these water kiosks are run by women's water committees. 75 per cent to 90 per cent of the population gets water this way.

Other sources of water include the Nairobi Dam (although it is polluted) and rain catchment.

**Sanitation:** Principally pit latrines, one per about 50 persons and in some cases up to one per 500 people. Because of the inadequacy of toilet facilities, human excreta litters the area posing a major health risk especially during the rainy season when the area floods. KWAHO has been assisting with the provision of V.I.P latrines.

Hardly any bathing facilities exist and where they do, they are in such bad state that residents hardly use them.

**Waste disposal:** Outside dwelling units, with waste water thrown onto roads and footpaths.

**Refuse disposal:** Usually thrown anywhere near the structures as there is no regular rubbish disposal or collection by the City Council.

**Electricity:** Electricity is found in some areas, e.g. Makina and Laini Saba. However, even in this area, only very few houses have electricity as access to electricity means paying higher rent (K.Shs 50 - 100 more) per month.

There are no street lights.

## Access

**Roads:** Mostly earthen roads (temporary) and footpaths. Planned roads are found in Makina, Kisumu Ndogo, Lindi and Silanga. There are roads for vehicular access in Makina but there are hardly any in Laini Saba, Mashimoni, Soweto or Gatwekera.

**Transportation:** 75 per cent of people walk to work because of the proximity to the industrial area where most people of the low income category work. Matatus and buses are available to town but they are too far from some residential areas, e.g., 1/2 - 3 km away. Despite existence of a train station, few use the train to town.

## Facilities

**Health:** There are no government or Nairobi City Council clinics in the area. However there are 20 NGO run clinics that offer free services. There are also a large number of private clinics owned and operated by qualified doctors that offer services for a fee. Other health services are accessible within 45 minutes walking distance at Kenyatta National Hospital, Ngong Road Dispensary, Langata Health Centre, Woodley, Dagoretti Corner Dispensary and Otiende health centres.

**Education:** There are five primary schools, the largest having as many as 1,500 pupils. The average class size is 50-60 pupils.

There are 30 nursery schools, privately owned by individuals, women groups or NGOs. There is also one Koranic school for Muslim children.

There are several churches and a mosque.

## Organizations

**NGOs:** International Planned Parenthood Federation (IPPF)(Family Planning), Danish Volunteer Service, Christo Utuwema, Church of God of Prophecy (housing) Don Bosco Boys Town, Focolare Movement, C.P.K., Kibera Mosque (health, education and welfare), KWAHO (health, water, sanitation, housing and education), Nairobi Family Support Service (welfare), Undugu Society of Kenya, Y.M.C.A, Crescent Medicaid (Health), Catholic Church (Housing, Health and Education), Church of God (education), Friends World Committee for Consultation (education, especially vocational training for women), Siloam International (education).

## Economic Activities and Sources of Income

**Household Incomes:** Are in the range of Shs. 700 to Shs. 1800 per month.

**Sources of Income:** A survey of 677 respondents conducted in Kibera in 1991 by K-REP showed the following sources of income:

Employment	38%
Agriculture	26%
Self-Employment	49%

**Wage employment:** Messengers, clerks, watchmen, machine operators, casuals labourers, domestic workers, etc. Wage employment is found at the city centre, industrial area and at estates at Otiende, Adams Arcade, Ngumo and Golf Course.

**Informal Sector:** Kibera has 7,300 enterprises. A third of all households have a small enterprise activity. Most are involved in trade of food, fuel, water, and the rest in manufacturing, tailoring shoe making/mending, carpentry, services i.e hairdressing and landlordism.



*Food is grown on any available patch of land. Most residents cannot afford to pay for all their food requirements. Improvement of sanitation in the settlement helps to keep this land free from contamination, and therefore good for food growing.*

## KASARANI DIVISION

Kasarani is located to the Eastern side of Nairobi but the precise distance to the town ranges from 5 km in Mathare, to 17 Km in Kahawa.

Kasarani division is home to many informal settlements which include among them the sprawling Mathare Valley, Kariobangi, Korogocho, Kahawa, and Kileleshwa.

Name of Settlement	Total area in hectares	Average No of dwelling units per hectare (1)	Average No of persons per unit(2)	Estimated population
Mathare	73.7	200	4	58,960
Korogocho/				
Kinyago	49.2	230	5	56,580
Thome	7.3	100	3	2,190
Njathini	8.75	100	3	2,625
Garba	13.75	100	3	4,125
Githurai	21.8	100	3	6,540
Kahawa	30.5	100	3	9,150
Kamac	9.95	100	3	2,985
TOTAL	214.95			143,155

Source: (1) Computed from aerial photography, Jan. 1993  
(2) Secondary Sources and Field Verification

Some of the land was originally owned by one individual called Baba Dogo, but he later sold the plots to individuals. Some of the adjacent land originally belonged to the City Council, but it was sold to individuals. All plots in Githurai and Majengo were bought by individuals from the original owner who was a white farmer.

### Housing Conditions

Room size (average) 6 sq.m. The most congested structures in Nairobi are found here with an average occupancy of 4 or 5 persons per room in Mathare and an average of 5 - 6 persons per room in Korogocho.

Most houses are made of mud and wattle, timber and recycled materials such as tin cans and cardboard. Most of the structures are built in rows with an average of 2 - 6 rooms per structure in Mathare and 5 - 6 rooms per structure in Korogocho.

Average rent - Mathare K.Shs. 200.  
- Korogocho K.shs. 150 (for rooms built of temporary materials)

Permanent houses rent at between K.Shs. 500 - 850 per month depending on whether there is electricity, sanitary facilities and security (NACHU Study).

Most dwelling units in this division, especially in Mathare, are in a dilapidated state. The structures are very congested, rooms are small and the population density is higher than in other informal settlements.

## Infrastructure and Services

**Water:** This is available from communal water taps and water kiosks at a cost of K.Shs. 0.30 - K.Shs. 1.00 per 20 litres. Some have their own stand by water-taps especially in Kahawa and Roy Sambu. Other sources of water are rain catchment and river (which is heavily polluted).

**Sanitation:** Pit latrines are the most common but there are some conservancy tanks. In some parts of Mathare and Kariobangi North there is a trunk sewer but not all houses are connected to it. Korogocho has very few pit latrines and most people use whatever open space is available. There is very little space to build a toilet in some of the settlements and in many instances toilets are built adjacent to living rooms.

**Refuse Disposal:** Although the City Council collects garbage from designated dumps the service is very irregular. Those living near the river throw their garbage into the river while others throw it onto roads in the hope that the City Council will collect it. Garbage is normally thrown outside dwelling units.

**Electricity:** No street lights. Those available at Korogocho and Mathare do not work due to vandalism. Few residential structures have electricity.

## Access

**Roads:** Mostly earthen roads and footpaths. Most are impassable during the rainy season. In some settlements structures are so crowded that it is difficult to find a way through the settlement.

## Facilities

**Health:** There are three health centres run by the City Council, at Baba Dogo, Soweto and Kariobangi. There are 9 privately owned health centres in Mathare and 11 in Kariobangi.

**Education:** There are 9 primary schools, 31 nursery schools owned by the City Council, individuals, churches, and women's groups. 19 of these nursery schools are in the Kariobangi section.

**Social Halls:** One at Mathare.

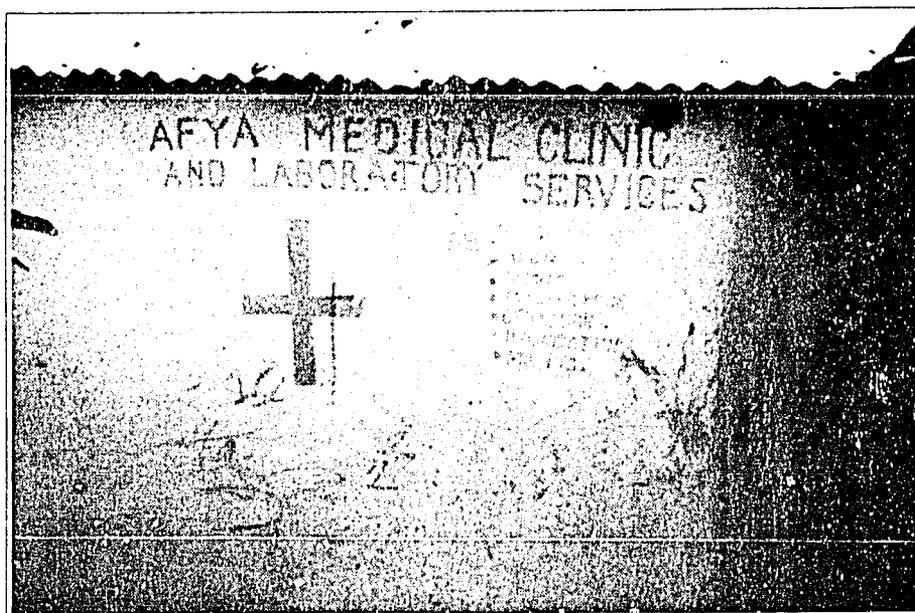
**Churches:** Several as all denominations are represented.

## Organizations

**CBOs:** There are 41 women's groups.

**NGOs:** Action Aid (education and welfare), Association for the Physically Disabled of Kenya (health), Africa Now (health in Korogocho), Cheshire Homes (welfare), Church of the Province of Kenya (education), Catholic Church (education and health), Islamic African Relief Agency (health), Institute of Cultural Affairs (health), Kenya Association for the Welfare of Epileptics (health), Kariobangi Baptist Parish (education and health), NCKK (health and housing), Population and Health Services, Siloam International (education), Undugu Society (welfare, recreation, education and health), Family Planning Association of Kenya (reproductive health and education), Redeemed Gospel Church (welfare, nutrition and education), World Vision (education).

*Health care is provided mostly by NGOs. A few private facilities exist, including traditional and herbal medicine practitioners.*



## Economic Activities and Sources of Income

**Household Income:** The NACHU study indicated that incomes range from K.Shs. 300 - 1,000 per month. This appears to refer only to income from formal employment. It is quite probable that expenditure patterns would indicate a higher income<sup>8</sup>. The same study found that there were some households with monthly incomes in excess of K.Shs 5,000.

### Source of Income:

Area	Wage Employment %	Self employment %
Mathare	23.3	17.1
Korogocho	20.4	12.8
Kariobangi	22.7	7.2

SOURCE: T. N. KiBUA, 1990

**Wage Employment:** Most of those employed are employed as clerks, messengers, security guards, domestic workers, casual labourers or machine operators, usually in the city centre or in the Industrial area. Wage employment is also found in Eastleigh, Muthaiga, Huruma, Kariobangi, Dandora (especially the Industrial sites) and Ruaraka.

**Informal Sector:** A large number of the people are employed in the markets as hand-cart pushers and load carriers. Others engage in petty commodity trade, carpentry, tailoring, manufacturing and metal works. The local markets provide outlets for such products and draw people from other areas because of the attractive prices. Such markets include Soko Mjinga in Korogocho, and Kariobangi City Council Market. Others resort to doorstep vending especially in Korogocho (where almost all streets are commercial). A wide variety of goods is sold in these markets including clothing, fresh produce, meat and some services i.e hair saloons, photographic studios and electrical goods shop. Kiamaiko in Mathare/Huruma is well known for its open-air butcheries and meat roasting places, while Kariobangi-North abounds with illicit liquor brewing (in Marura, Korogocho, Baba Dogo, Ngomongo and Lakhzamu). Other activities include tea and green groceries kiosks.

<sup>8</sup> When inquiries are made about expenditure, it often reveals that families spend more than they indicate they receive as income. This may be because they do not record income from informal sources, or income received in kind.

## DAGORETTI DIVISION

Dagoretti is about 10km to the west of the city centre.

Dagoretti was originally outside the city but when the boundaries were extended in 1963, it became part of the city. It still has a rather rural appearance.

In terms of location, it spreads over a large area which stretches from Riruta, through Kawangware to Kangemi.

There are three major informal settlements in the Division, Kawangware, Riruta and Kangemi.

Name of Settlement	Total Area in hectares	Average No of dwelling units per hectare(1)	Average No of persons per unit(2)	Estimated population
Ngāido	12	100	5	6,000
Riruta	15	100	5	7,500
Karandini	23	100	5	11,500
Kawangware	111	100	5	55,000
Muslim Village	37	100	5	18,500
Kangemi	75	100	5	37,500
Dagoretti	14.5	100	5	7,250
Waitihaka	41	100	5	20,500
Mutuini	45	100	5	22,500
<b>TOTAL</b>	<b>373.5</b>			<b>186,250</b>

Source: (1) Computed from aerial photography, Jan. 1993

(2) Secondary Sources and Field Verification

[Note: Kibagare, demolished in 1990 was in this area]

## Housing Conditions

Most houses are built of mud and wattle and corrugated iron sheets, a few are built with timber walls and cement floors. Most are not well maintained. Some are in poor condition with the roofs and walls almost caving in.

**Average Rents:** Semi-permanent houses rent at K.Shs. 80 - 250 per month. For permanent houses rents range from K.Shs. 300 - 600 per month. Landlords use the increasing demand for houses to continually raise rents.

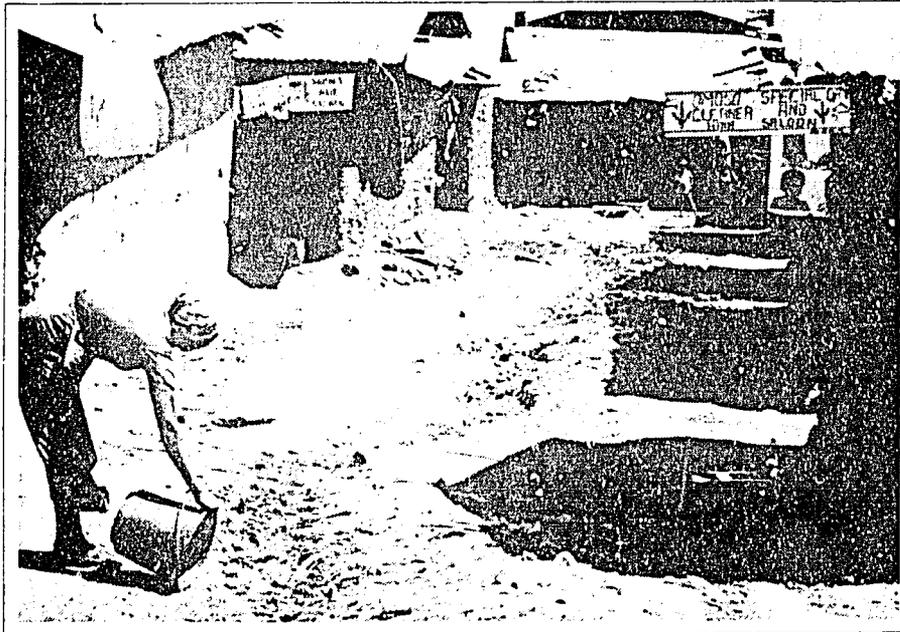
## Infrastructure and Services

**Water:** In most areas water is obtained from kiosks at K.Shs. 0.50 - 0.80 per 20 litres. In Kawangware and Kangemi water is obtained from standpipes provided on the plots by landlords. The cost of water is included in the rent. In Kangemi, residents also have the option of getting water either from the kiosk or from the tap provided by the landlords. In Kagichu, the water source is a well.

**Sanitation:** Pit latrines are the most commonly used. A few houses are connected to a trunk sewer.

**Refuse Disposal:** There is no regular garbage collection service. Composting is the most common method of solid waste disposal.

**Electricity:** About 25 per cent of houses in Kawangware and Kangemi have electricity. Kawangware has street lights along the main streets.



*In the absence of proper drainage, residents throw household waste water on to footpaths, or make-shift drains.*

## Access

**Roads:** The main roads are tarmacked but the roads within the settlement are earthen or murrum. There are two post offices and a few phone booths, although these do not work for much of the time.

## Facilities

**Health:** There are 19 health clinics - 5 in Kangemi, 11 in Kawangware and 3 in Riruta. Except for two city council clinics - one in Kangemi and the other in Kawangware - the others are privately owned.

**Education:** Kangemi has one secondary school, two primary and six nursery schools. In Kawangware there are four primary schools and 13 nursery schools. In Riruta there is only one primary and 5 nursery schools. All the primary schools are operated by the City Council, while the nursery schools are privately run.

**Markets:** There is one market in Kawangware and one at Kangemi.

## Organizaations

**CBOs:** Nine women groups.

**NGOs:** Ananda Marga (welfare and education), Cheshire Homes (welfare), Compassion International (education and Christian Counselling), Catholic Church (housing, health and welfare), C.P.K (education and health), Family Planning International Association (reproductive health), Kenya Association for the Welfare of Epileptics (health), Undugu Society (welfare and education), Family Planning Association of Kenya (reproductive health and education), Breast-Feeding Information Group (health).

## Economic Activities and Sources of Income

**Household Incomes: Land-lordism:** Resident landlords are relatively well to do as they earn between K.Shs. 2,000 - 5,000 per month. Other (or tenant) residents earn between K.Shs. 600 - 1,800 per month (Kawangware K.Shs. 600 - 1,000; Riruta 400 - 800 and Kangemi 800 - 1,800).

**Sources of Income:** A survey of 489 respondents in Kawangware in 1989 (Ondiege, Syagga) and 195 respondents in Kangemi showed the following sources of income:

Area	Farming	Business Trade	Wage Casual	Permanent employment
	%	%	%	%
Kawangware	2.25	21.88	11.04	14.93
Kangemi	2.05	22.13	11.79	41.03

Another survey done in 1990 (T.N. Kibua) had the following results:

Area	Wage employment	Self employment
	%	%
Kawangware	28.1	6.7
Kangemi	30.7	7.4

A survey carried out in Kangemi in 1991 (Ndungu, 1992) showed the following sources of income (percentages)

Area	Kangemi
Self Employment	23
Wage Employment	50
Casual	27

Wage income was earned mainly through domestic work (17 per cent) and watchmen (13 per cent). 20 per cent of the population rely on the sale of fresh produce for their household income.

**Wage Employment:** Gardeners, domestic workers, watchmen, etc. Most of these jobs are found in neighbouring high income areas of Kileleshwa, Lavington, Kyuna, Loresho, Mountain View etc. A number work in the city centre and in fact Kawangware and Kangemi have developed as "dormitory towns" serving Nairobi.

**Informal Sector:** Petty commodity trade, manufacturing, services, etc. These include tailoring, shoemaking, metal works, kiosks and butcheries, retail trade, repair of clothes and shoes, carpentry and wood work. Others also engage in illicit brewing and sale of alcohol, prostitution, urban farming and landlordism.

In some of the villages in Kangemi, for example in Marenga near the Nairobi-Nakuru highway, there are carpentry and metal workshops whose products not only have a market in the vicinity but also in the other areas of Nairobi i.e Uthiru, Mountain View and Westlands. Many retail shops and kiosks are to be found as well as open air displays of wares during market days.

In Sodom, there is subsistence agriculture (usually sukuma wiki, maize and beans) on the edge of the Watiti stream. Approximately 5 per cent of the total population of Kangemi is involved in urban agriculture).

## EMBAKASI DIVISION

Embakasi is to the eastern part of Nairobi, about 12-15km from the city centre.

All the informal settlements in Embakasi, except for Soweto, were originally workers camps for settler farms in the area. Most of the land is Government owned.

Name of Settlement	Total area in hectares	Average No of dwelling units per hectare (1)	Average No of persons per unit (2)	Estimated population
Maili saba	39.7	100	3	11,910
Kayole	23.3	200	3	13,980
Soweto	10.0	200	3	6,000
TOTAL	73.0			31,890

Source: (1) Computed from aerial photography, Jan. 1993  
(2) Secondary Sources and Field Verification

### Housing Conditions

Most of the structures have 4 rooms. The majority of these are temporary - made of mud and wattle and timber off cuts (Gitau, Mwangenyi, Silanga and Maili Saba). Housing conditions are relatively better than in most of the other settlements. Due to its elevation Kayole is fairly well drained. It is also in Kayole where more dwellings with concrete floors are found.

**Average Rent:** K.Shs. 100 per month. Range - K.Shs. 50-250 for semi-permanent rooms; K.Shs. 200-400 for rooms with cement floors.

### Infrastructure and Services

**Water** - In Kayole and Gitari Marigu, there are communal water taps where water is sold. Water is also available from the Nairobi and Getathuru rivers (though polluted) while some rely on water from sunk wells (Mwangenyi and Gitari Marigu).

**Sanitation:** Sewage disposal is by pit latrines which are often used by 15-30 people. This clearly is over-use and the lack of regular maintenance explains the squalid conditions which worsen during the rainy season.

**Refuse disposal:** Refuse is usually thrown outside the houses or in the rivers.

**Electricity:** There is no electricity in Embakasi except in Kayole and then only in a few areas. There is no street lighting.

### Access

**Roads:** Good tarmac roads connect Kayole to the city centre while access roads within are largely

earthen and tend to become difficult to use during rainy season. For most of the other informal settlements, there are no access roads.

## Facilities

**Health:** There are four private health clinics (Kayole) and two accessible health centres at Embakasi and Umoja which serve the nearby areas.

**Education:** There are no City Council schools in the division and children attend schools in adjacent divisions. NGOs and CBOs providing services include the Baptist Church (nursery school), Compassion International, the Church of the Province of Kenya (a nursery school at Njiru), the Salvation Army, (a nursery school at Soweto Village), and the Soul Winning Eva Church which has a nursery school at Lunga Lunga.

## Organizations

**CBOs:** 11 women groups. Some of the women are working together in a brick-making cooperative.

**NGOs:** Baptist Church Child Sponsorship (education), Compassion International (education and christian counselling), Catholic Relief Services (welfare and relief), C.P.K. (education and health), Catholic Church (health, welfare and education), Church of Assembly (education), Edelvale Trust (welfare and education), Food for the Hungry International (health, water and Welfare), Salvation Army (education), Family Planning Association of Kenya (reproductive health and education).

## Economic Activities and Sources of Income

**Household Income:** Average income is K.Shs. 900 per month for those in wage employment (range K.Shs. 600 - 1200 per month). Casual labourers earn about K.Shs. 400 per month. Subsistence agriculture is common in the division.

**Wage employment:** Most people in wage employment work in quarries which are found in the area i.e at Njiru, and others work in the Industrial area, doing casual work.

**Informal Sector:** Subsistence agriculture and rearing of livestock (goats, cows, pigs, etc.) Also poultry keeping.

## PUMWANI DIVISION

Pumwani is the oldest low-income settlement in Nairobi, dating as far back as 1919. There are several informal settlements in this area, largely located on Government and City Council land. Landlords in Pumwani have temporary occupation certificates. This is true in Mashimoni, Majengo, Ndagoroni and Digo settlements.<sup>9</sup> Majengo, the biggest, has 4232 rooms in the "swahili" type of structure (Kibua, 1990). There are City Council lavatories, public water points, council clinics and street lights.

### Kitui village

Has about 2,500 rooms all of them in temporary structures. There are no toilets, sewerage, water and no garbage collection/disposal system. Inhabitants depend on public facilities. There is limited economic activity, e.g., tea and vegetable kiosks and other retail kiosks.

Name of Settlement	Total area in hectares	Average No of dwelling units per hectare (1)	Average No of persons per unit (2)	Estimated population
BuruBuru Carton Kitui/ Pumwani Village	4.5	140	3	1,890
	10	250	4	10,000
TOTAL	14.5			11,890

Source: (1) Computed from aerial photography, Jan. 1993  
 (2) Secondary Sources and Field Verification

## Housing Conditions

Average room size - 5.2 sq.m. (Mashimoni, Majengo, Digo and Ndagoroni) and 7.5 sq.m. in Kitui and Kinyago Villages. Most houses are made of mud and wattle walls, with corrugated iron sheet roofs. Some are made of polythene sheets and cartons (Kitui). Many of the more sturdy structures have between 10 and 40 rooms per structure.

**Average Rent:** The average rent is K.Shs. 200 in Pumwani, ranging from K.Shs. 60 - 200 per month in Majengo, Mashimoni, Digo and Ndagoroni and from K.Shs. 100 - 250 per month in Kitui Village. The rents are on average K.Shs. 400 in Kinyago Village (ranging from K.Shs. 300 - 500 per month) largely because most facilities, except electricity have been provided (by Undugu Society and UNICEF). This demonstrates that provision of infrastructure and other basic services has the effect of increasing rents.

## Infrastructure and Services

**Water:** There is free water provided through communal water pipes in Mashimoni, Majengo, Digo and Ndagoroni. However, to avoid queues people pay about K.Shs. 1.00 per 20 litres from vendors who have collected water from the water points. In Kinyago and Kitui water is sold at kiosks for between K.Shs. 0.50-1.00 per 20 litres. People in Kinyago harvest rain water in large concrete tanks.

<sup>9</sup> Muoroto which was demolished in 1990 was in this division and had 500 structures

**Sanitation:** There are trunk sewers in Majengo, Mashimoni, Digo and Ndagoroni. The facilities have been provided by the City Council. There are pit latrines in Kinyago village with one latrine serving 14 rooms or 56 people. There are a few pit latrines in Kitui village and these are found in the low lying areas near the river.

**Refuse disposal:** Rubbish is thrown in any open space and in front of dwelling units or in the river (especially in Kitui and Kinyago). In Majengo, Mashimoni, Digo and Ndagoroni, the City Council provides metal drums where refuse is deposited and collected by the City Council later.

**Electricity:** There are street lights in Majengo, Digo, Mashimoni, and Ndagoroni. There are none in Kinyago and Kitui. Very few structures are connected to electricity.

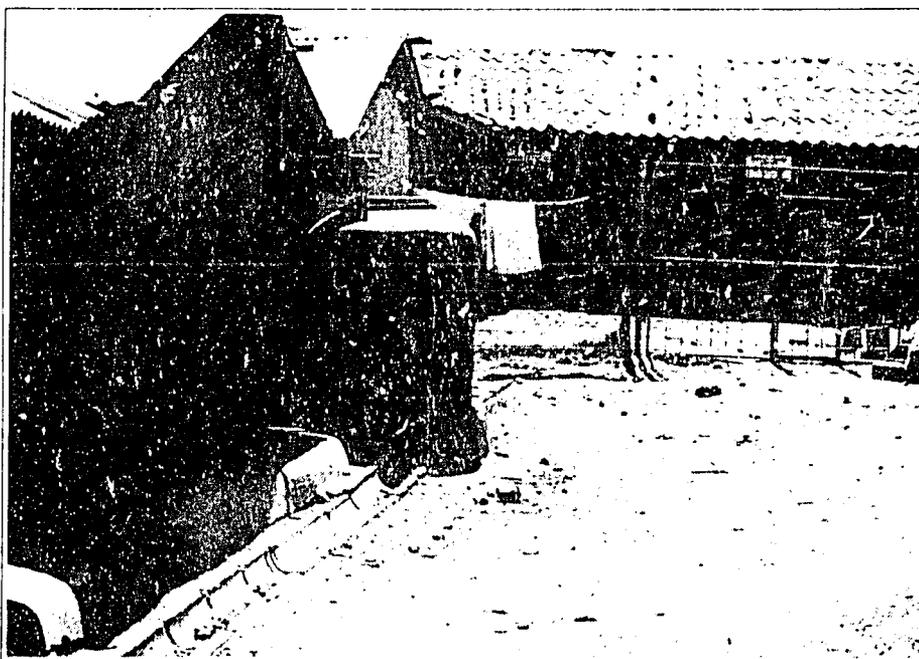
## Access

**Roads:** There are two main tarmac roads and numerous dirt footpaths.

There are two telephone booths.

## Facilities

**Health:** There are three health clinics (found at Mashimoni) in Pumwani Division and there is one health centre run by the City Council in Pumwani.



*Simple upgrading can make a lot of difference. These cement drains, and the plaster on the walls were done with the assistance of the Undugu Society, an NGO working in informal settlements. The concrete tanks are used to catch rain water for the use of Pumwani residents.*

**Education:** There is one secondary school, two primary schools and four nursery schools (privately owned). There is also an educational centre run by Undugu Society (includes a tailoring school for girls) in Digo. Most of these are found in Mashimoni, Majengo, Digo and Ndagoroni.

**Social Halls:** There is one at Pumwani, which also has a cinema.

**Markets:** The nearby Gikomba market offers opportunities to buy and sell different items such as household goods, clothing furniture, farm produce and *jua kali* products. It offers services i.e in metal welding, mechanics and motor-car body building.

**Religious facilities -** There are several churches and a mosque.

## Organisations

**CBOs:** Nine women groups.

**NGOs:** Aid Crescent Medicaid (health), Baptist Mission of Kenya (education), Christian Hostels Fellowship (housing), Compassion International (education and christian counselling), C.P.K. (education and health), Catholic Church (welfare, education, housing and health), Eastleigh Community Centre (education), Institute of Cultural Affairs (health), Mama Fatuma Good Will Children's Home (welfare), St John's Community Centre (welfare and education), Salvation Army (housing and vocational training), Undugu Society (education, welfare, housing, recreation and health), United Muslim Women's Association (education), World Vision (education), Pumwani Child Survival and Development (welfare and children's health), P.C.E.A. (education), Voluntary Service Organisation (welfare), Catholic Relief Services (relief).

## Economic Activities and Sources of Income

**Household Income:** Average monthly income ranges between K.Shs. 100 - 6,000 per month. Resident landlords who also have businesses in the area have relatively high incomes.

### Sources of Income

Wage employment - 10.7 per cent

Self-employment - 21.3 per cent

Source: T.N. Kibua, 1990.

**Wage Employment:** Some wage employment is available in the city centre and in the industrial area. Other wage employment includes serving as shop attendants and watchmen. Women engage in domestic or cleaning work in the city.

**Self-Employment:** This is mainly at Gikomba market selling second-hand clothes, vegetables and dry foods. Another type of self-employment is petty commodity trade carried out in front of dwellings. Other activities include tea and vegetable kiosks, *jua kali* mechanics, metal welding, shoe shining and repair works as well as butcheries, bars, barber shops, hair salons, carpentry, charcoal dealing and prostitution (Digo and Dagoroni).

## PARKLANDS DIVISION

Parklands has remained a high income low density residential area, and informal settlements are a relatively recent development. Only one settlement had been documented before this inventory was prepared. i.e. Gigiri, which was demolished in 1991.

The informal settlements which have been located in this area are started normally by squatters who invade private land that is awaiting development. This is mostly former agricultural land that has been sub-divided for high-income housing development. This means that the life-span of these settlements is therefore always uncertain.

The following settlements were identified through aerial photography.

Name of Settlement	Total area in hectares	Average No of dwelling units per hectare	Average No of persons per unit (2)	Estimated population
Runda	11.5	100	3	3,450
Kiisuru	11.25	100	3	3,375
Spring Valley	1.67	100	3	501
TOTAL	24			7,326

Source: (1) Computed from aerial photography, Jan. 1993  
(2) Secondary Sources and Field Verification

In the absence of documentation, one can assume that the residents of these areas are employed in the neighbouring high income areas, and also in the city.

It can be observed that many of the household engage in subsistence agriculture in nearby undeveloped plots.

The settlements are relatively small, and the structures are made of either mud and wattle, or timber off-cuts.

# ANNEX 1

## References

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## ANNEX 2

### Nairobi Inventory of Informal settlements

#### **Aerial Photography and Mapping Procedure**

After conducting a thorough literature review of informal settlements in Nairobi it became clear that no systematic and consistent information existed on the number of informal settlements, their sizes, exact locations and estimated populations.

It therefore became necessary to organise aerial photography of all the settlements. The Department of Resource Surveys and Remote Sensing (DRSRS) of the Ministry of Planning and Natural Development, was retained to assist in conducting the exercise.

#### **Process/methodology**

Since no accurate and up to date information and mapping showing the actual location of the informal settlements in Nairobi existed, it was decided to fly the whole of Nairobi. A rough sketching of the informal settlements, and the administrative divisions where they occur was prepared as a guide to assist the planning of the flight lines. This was based on information obtained from the literature, and discussions with City Council officials.

The actual flying was done in January 1993. After the flying, the photographs that covered informal settlements were identified and printed. An index map was also prepared to assist in photo interpretation and mapping.

The aerial photos produced were at the scale of 1:10,000. This scale was selected taking into account the nature of the settlements being flown, and the type equipment available at DRSRS .

#### **Photo Interpretation and Mapping.**

As stated above, the photos to be interpreted are at a scale of 1:10,000. This meant that the minimum delineation area is taken as 5mm x 2.5mm or 10mm x 1.25mm on the photographs which represents 1250m<sup>2</sup> on the ground.

The photographs were first scanned and classified. Necessary base maps were prepared.

While maintaining the minimum delineation unit, the interpretation of the photographs was done with the help of a mirror stereoscope. Photo image characteristics such as tone, pattern, texture, and stereo heights, were used in differentiation of features.

Informal settlements were delineated into overlays placed on the photographs. Where necessary unidentified public facilities were marked for field check. The interpretation on the overlays was finally transferred onto the relevant base maps as necessary, using a kargle reflecting projector for appropriate scale.

The following types of maps were then produced for purpose of the study.

- a) A map of Nairobi at a scale of 1:50,000, showing all the informal settlements, administrative divisions, and major transport network.
- b) Maps of each of the five largest settlements at a scale of 1:10,000, showing public amenities, roads, footpaths, drainage etc. The settlements which constitute a representative mix of location on public and private lands, are as follows :

- Kibera
- Mukuru/Kaiyaba (Industrial area settlements)
- Kariobangi/Korogocho
- Soweto
- Kawangware/Kangemi

### Population Estimates

As stated above, one of the major objectives of conducting aerial photography was to provide a basis for estimating the population of the various informal settlements in Nairobi.

The scale of photographs available, i.e 1:10,000 has its own limitations and difficulties in the micro level study of residential environment, especially informal settlements. For example accurate counting of residential dwelling units is difficult.

The following methodology was therefore used to estimate the population of the settlements:

a) The area of each informal settlement in Nairobi was computed in hectares. This was done using a digital planimeter.

b) Measurements of various lengths and widths of randomly selected structures within each of the five representative settlements mentioned above, were made on the photographs using a magnifying glass and a ruler. The same were then identified on the ground through field check, and the number of dwelling units on them counted. The average number of units per length and width of the structures per locality was established.

c) Using the field measurement information, a template covering one hectare on the photograph was used as a sampling point and the number of dwelling units within estimated using the averages established in (b) above.

The number of sample points analyzed for each of the five settlements varied. Depending on size, but covered at least 40% of each settlement area. The average number from the samples was then used to calculate the average number of dwelling units per hectare for each of the five settlements.

d) Having established the number of dwelling units per hectare for the five settlements above it was then possible to estimate the densities (dwelling units per hectare) of each of the other settlements by extrapolating the figures from the most comparable settlement among the five. Such comparison was guided by several criteria, for example age of settlement, land tenure (private or public land) as well as prior field knowledge of the settlements.

e) The next step was to estimate the average number of persons per dwelling unit, in each of the informal settlements. This was done by use of existing literature coupled with field verifications.

f) Having estimated the area in hectares, dwellings per hectare and persons per dwelling unit, for each settlement, it was then possible to estimate the total population for each settlement and the total population resident in informal settlements in Nairobi.

# ANNEX 3



## VOLUNTARY ORGANISATIONS IN NAIROBI BY TYPE AND SERVICE PROVIDED

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
1. Action Aid	Support Foreign	Kariobangi Project (1993)	Education	Basic education sponsoring children. Provides books, uniform and food, classroom construction	1,000
			Education Welfare	Technical schools Through other NGO's	
2. African Family Support	local		Welfare	helps poor families become self-sufficient in incoming generating. Health Emotional health (counselling services)	
3. African Medical and Research Foundation (AMREF)	Support-local	Lunga Lunga	Health	Child survival team	
		Wilson Airport		Staff Clinic	
4. Aga Khan Foundation	Support Foreign	Museum roundabout	Education	Aga Khan nursery	235
		Limuru Road	"	Aga Khan P. School	1,263
		Limuru Road	"	Aga Khan Academy	525
		Waiyaki Way	"	Aga Khan H. School	432
		Limuru Road	Housing	Aga Khan Girls Hostel	56
		Limuru Road	Health	Aga Khan Hospital	
Limuru Road	Recreation	Aga Khan Club			

Source: Kenya Country Case-Study on Urban Management by Mazingira Institute 1990.  
(List of NGOs from Directory of Voluntary Organizations in Kenya  
Kenya National Council of Social Services 1988)

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
5. Ananda Marga	Support Foreign	Kangemi	Welfare	Boys Home	10
		Kabete	"	Girls Home	10
		Low-income areas	Education	30 pre-primary Schools Kangemi Training Centre for Teachers (nursery)	
6. Arya Samaj	Support Local		Education	Arya Nursery	
			"	Arya P. School	
			"	Arya Girls H. School Arya Boys School Health Arya Dispensary Welfare Supports Dayanad Orphanage	
7. Association for Education & Development (1977)	Support Foreign	Nairobi West Community & Fellowship centre	Education	Donations, research	
8. Association for the Physically Disabled of Kenya (1985)	Support Local	Lagos Road, City Centre	Special Health	Child arthopedic Clinic Child assessment centre Orthopedic workshop makers of walking aids)	appr. 10 children per day
		Nile Road	Education	Nile Road Primary School (taken over by NCC) for disabled children	
		Kariobangi	Health	Mobile team visits disabled slum children	
9. Amani Counselling Centre	Support Local		Health	Emotional health Training & Educational Programmes	
10 Africa Now	Support Foreign	Korogocho	Health	Nutrition rehabilitation	

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
11 African Wonder Orphans & Widow Help Society	Support Local		Welfare Education	helping orphans & widows	
12 Aid Crescent Medical		Pumwani, Pangani, Kibera, City Centre, Biafra, Eastleigh	Health	Clinics	
13 American Women's Association	Support Foreign		Education Health	Service grants to Schools hospitals and self-help groups	
		Water	donations		
14 Baptist Mission of Kenya	Support Foreign	Shauri Moyo	Education	Adult education, vocational training, nursery school	
15 Baptist Church		Embakasi, Maili saba	Education	Nursery school	
16 Breast feeding information group	Support Local		Health	Child health and nutrition family planning	
17 Chesire Homes Kenya	Support Local	Dagoretti Kariobangi	Welfare	Childrens Homes Home for the aged	130
18 Christian Hostels Fellowship	Support Local	Pumwani	Housing	Boys Hostel	
19 Christian Industrial Training Centre (1958)	Support Local		Education	Vocational Training	265

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED (IF KNOWN)
20 Compassion International	Support Foreign	Kitui Village Soweto and Kangemi Health	Education Christian Counselling		
21 Chandaria Foundation	Support Local	City Centre	Education Health Waste disposal	Donations  has provided waste receptacles in city centre	
22 Church Army in E.A	Support Local	Jogoo Road	Education  Recreation Housing	Nursery School Secondary school vocational Training Adult literacy and Adult education Supports poor children Fields available for youth Community Hall Rooms for night lodging	60-80 160 100-150  54
23 Christian Childrens Fund	Support Foreign	Bahati FHP	Health Housing  Education Welfare	Preventive health care Provideds iron sheets roofing and provided block-making machine  Vocational training Child sponsorship Supports childrent at Kenya Christian Homes Edelvale Home Jacaranda Special School Marian refugees Flooding Project Amani Project	570 children and their parents   61 34 105
24 Catholic Relief Services USCC/ CRS/Kenya Prog.	Support Foreign	Nairobi East, Ngundu, Embakasi Village, Njiru	Welfare & Relief		

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
25 Christian Mission Aid (1986)	Support Foreign	Karen - Kuwinda	Education	Sponsors boys for training two Day-care centre-once a week for pre-nursery children	
26 Church of the Province of Kenya (CPK)	Support Local	Embakasi, Njiru	Education	Nursery School	160
		Mathare Valley	"	Child Sponsoring	
		Pumwani	"	Vocational training for unmarried mothers	
		All Parishes	"	Pumwani High School	
		Majengo - CITC	"	Nursery School	
		Kibera	"	Vocational Training	
		"	"	Youth activities and Adult Education	
"	"	Nursery Schools(2)			
27 Catholic Church (Nairobi Diocese)	Support Foreign	Kibera	Housing	Dispensary	
		"	Health	Vocational Training	
		"	Education	Nursery School	
		Woodley	Education	Vocational Training	
		Makadara	Welfare	Unable adults & Children	
		Pumwani & Kasarani	Education	Primary School	
	Health	High School, Polytechnic			
		Community Centre			
		Dispensary			
		Nutrition Centre			
28 Church of God of Prophecy		Kibera	Housing	Low cost housing - soil blocks & fibre cement roof tiles	
29 Church of God Adult Education		Kibera - Laini Saba	Education	Nursery	

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
30 Church of Assembly		Ruai 1, Ruai 11, Ruai 111 Embakasi Ranching Co.op.	Education	Nursery School Ruai Village Polytechnic	
31 Daynod Home	Support Local		Welfare	Childrens Home	
32 Eastleigh Community Centre	Support Local	Eastleigh	Education	Vocational Training Community Development	
33 Edelvale Trust	Support Local	Donholm	Welfare Education	Edelvale Girls Home Edelvale Pri. School (taken over by NCC) Vocational Training	50
		Westlands (Waridi Villa) Buru Buru	Housing Education Welfare	Girls Hostel Nursery School Jamaa Home for unwed mothers	100
			Health	Jamaa Maternity	47 48
34 Friends World	Support Foreign	Kibera-Mashimoni	Education	Vocational Training for women	
35 Food for the Hungry International	Support Foreign	Ruai	Welfare Health Water	Famine relief Child Sponsorship Food Nutrition Water & Agriculture development	
36 Faith Homes of Kenya	Support Local		Education Welfare	Nursery School Primary School Childrens Home	

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
37 Family Planning Association of Kenya	Support Local		Health	Family Planning Clinics Youth guidance and counselling	
38 Family Planning International Association	Support Foreign	Kawangware NCC Clinics	Health	Assistance to NCC clinics	
39 Hudley school for the Blind	Support Local		Education	Printing Books for the blind and partially blind	
40 Islamic African Relief Agency	Support Foreign	Kariobangi	Health	Health Centre	
41 Islamic Foundation	Support Local		Welfare	Assistance to widows and the disabled	
42 Institute of Culture Affairs	Support Local	Mathare, Korogocho Pumwani, Kibera Kawangware	Health "	Training Community based health workers Kabiro Health Centre	
43 Kenya Ass. for the Welfare of	Support Local	Mathare Riruta Karen	Health " "	Clinic(free) " "	
44 Kenya Christian Homes(Dr Bernados)	Support Local	Langata Road	Welfare	Childrens Home Foster Parent services	83 83

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
45 Kenya Society for the Blind	Support Local	Kilimani Primary School	Welfare	Revolving loan scheme to help the blind	20
			Education	Integrated Programme where blind children learn alongside sighted ones - Special equipment provided. Itinerate teacher - to identify blind students	
46 Kenya Society for the Mentally Handicapped	Support Local	South C(headquarters)	Recreation	Taking book library 250 books	
			Special Education	Child sponsoring Donation of teaching materials to schools	
47 Kenya Society for Deaf Children	Support Local		Education		
48 Kenya Water for Health Organisation	Support Local	Kibera	Water	Provided water tanks and pipes	14 women groups
			Sanitation	20 pit latrines	
			Housing	Provided machine for stabilised blocks	
49 Kenya Womens Society	Support Local		Health Education	Primary health clinic Vocational training	
			Education Health	Supports Starche Boys. Nairobi Girls Centre. Women Cancer Ward at Kenyatta Hospital and Mathari Hospital	
50 Kariobangi Baptist Parish	Support Local	Dandora	Education Health	Nursery School Feeding Programme	

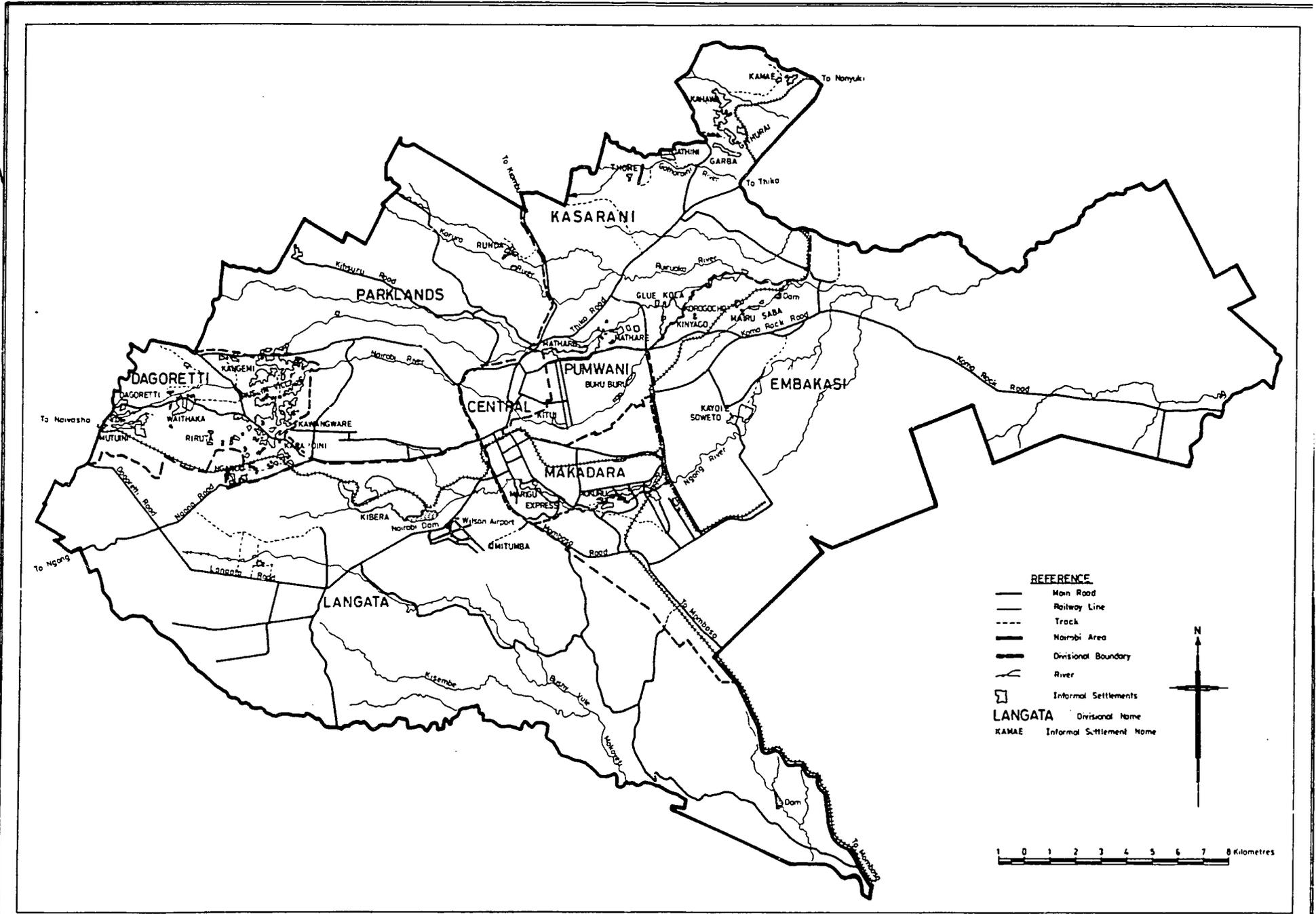
ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
51 Kenya Red-Cross Society	Support Local	Makadara	Welfare Relief Health	Helps the disabled and the aged Training First Aid	
52 Kibera Mosque	Support Local	Kibera-Makina	Welfare	Assisting Children	
53 Lions Club of Nairobi	Support Foreign		Health Education Welfare	Donations	
54 Mama Fatuma Goodwill Childrens Home	Support Local	Eastleigh	Welfare	Childrens Home	
55 Norad	Support Foreign	Kibera	Education	Vocational Training	
56 National Council of Churches of Kenya (NCCCK)	Support Local	Mathare Valley Mathare and Dandora	Health Housing	Primary Health Care Site and Services scheme in conjunction with the Government	
57 New Life Mission(1985)	Support Local	Ongata Rongai	Welfare	Childrens Home	20-40
58 Nairobi Family Support		Kibera-Makina	Welfare	Assisting families with handicapped children	
59 Nairobi Dam	CBO	Nairobi Dam Estate	Waste disposal	Garbage collection and disposal	
60 Oxfam	Support Foreign		Health Welfare	Donations through other organisations	

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
61 Population & Health Services	Support Foreign	Pangani Mathare	Health	Family Planning Clin.30-40days Family Planning Clinic	
62 Rotary Clubs of Kenya	Support Local		Welfare Health	Donations Education	
63 Round-table Nairobi	Support Local		Welfare	Donations	
64 Siloam International Kenya (1986)	Support Foreign	Korogocho Kibera	Education " "	Sponsors Pri. Education " " " Nursery School	70 25 60 - 70
65 St. John's Council for Kenya (1939)	Support Local	Nairobi	Health	24 hour Ambulance service - 2 vehicles	
66 St. John's Community Centre (1956)	Support Local	Pumwani	Welfare Education	Feeding the aged Family welfare Vocational Training Adult Literacy	
67 Starehe Boys Centre (1959)	Support Local	Starehe	Education	Starehe Boys Pri. Sch. Starehe Boys H. School Child Sponsoring	1000
68 SOS Childrens Village (1971)	Support Foreign	Buru Buru	Education Welfare	Nursery School Technical School Childrens Home Youth Home	

ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
69 Salvation Army	Support Foreign	Pumwani Quarry Road	Housing Education	Girls hostel Nursery School	
		Kiambu Road Embakasi Soweto Village	Welfare Welfare Education	Feeding the aged Home for the Aged Nursery School child sponsorship	
70 SNV/ Netherlands Development Organisation	Support Foreign	through other organisations	Water		
			Education	Technical training Small business	
71 Save the Children Fund	Support Foreign		Education	Sponsors secondary education	
			Welfare	development	
72 Soul Winning Eva Church		Lunga Lunga Industrial Area	Education	Nursery School	
				Vocational Training Child sponsorship	
73 Undungu Society of Kenya	Support Local	Mukuru/Kitui Village Mathari, Dandora	Housing	Low cost housing	
			Welfare	Parking Boys Homes(3) Small busines loans Youth Centres	
		Mathari, Kitui, Ngei l&ll, Dandora, Gitathuru	Recreation		
		Mathare	Education	Informal education	200
		Pumwani	"	" "	100
Ngomongo	"	" "	96		
74 United Muslim Womens Ass.	Support Local	Eastleigh	Health	Vocational training Community health	
			Education	Tauheed Muslim School Child sponsorship	
75 World Vision	Support Foreign	Pumwani	Education	Nursery School Child sponsorship	

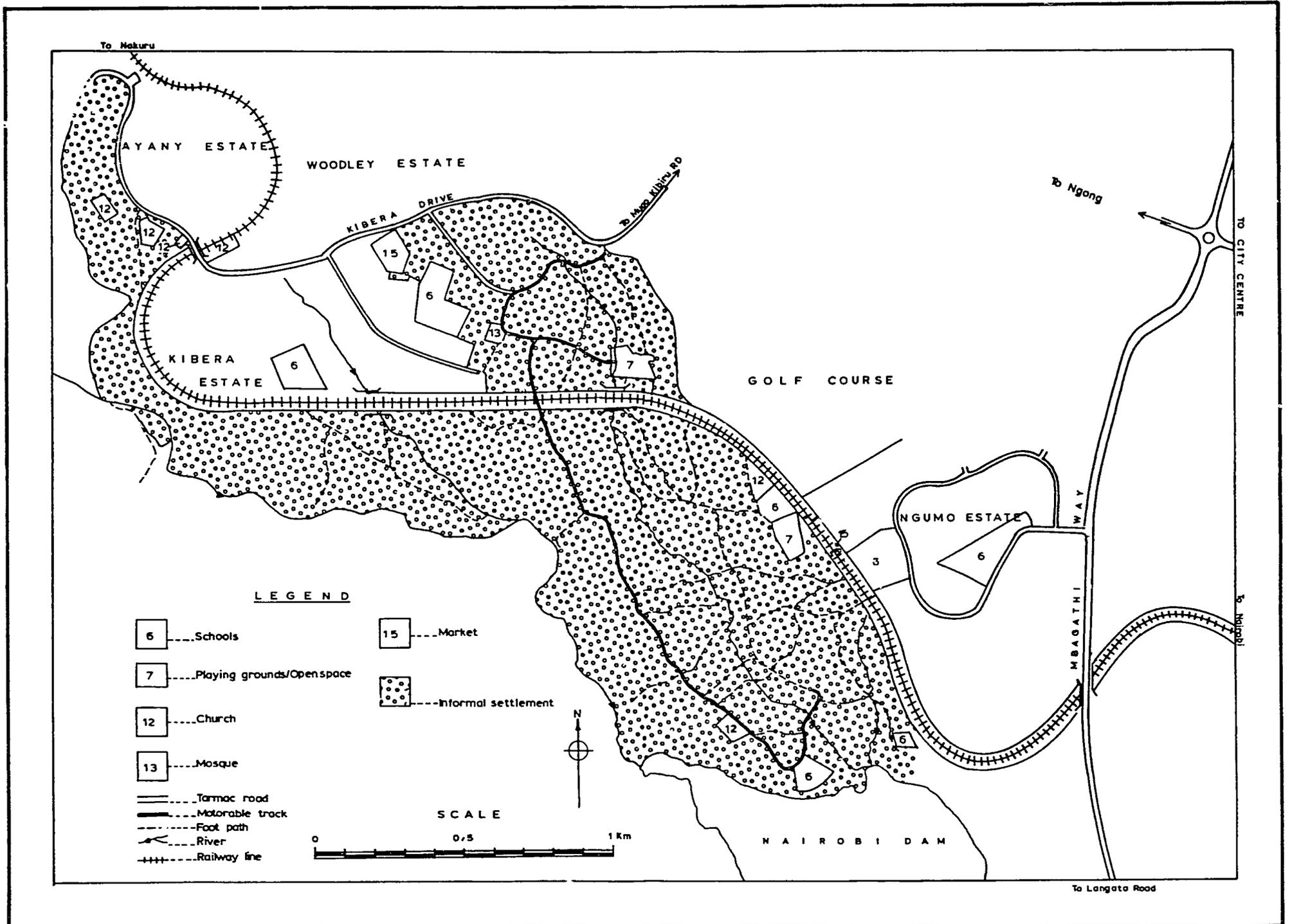
ORGANISATION	TYPE	PROJECT/LOCATION	SERVICE	ACTIVITY	NO OF PERSONS SERVED(IF KNOWN)
76 World Concern	Support Foreign	through other organisations	Education	Vocational training	
77 Young Womens Christian Association of Kenya	Support Foreign		Housing Education	Womens hostels(3) Vocational Training Daycare Centre	
78 Young Mens Christian Association of Kenya	Support Foreign	Nairobi Central, Shauri Moyo & Nbi	Education Recreation Housing	Nursery Schools Vocational training Indoor/Out sports Mens hostels	
79 Youth Christian		Makadara	Welfare	Assisting unable adults and children	
80 Zakayo Rukare Kisumu Ndogo		Kisumu Ndogo	Education	Nursery School Adult education Vocational Training	

# INFORMAL SETTLEMENTS IN NAIROBI



15

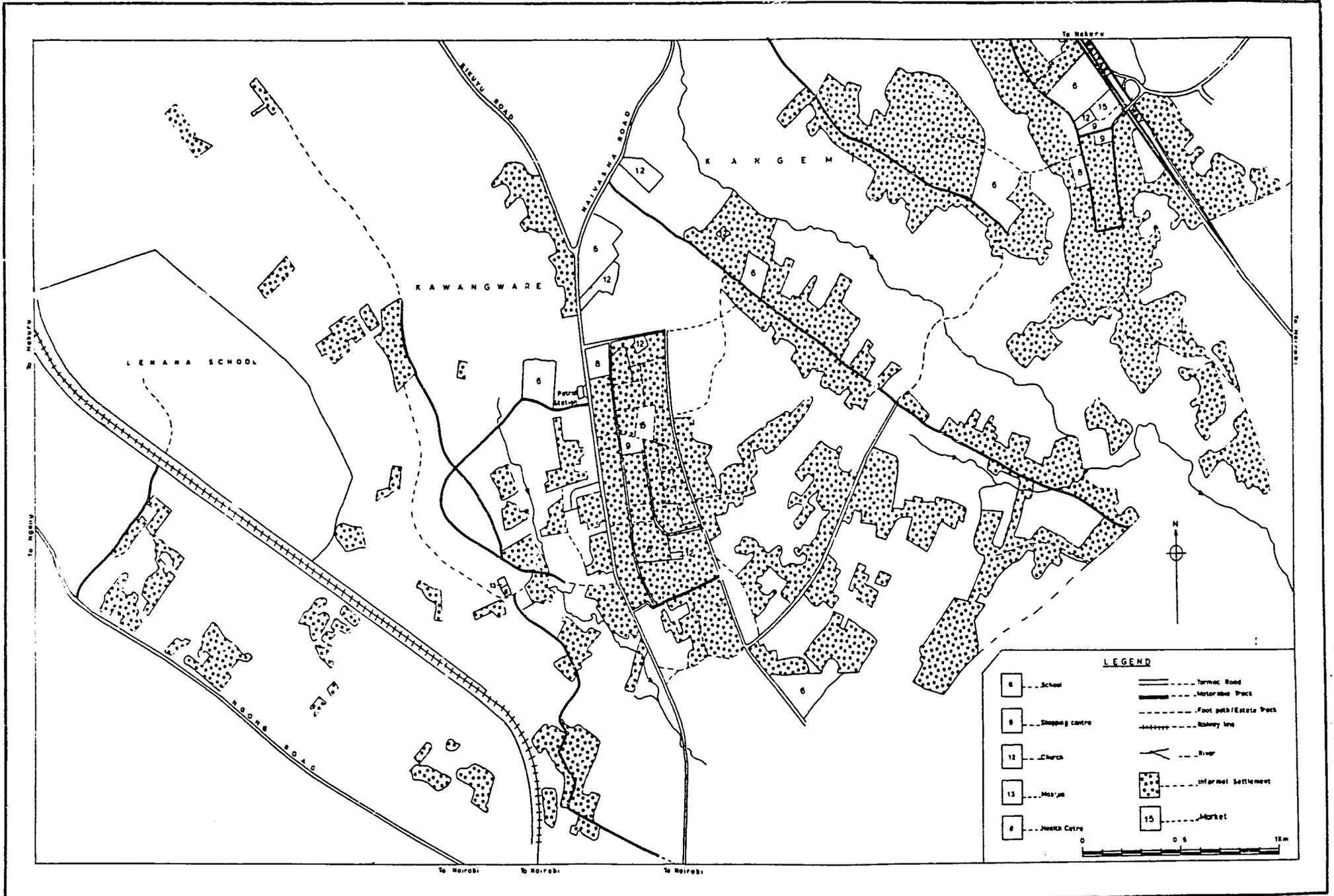
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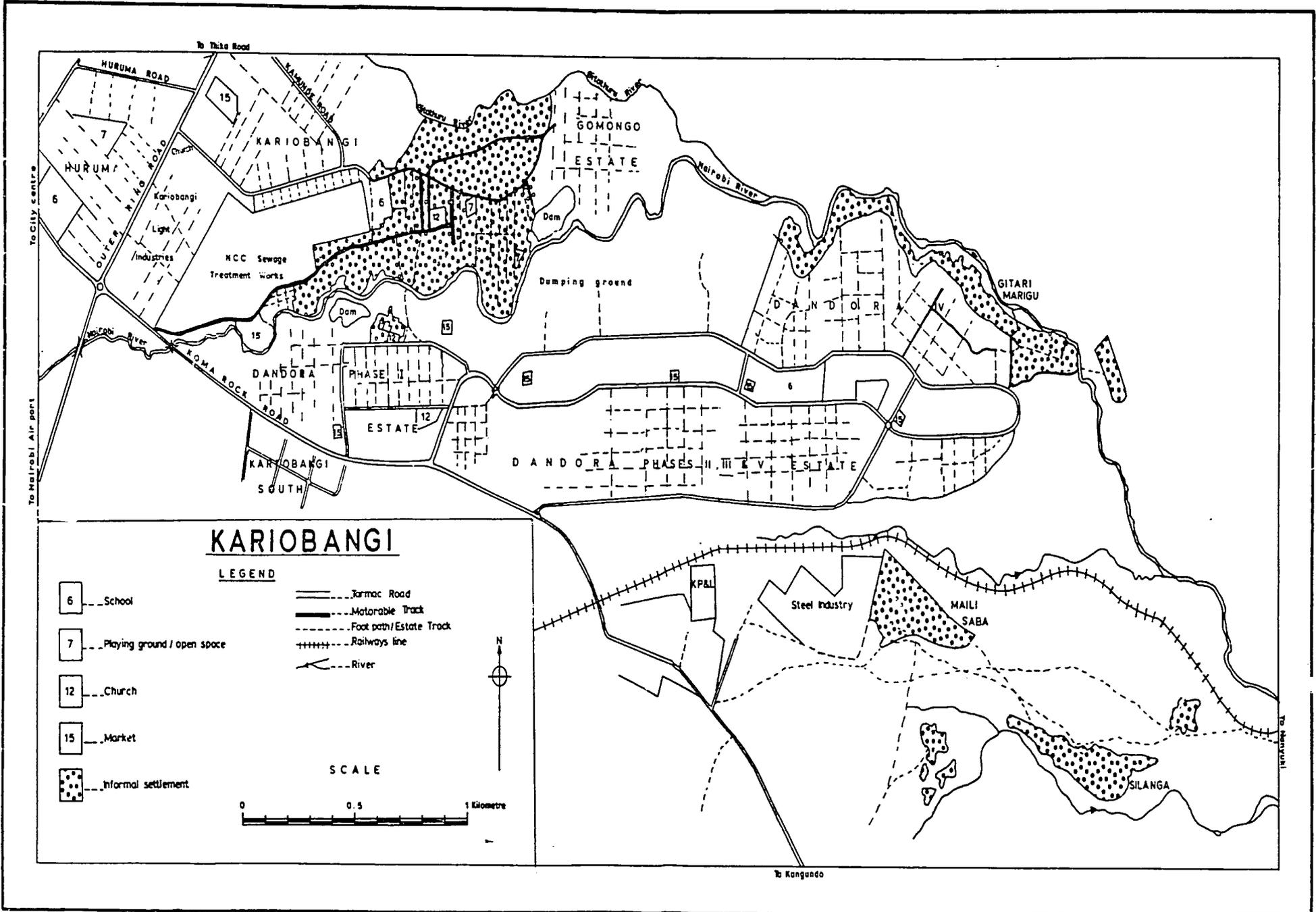


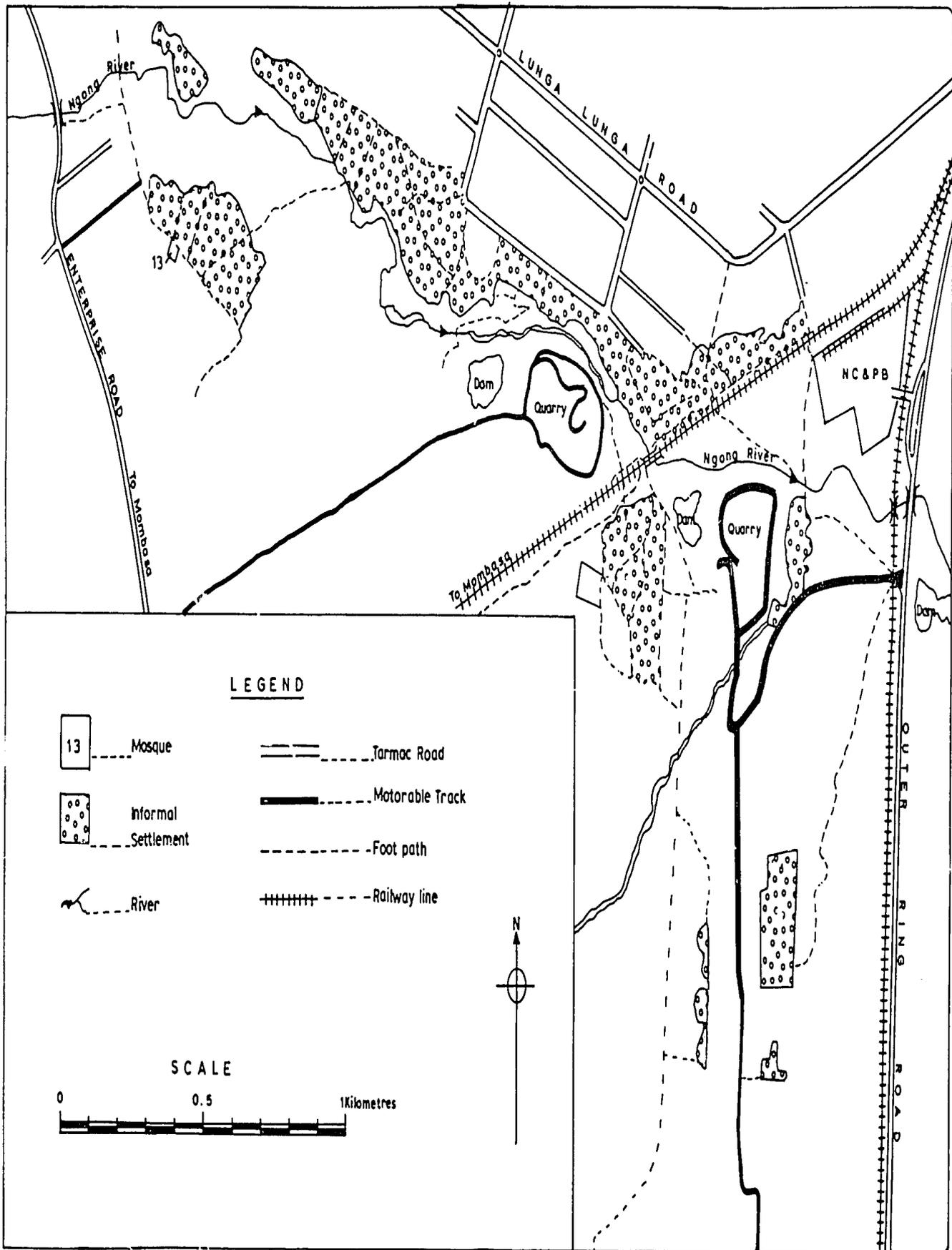
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MATRIX DEVELOPMENT CONSULTANTS

# KANGEMI / KAWANGWARE



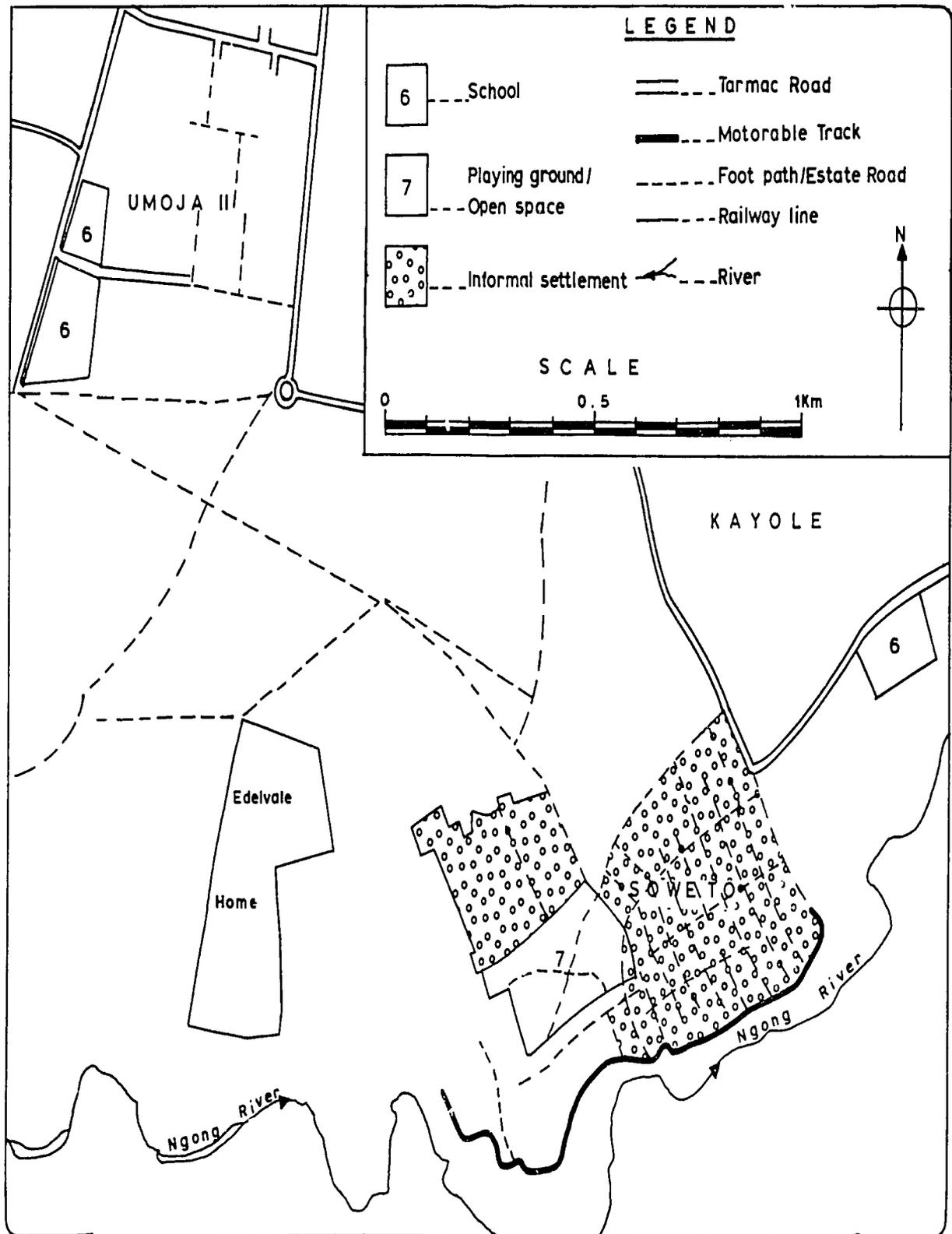




SOURCE. Aerial photographs of Jan 1993  
at 1 : 10000

MATRIX DEVELOPMENT CONSULTANTS

# SOWETO



SOURCE: Aerial photographs of Jan 1993  
at 1:10000

MATRIX DEVELOPMENT CONSULTANTS.