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**INFLUENCE OF ROAD TRANSPORT SYSTEM ON GROWTH AND DEVELOPMENT OF
HUMAN SETTLEMENTS: A CASE OF MLOLONGO IN MACHAKOS DISTRICT, KENYA**

By

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**A THESIS SUBMITTED IN PART FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF ARTS IN PLANNING IN THE UNIVERSITY OF NAIROBI**

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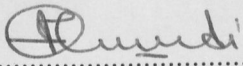
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Dedication

Declaration

This project is dedicated to my mother
Mrs. Janet K. Owino

This thesis is my original work and has not been presented for a degree in any other university.

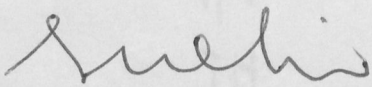
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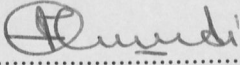
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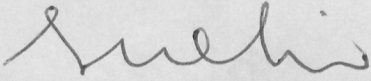
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As many before us have noted, this project has benefited from the cooperation and support of many individuals. To mention everyone who contributed to this undertaking would fill several pages. I have thus decided to limit my acknowledgements to those who went out of their way to help me in my endeavor, and those who encouraged me during those times when the completion of the task seemed so far away.

I must express my gratitude to my supervisors Dr. Samuel Obiero and Mrs. Dorothy Aborjo who gave me insight into the relevant issues to this work. Their support and general guidance turned this work into a thesis. I profusely thank all academic staff members of the Department of Urban and Regional Planning namely Professor Ngaa, Professor Ndegwa, Professor Obudho, Dr. Mwangi, Dr. Ngugi, Mr. Malochi, Mr. Mairua, and Mrs. Njiru for offering me unlimited knowledge and hints during the seminars held.

Special thanks also go to my colleagues, Ambiro, Orya, Muthyah, Getangita and Sabat for providing me a conducive academic environment.

Finally, I owe a debt of gratitude to the University of Nairobi for offering me a University Scholarship to enable me pursue my studies and to the Kenya Government for granting me a two year study leave and research authorization to collect data for this thesis.

To all those listed above and whom I may have not mentioned, I express my heartfelt thanks.

Gideon, Fredrick Owino

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Omondi, Fredrick Owino

Abstract

Recommendations are mainly based on the guidelines to control and guide development of human settlements along all the major transport systems in Kenya. The study recommends that a Transport system as an essential land use activity has brought many changes on the other land uses and values. One of this has been the growth and development of human settlements. Initial scattered human settlements in most cases grow up to become urban centres often in unplanned ribbon manner which pose challenges for rational land use planning and smooth traffic flow. This unplanned haphazard developments form a major obstacle because they are usually not controlled. As a result of this lack of control, they end up resulting in the mismanagement of the scarce resources available in these areas.

The study went further and examined the rationale for development of human settlements along road networks in Kenya. It also examined what leads to haphazard development of the settlements and their effect on road network. Lastly, this research examined the challenge of haphazard development of human settlements, and market centres along road transport networks in Kenya.

The study hypothesized that road transport system influences growth and development of human settlements along major roads. The study's objectives were thus: to identify factors which have favoured the growth and development of Mlolongo settlement along the Nairobi – Mombasa road: to examine the socio – cultural and environmental effects created by the relationship between settlement patterns and road transport network: and finally to come up with intervening policy framework which can be advanced to control and guide growth and development in human settlements in relation to transportation system in Kenya.

Sources of primary data included a field survey in which guided interviews, household questionnaires, personal observations, photography, mapping, land use survey and key informant interviews were used to collect relevant data.

The study found out that the weighbridge and the Nairobi – Mombasa road were the main factors which influenced the growth and development of Mlolongo. Other factors of significance were the influence of Nairobi, close proximity to industrial area, cheap and flat land.

Recommendations are mainly based on the general policy guidelines to control and guide development of human settlements along all the major transport systems in Kenya. The study recommends that a good management plan be prepared to control and guide the growth and development of Mlolongo center. It also recommends that human settlements should be integrated into the transport system and lastly, it recommends that a long term physical development plan be prepared.

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List of Abbreviations

CBO.....	Community based Organization
GIS	Geographic Information System
NGO	Non Governmental Organization
U.N.E.P.....	United Nations Environmental Programme
U.S.V.....	Unimproved Site Value

CHAPTER 1: INTRODUCTION

1.1 Background

Growth and development of human settlements often goes hand in hand with transportation system. Goodman (1968) notes that in the pre 19th century cities, urban settlements were gradually small enough to permit travel by foot, horse, cart or other primitive means. Mass transportation developed as a means of carrying people in cities from the mid 1800s. Urban development extended into the countryside along fastest travel routes, with suburban railroad stations giving birth to the suburbs. Water transport for example led to early development of human settlements along the East African Coast. With the emergence of the railway transport in the 20th century, human settlements sprung up at a very fast rate in the interior. The railway made spatial division of labour possible and so opened the way for the growth of human settlements. Morlok (1978) indicates that most early settlements were located at points of some transportation significance. Goods and persons had to be transshipped at these points hence there was a need for terminal facilities, warehouses, e.t.c.

Throughout the history of settlements, the need to maintain good accessibility has been an important force in determining the location of settlements and the form and internal layout of the individual towns and cities (Whittick, 1974). Many of these settlements have continued growing over the centuries to become many of the largest cities. Settlements also grew at points where overland transport routes intersected or crossed, these being natural stopping places and points of greatest accessibility to other places. The advantages of engaging into trading activities with one's neighbours tended to reinforce the location of settlements at points of ease of transportation access (Morlok, op. cit). Hansen (1959)

demonstrates that locations with good accessibility had a greater chance of being developed, and at a higher density, than remote locations. The recognition that trip and location decisions co-determine each other and that therefore transport and land use planning needed to be coordinated, quickly spread among planners.

Apart from accessibility as a factor influencing location of human settlements, transport costs also play a major factor in location. Transport costs are easier to quantify and they have tended to centralize activity. It is impossible to avoid a production oriented view of location. Larger towns have gained by capturing much of the multiplier impact of increased enterprise on the land and in manufacture. They have increased their importance as social and service centres yet it is worth noting that the consumer preferences made possible by increased efficiency and higher real incomes created, not only new suburbs, but also new settlements based on leisure rather than production. Consumer preferences in the twentieth century have also influenced a move to rural areas and smaller towns with pleasant environment. Such consumer and environmental influences on location are of increasing importance yet they have been neglected due to the continued domination of theories and policies pre-occupied with production and distribution of goods.

Innovations in road transport technology have had, at times, a marked impact on both the settlement pattern and the structure of urban centers. The network of roads, which were constructed between 1900 and 1945, played a major role in the growth and development of human settlements and townships. They were mainly used in facilitating the export of raw materials and import and sale of manufactured goods (Obudho, 1981). Transportation is the result of derived demand, which is attributed to the need

for goods and services in specific places at specific times (Catanese *et al*, 1988: 310). It is transportation that makes a community to exist and to survive. This is because it enables the community to be supplied with food and other necessities of life. Mairura *et al* (1994) notes that the quality of life in urban settlements and the prosperity of urban economy are highly dependent on effective transport system, among other things. An efficient transport system being affordable to all, time efficient and safe.

Road transport is an integral part of the functioning of any society. There is a close relationship between road transport and the style of life, the range and location of productive and leisure activities, and the goods and services which will be available for consumption. Advances in road transport have made possible changes in the way people live, the way in which communities are organized and the style of life. This is in the sense of the range of activities, both economic and none economic, that individuals engage in. In most developed urban centres, a large fraction of the working population travel to and from work, not to mention all the travel for shopping and social reasons. Goods are routinely transported over extremely long distances to provide those material things which are part of the expected standard of living.

As concerns the non-transportation elements of the road transport networks located within human settlements, both large and small communities have experienced the impacts on the environment. These impacts have very often been detrimental to the quality of life, largely because little thought has been given to the possibilities of locating, designing and using the streets as a means of enhancing the community.

In the near future, more places will become urban than rural (Habitat, 1978). As such national and regional networks of road transport must be supplied. This will support a physical pattern of human settlement locations considered in the public interest. The task of rapidly increasing complexity is to arrive at internal road transport system solutions that overcome the congestion and high social costs of urban concentrations. Lastly there is a need to view road transport, location, and design decisions as an integral part of a strategy to improve the quality of life in human settlements.

1.2 Statement of Research Problem

Transport is one of the major factors determining the spatial organization of urban areas. Medieval cities were built for walking, and this required that living and working were close together (Hansen, 1959). The railway made spatial division of labour possible and so opened the way for the growth of human settlements. Rapid transit and the private car have facilitated the expansion of metropolitan areas over wider and wider territories. However, the growing separation of human activities demands even longer trips and greater volumes of traffic with all their associated problems of congestion, traffic accidents, energy use, pollution and land consumption.

Bruton (1978) argues that the element in man-made environment is determined by transportation. In urban areas, transportation determines people's decision on where they will live, work, shop and play. Commercial activities are also able to choose optimum location for their production and distribution of activities due to accessibility. Industries are located in areas served by good roads. This is to enable the industries to transport their produce to the markets without many delays. In case the transport network is poor, then certain industries end up incurring great losses as it takes considerable time for their

produce to reach the market. This in turn leads to the reduction in income levels of these industries. As a result of the haphazard and unplanned human settlements and market centres along road transport networks, the problem of inaccessibility ensues, thus affecting the operation of these industries.

The development of a road transport network has a number of impacts and implications. These are both positive and negative. Land values along the roads are often high because of accessibility thus very competitive. Due to competition, there is likely to be congestion. Space at the centre of activities or towns gains more value and value declines outwards. Growth of unplanned human settlements along the roads, in turn, creates constraints and hazards for road transport. The study examines the scope of planning principle and standards in force for guiding human settlements along road networks in Kenya and the current practice for developmental control.

A transportation system determines the way in which growth proceeds. In Kenya, road transport has significantly influenced the growth and development of human settlements before and after independence. Areas served by major roads are characterized by increased human activities such as trade and the emergence of new settlements. Such a problem is evident when traveling around Kenya, whereby it can be noticed that where towns emerge, they seem to be haphazardly located. Others are located in a way that they have no bearing or they cannot easily be accessed. Most of these towns develop as a result of transport related activities. In recent years, many of the settlements have tended to grow very fast and in most cases are not planned. Uncontrolled development usually encroaches on the travel way and adds to the undesirable conditions of adjacent neighbourhoods. These developments often become unmanageable and get out of control. These activities in due course lead to various

conflicts, which in turn call for, induced planning interventions. As a result of this phenomenon, spatial land use planning and design are called for but it is usually too late to bring the situation back to normal. The end result is that the developments are not harmonized and legalized.

The haphazard development of human settlements along road network system is one of the major Human settlement development is increasingly unsustainable due to ineffective planning methods, inadequate development control and the fallen standards of services such as poor road maintenance of public transport. The haphazard development of human settlements along road network system is one of the major problems in Kenya. These human settlements need to be controlled following the enactment of Physical Planning Act No. 6 of 1996 which has a view to ensure that development takes place in an orderly manner and ensure that adequate provision is made for transportation, public purposes utilities and services, commercial, industrial, residential and recreational areas including parks and open spaces.

Mlolongo settlement is a centre which has been growing very fast over the last few years. It is taking a linear type of development along the Mombasa road. This can be likened to Arturo Soria y Mata's (1844 – 1920) linear city (La Cindad Lineal). Hall (1989) notes that this linear city was to be developed along an axis of high speed, light intensity transportation from an existing city. Arturo's argument was that under the influence of new forms of mass transportation, cities were tending to assume such a linear form as they grew, an argument which had some justification at that time. This type of linear development has various disadvantages associated with it. In the case of Mlolongo, which also tends to take this type of development as a result of Nairobi - Mombasa road and other factors yet to be determined, control measures have to be taken. Doxiadis (1968) notes that the linear city is not

feasible. This is because the surface of the earth is three dimensional and the creation and functions of a linear city is impossible.

The haphazard development of human settlements along road network system is one of the major problems in Kenya. The purpose of this study was to identify the factors influencing the development of human settlements along Kenya's road network, effects of such settlement patterns and come up with appropriate intervening policy framework to control and guide the growth and development of these human settlements, with a case study of Mlolongo, along Nairobi – Mombasa road.

1.3 Research Questions

The study sought to answer the following questions: -

- i) What factors have favoured the growth and development of Mlolongo settlement?
- ii) What are the socio – cultural, economic and environmental effects created by the relationship between settlement pattern and road transport system in Mlolongo?
- iii) Which intervening policy framework can be advanced to control and guide growth and development in human settlements in relation to transportation system in Kenya?

1.4 Study Objectives

The main objective of this study was to examine the influence of road transport system on the growth and development of Mlolongo settlement along the Nairobi – Mombasa road.

The specific objectives of the study were to: -

- i) Identify factors which have favoured the growth and development of Mlolongo settlement along the Nairobi – Mombasa road.
- ii) Examine the socio – cultural, economic and environmental effects created by the relationship between settlement patterns and road transport system.
- iii) Come up with intervening policy framework which can be advanced to control and guide growth and development in human settlements in relation to transportation system.

1.5 Research Hypothesis

The main issue in this study was that road transport system plays a positive role in the growth and development of human settlements. The study examined the extent to which lack of development control has contributed to haphazard development of human settlements along Kenya's road transport system. Human settlements not only flourish as a result of transportation network but also as a result of transportation systems such as terminal facilities.

In this study, road transport system has been used as a tool for growth and development of human settlements. The hypothesis can thus be stated, “ Road transport system has significantly influenced growth and development of human settlement in Mlolongo.

1.6 Scope and Significance of the Study

The study of transportation as an aspect of spatial interaction has occupied the attention of many planners for many years and has been a lively aspect of the discipline. It is concerned with transportation development, location and movement of people and goods within the territorial – economic complexes of countries and regions. Many planners have recognized its interrelationship with the location of industry, agriculture, population distribution, cities and natural resources. In a developing country, such as Kenya, there has been a widespread concern for transport in the context of the desire to promote rapid economic and social development. It is opportune that a study of road transport system and its influence on human settlements was undertaken at a time when the public should be made to know the social and economic roles of the road transportation infrastructure.

The study looked at: -

- i) Socio – economic and physical characteristics of the study area.
- ii) Historical growth and development of Mlolongo.
- iii) Land ownership and allocation.
- iv) Traffic flows in the study area.
- v) Positive and negative impacts of road transport system on land use, land values and human settlements in Mlolongo.
- vi) Implications of the above on the spatial land-use planning and human settlements in Mlolongo.

Recommendations have been made for proper land –use planning and appropriate use of land in Mlolongo in harmony with other land-uses in Kenya. Poor use of land along road transport system in Mlolongo has led to growth and development of human settlements against a background of insufficient services such as water and sewerage thereby lowering the standards of life of residents. These services have also become expensive as a result of the rapid growth of these settlements. The study has come up with the impacts and subsequent implications of road transport system on the spatial land-use planning and human settlements in Mlolongo and also policy proposals which may be used to counter negative consequences of the road transport system.

1.8 Definition of Key Terms/ Concepts

1.7 Organization of the Study

The study was mainly focused on the influence of road transport system on the growth and development of Mlolongo settlement.

Chapter one being the introductory chapter, gives the background to the research problem. In this chapter, study objectives, justification, scope and limitations are spelt out. Research methodology, analytical framework and study limitations are also spelt out in this chapter.

Chapter two is the literature review which has helped in the identification of gaps and a conceptual framework.

Chapter three gives an analysis of the study area in details. This includes the geographical and historical background to the study area among others.

Chapter four analyses the data collected by relating it to specific research objectives. This chapter identifies factors which have led to Mlolongo's growth, reasons leading to haphazard development, planning challenges experienced and effects of road transport system in the study area. Emphasis is on visual aids such as photographs, maps, tables and bar charts.

1.8.3 Land values

The last chapter proposes intervening policy framework which can be advanced to control and guide growth and development in human settlements in relation to transportation in Kenya.

1.8 Definition of Key Terms/ Concepts

Most of the terms used are clear day to day language and do not need further definitions but for the general reader, certain technical terms need both operational as well as general definition to show what they mean within the context of this study. Only those terms whose meanings are not explained within the text are dealt with here. The rest are explained within the text.

1.8.5 Accessibility

1.8.1 Transportation / Transport

The movement of people and goods as opposed to the movement or flow of information and ideas. The terms transportation and transport have been used interchangeably without assigning specific meaning to where one is used and not the other, as essentially they mean the same thing.

1.8.2 Road Transport System

Defined as the location in space along which passengers and/or freight or goods flow. It also includes other transport related systems namely the weighbridge, petrol service stations and garages.

1.8.3 Land values

Land value is the present value of a stream of income expected from land in the specified future. This stream of income is the periodic rent or income receivable from land or expected as net yield from the produce of land (Balchin, 1986).

1.8.4 Human settlements

Means built up locations in space designated for various activities of man. It may be a road and other structures from which or where people provide for themselves the necessities of life.

1.8.5 Accessibility

Measurement of the spatial distribution of activities about a point, adjusted for the ability and desire of people or firms to overcome separation. Black (1981) defines accessibility as the concept which combines the geographical arrangements of land use and the transport that serves these land uses. Accessibility is a description of how conveniently land uses are located in relation to each other, and how easy or difficult it is to reach them via the transport network.

1.8.6 Land use

It is part of the larger process of city planning. It is basically concerned with the location, intensity, and amount of land development required for various spaces – using functions of city life.

1.8.7 Policy

A statement and a predetermined guideline that provides direction for decision making and taking action (Hudson, 1970).

1.8.8 Congestion

A condition of any transportation facility in which service demand exceeds capacity, resulting in increased delays for the uses of that facility.

1.8.9 Development

The carrying out of building, engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any buildings or other land (Cullingworth, 1982). According to the Physical Planning Act (Cap 286), development is defined as the making of any material change in the subdivision of any land which is termed as class A development and the erection of such buildings or works and the carrying out of such building operations, as the minister may, from time to time, determine, which is termed class B development (GoK, 1996).

1.8.10 Growth

Physical increase in numbers.

1.9 Research Methodology

1.9.1 Study Area

In order to adequately address the stated problem and broad objective, the following methodology was used. The first step of the study involved carrying out a thorough literature review of past studies on roads, human settlements and the influence of road transport system on growth and development of human settlements. as well as development control in similar areas. This review of literature followed the basis on which the study proceeded. The literature review made the researcher clearly understand the study problem.

The second step involved carrying out a reconnaissance survey of the study area so as to have good background knowledge. This familiarization tour which involved observations influenced the sample design.

The third step was the administration of the pre – survey questionnaires with a view of testing their applicability and relevance in the field. This exercise enabled amendments to be made so as to come out with workable questionnaires.

The fourth step was the administration of the final questionnaires with a view of collecting desired data.

The fifth and last step was data analysis. It involved the analysis of data collected both from the field and existing literature.

1.9.1 Study Area

To efficiently evaluate the influence of road transport system on the growth and development of human settlements in Kenya, a case study was made in Mlolongo. It is a market center in Machakos district in Eastern province. The location of Machakos district in Kenya is shown on map 1.1. The center is in Mavoko Municipality (Map 1.2) and is located along the Nairobi – Mombasa Road which is an International Trunk Road. The distance from Nairobi to Mlolongo is approximately 20 km.

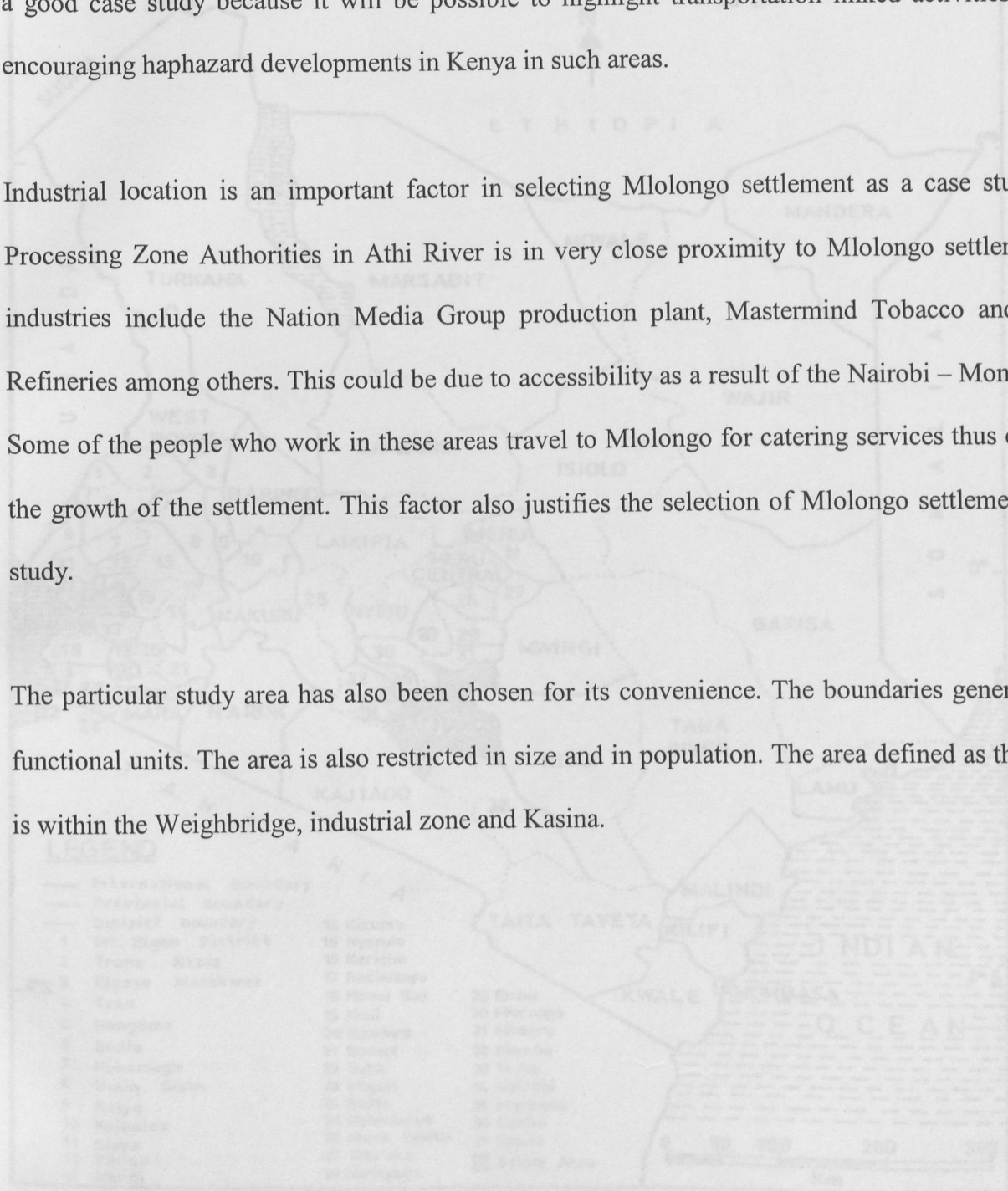
Mlolongo settlement was chosen as a study area due to a number of factors. The most important factor is that Mlolongo settlement is situated along an International Trunk Road. This road links Mombasa and Nairobi which are centers of international importance.

The section of Mombasa road along Mlolongo settlement is characterized by very slow movement of vehicles. This can be attributed to the fact that there is a weighbridge in that area and heavy vehicles have to diverge from the main road to the weighbridge. The duration of time taken at this place has partially led to the development of facilities such as hotels and lorry parks in Mlolongo. The weighbridge thus makes the area suitable as a study area.

Mlolongo settlement is very representative of a haphazard and unplanned settlement which is growing very fast. Being in Mavoko municipality, it should have a plan to aid in its development. This makes it a good case study because it will be possible to highlight transportation linked activities which are encouraging haphazard developments in Kenya in such areas.

Industrial location is an important factor in selecting Mlolongo settlement as a case study. Export Processing Zone Authorities in Athi River is in very close proximity to Mlolongo settlement. Other industries include the Nation Media Group production plant, Mastermind Tobacco and Kapa Oil Refineries among others. This could be due to accessibility as a result of the Nairobi – Mombasa Road. Some of the people who work in these areas travel to Mlolongo for catering services thus encouraging the growth of the settlement. This factor also justifies the selection of Mlolongo settlement as a case study.

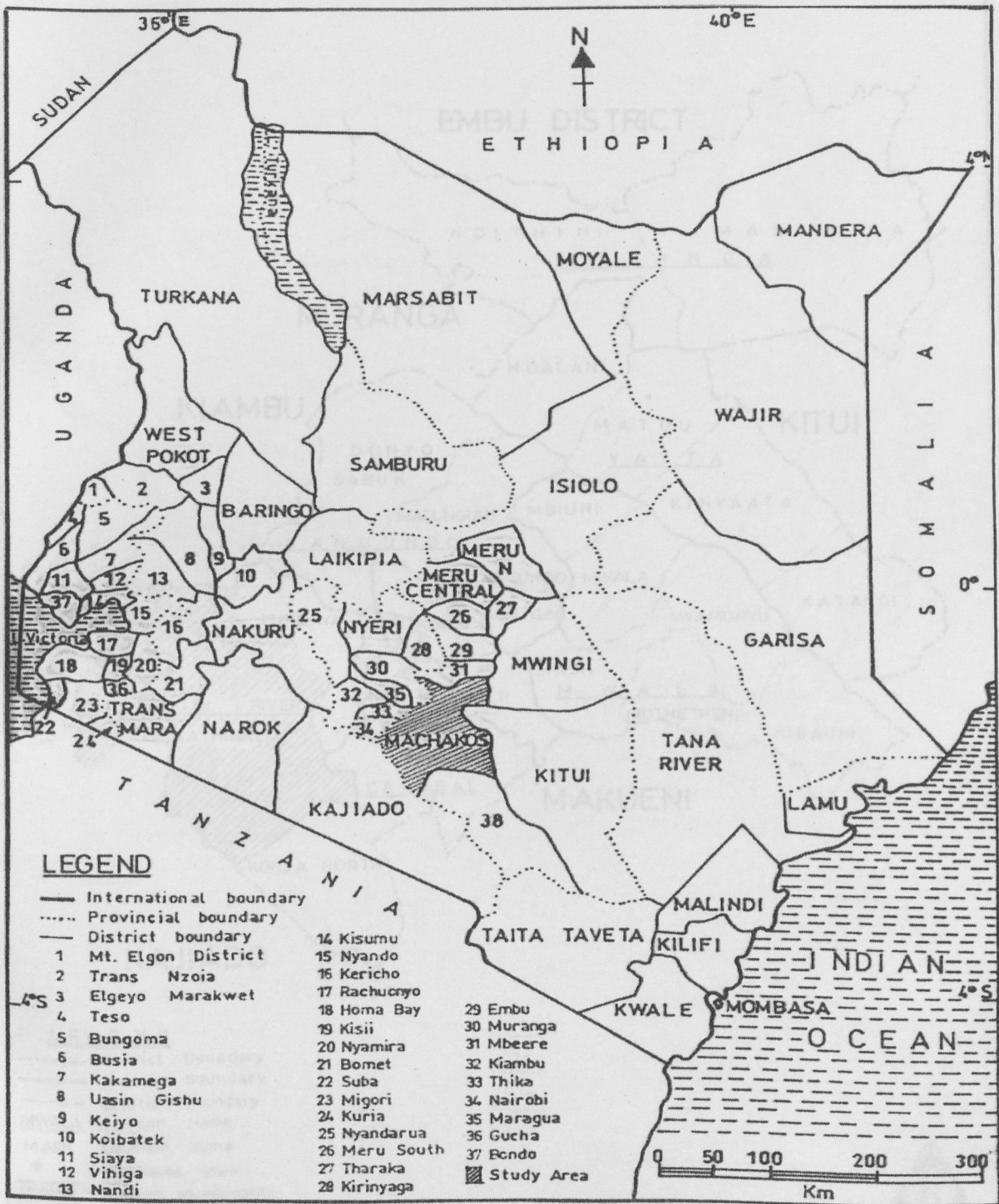
The particular study area has also been chosen for its convenience. The boundaries generally enclose functional units. The area is also restricted in size and in population. The area defined as the study area is within the Weighbridge, industrial zone and Kasina.



Source: Survey of Kenya

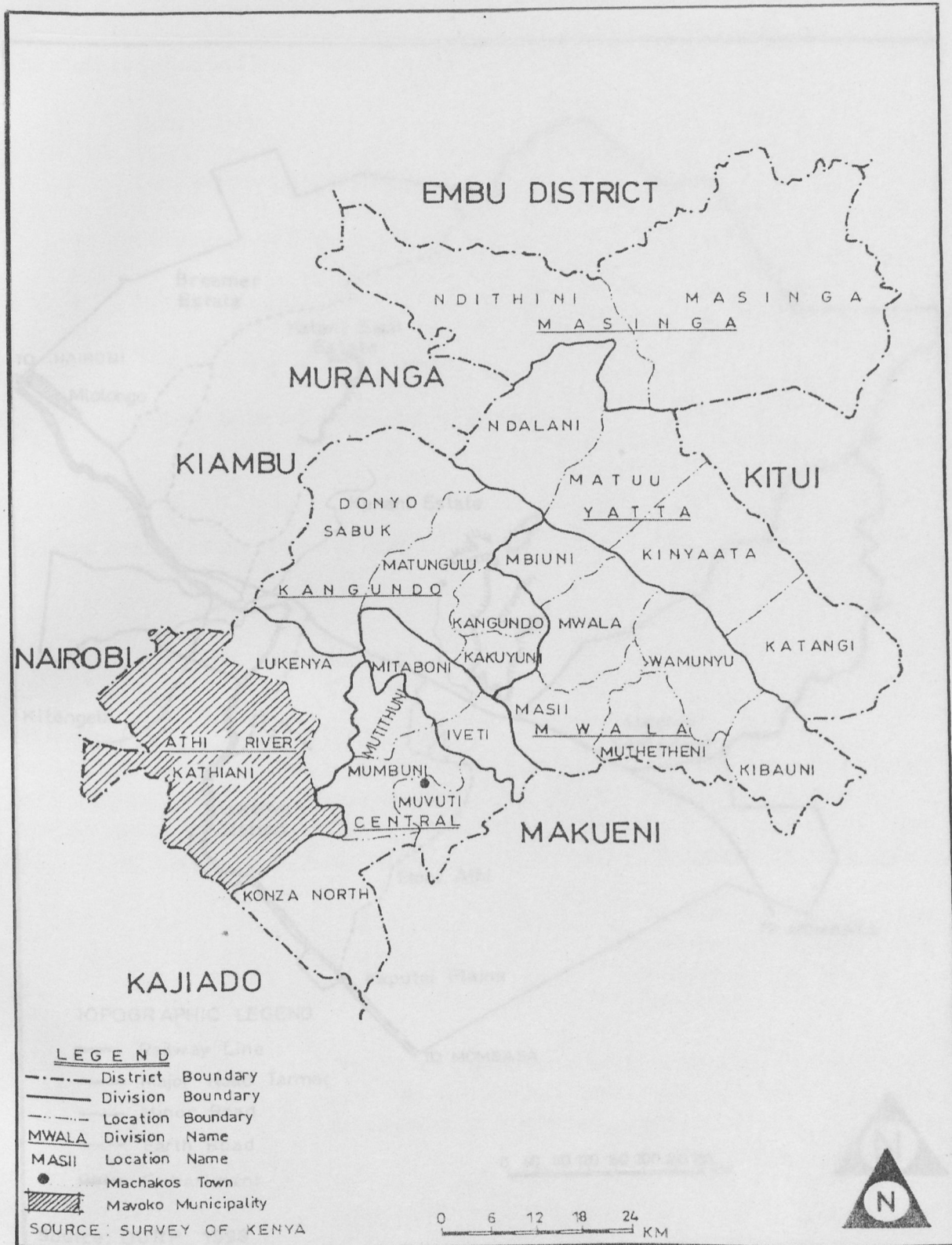
Map 1.2 Location of Mavoko in Machakos District

Map 1.1 Location of Machakos District in Kenya

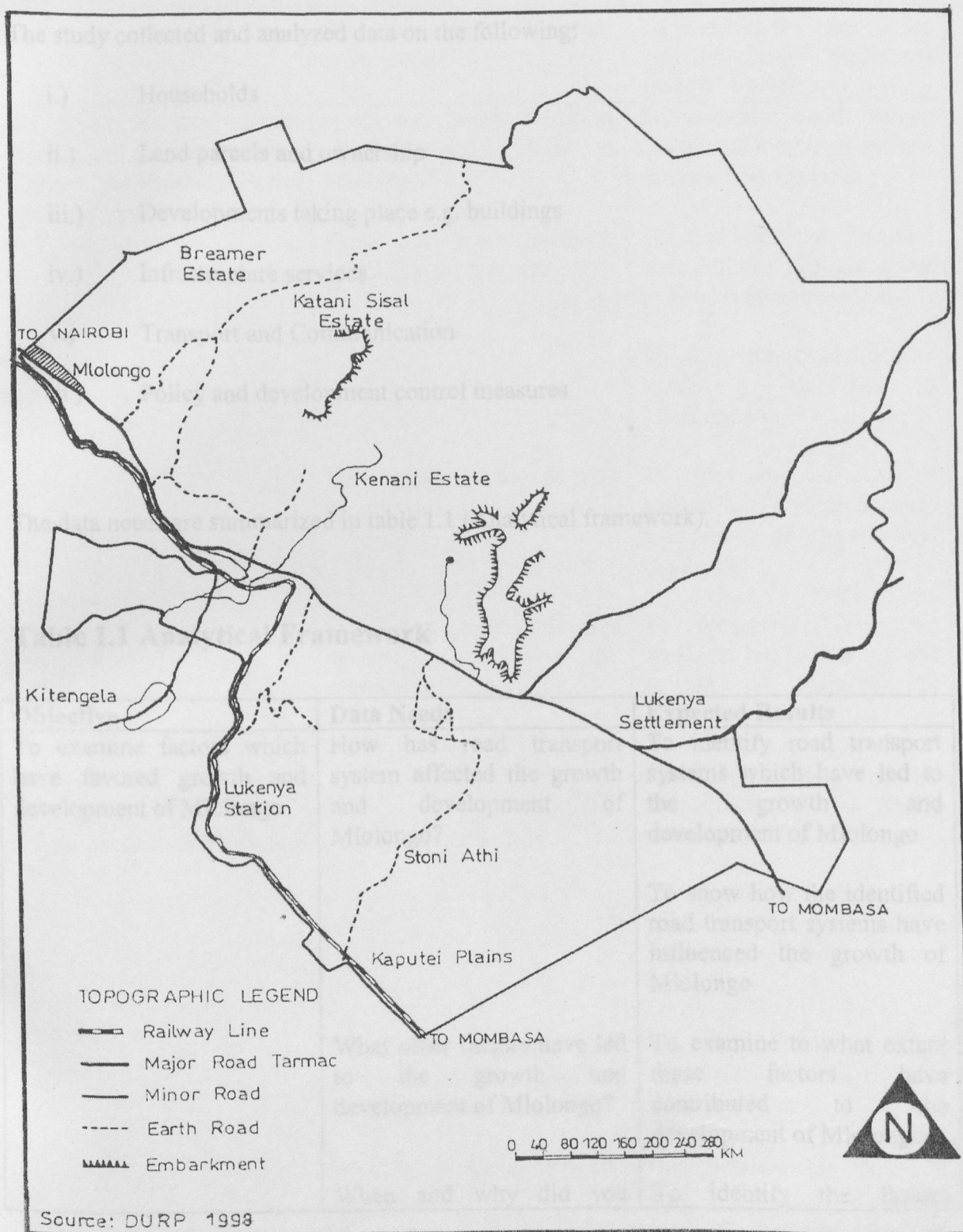


Source: Survey of Kenya

Map 1.2 Location of Mavoko in Machakos District



Map 1.3 Location of Mlolongo in Mavoko



1.9.2 Data Needs

The study collected and analyzed data on the following:

- i.) Households
- ii.) Land parcels and ownership
- iii.) Developments taking place e.g. buildings
- iv.) Infrastructure services
- v.) Transport and Communication
- vi.) Policy and development control measures

The data needs are summarized in table 1.1 (Analytical framework).

Table 1.1 Analytical Framework

Objective	Data Needs	Expected Results
To examine factors which have favored growth and development of Mlolongo	How has road transport system affected the growth and development of Mlolongo?	To identify road transport systems which have led to the growth and development of Mlolongo To show how the identified road transport systems have influenced the growth of Mlolongo.
	What other factors have led to the growth and development of Mlolongo?	To examine to what extent these factors have contributed to the development of Mlolongo.
	When and why did you	To identify the factors

	decide to reside in Mlolongo?	which have a pooled population to Mlolongo?
	What has made Mlolongo grow so fast?	To find out the reasons for sporadic and haphazard growth of Mlolongo.
To Examine the effects created by the relationship between settlement patterns and road transport channel	How has road transport affected land values in Mlolongo?	To compare land values along road transport system and neighboring land.
	How has road transport affected your business?	To find out the financial contributions brought about by road transport system.
	How much money do you pay to your place of work?	To determine the income levels of residents in Mlolongo.
	How has road transport system affected the residents of Mlolongo?	To find out if transport system has any relationship to place of work and residence.
		To determine how road transport has influenced the culture of residents in Mlolongo.
		To find out if road transport has influenced the living standards of the residents.
		To find out the environmental effects affecting the residents in the study area.
	Which are the most prevalent diseases affecting your household members?	Find out the diseases which are directly caused by road transport system.
	How much rent do you pay per month?	To compare the rents of houses next to the road

	How much and when did you purchase your land?	transport system and other houses away from the road. Compare land values along the road and other land.
To come up with intervening policy framework to control and guide growth and development in human settlements in relation to transportation system in Kenya	Was a physical planner involved before constructing the Athi River Weighbridge? What is the existing policy for market centres along major road transport system? What are the community's views on current planning issues?	Find the procedure used in locating the weighbridge in Mlolongo and the measures which were put to guide upcoming developments. Determine how effective these policies are in case they exist. Come up with alternative policy measures to guide the growth and development of market centres along major road transport system. Find out the level of awareness of planning issues in Mlolongo. Incorporate some of their views in the policy to guide developments along major transport system.

Source: Author, 2003

1.9.3 Sources and Methods of Data Collection

Sources of data were both primary and secondary. Primary data was collected from government

officers such as the District Commissioner, District Officers, Chiefs, District Physical Planning Officer, District Roads Engineer, District Lands Officer, Mavoko Municipal Council Town Clerk and other professionals in relevant fields. Interview schedules were then administered to the various government officers listed. Secondary data included reports from government ministries, materials from journals, reports and books. Primary data was collected through a number of methods namely: -

- i) Personal observations
- ii) Photography and mapping
- iii) Land use/ physical inventory/ survey
- iv) Questionnaire interviews

Secondary data formed a very large part of this study. It was collected by reviewing literature from the following sources.

- i) University libraries
- ii) Kenya National Archives
- iii) Urban Development Department Library
- iv) Physical Planning Department Library
- v) Kenya Building Research Centre Library

Both published and unpublished works from the government were used.

1.9.4 Research Tools and Resources

Tools used in this study included writing materials such as field notebooks, pens, questionnaires, a camera, measuring tape, scale rule and base maps. Two research assistants were also employed to assist in administering questionnaires.

1.9.5 Sampling Design

The total population in the study area was considered. The 1999 population census data was used to determine the sample frame. The total population of Syokimau sublocation where Mlolongo is located is 5,984 and the number of households is 2,511 (GoK, 1999).

For the household questionnaires, the entire location of Mlolongo was considered as it is a relatively small area. There was no need to stratify this area because of its small nature and homogeneity.

Ideally, at least 10% of the population should be sampled, but in the case of large populations, smaller percentages may be used. In any case, a sample should not usually be smaller than about 30 to 50, even if this is more than 10% of the population (Ferguson *et al*, 1981: 9 – 10). This study's sample size was based on this argument. The study, therefore intended to interview 30 respondents. Whereas the study could have had a much bigger sample size as possible, the homogeneity of data collected led to a total of 80 respondents to be interviewed. For business premises survey, systematic random sampling was used. The business premises were first listed. The desired sample size was then determined and divided into the population size to give the increment value. The first business premise was selected by a

random process. The premises were selected at an interval of 3 if it met the requirements. A total of 30 business premises were thus surveyed. There are three petrol stations in the study area of which a total of 2 petrol stations were surveyed.

1.9.6 Procedure of Data Analysis

Data collected from the field was first edited so as to ascertain its accuracy. This involved the correction of possible omissions and errors detected. The second step involved entering the data into the computer. Statistical Package for Social Sciences (SPSS) Programme was used in deriving raw data and in analyzing it. Microsoft excel also aided in data analysis

1.9.7 Methods of Data Analysis

In order to avoid bias, secondary and primary data was analyzed through quantitative and qualitative methods. To present the data, graphs, pie charts, maps, photographs and tables have been used. Bar charts have been used to analyze discrete or categorical data.

1.10 Study Limitations

During the time of the survey, there were various problems which were experienced. Limited time and inadequate finance were the serious limiting factors. Lack of up to date maps and poor record keeping made information acquisition quite tasking. However, it was felt that despite all these limitations, data and other information gathered for the study was sufficient to bring out the influence of road transport system on growth and development of human settlements.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The literature reviewed in this chapter does not represent the total work on the subject. However, works described are considered by the researcher as being the major contribution to this study. It is possible to divide the work described in this chapter into four categories. The first and second is on a broad look at road transport and human settlements respectively. The third deals with the specific area of influence of road transport system on human settlements. The last section is the conceptual framework from where the linkage between transportation and development of human settlements is developed.

2.2 Road Transport

The idea about the nature of the relationship between road transport and development has changed considerably over the years. Much of literature on road transport of less developed countries reveal a wide spread belief in the importance of transport and the efficiency of its improvement in accelerating development process. The road transport network in Kenya currently accounts for over 80% of the country's total passenger and 76% of freight traffic. The road network consists of over 63,000 km of the classified system and about 87,000 km of unclassified road system. The classified road network has grown by 51% from 41,800 km at independence to 63,291 km in 2000, with the tarmacked road length increasing from 1,811 km to 8,937 km over the same period (GoK, 2002).

According to Wasike (2001), road transport is the most widely used means of transport in Africa. He further notes that the fragmentary nature of the railway system and the limitations imposed on the

scope of inland water transport by geographical factors mean that transport of people and freight by rail and inland waterways has to be supplemented, usually by road transport over long distances. Road transport occupies the most space on land as compared to other modes of transport. Madungha (1975) notes that roads are the most important element of transportation network and road vehicles form the most flexible form of transportation with ability to carry small units of freight or passengers economically and reliably between any two points in proximity to an all weather road.

Roads are generally classified into three levels namely:

i) National or primary roads connecting capital cities, which serve as the main linkages to

Roads Department (1962) carried out a study and found out that early programmes concentrated on upgrading Trunk Roads to engineered bitumen and gravel standards. These standards of reconstruction have subsequently been shown to be inadequate to the heavy increase in vehicle numbers and sizes. The rehabilitation on some major roads built in this period still remains a high priority Trunk Road need.

2.2.2 Urban Road Reserves

Roads Department (1979) carried out another study on the Kenya highway system. The study found out that the Kenya highway system consists of a highly diversified network of road links ranging from little more than forest trail accessible only in the dry season to well engineered multi-lane tarmac roads. Apart from some few exceptions, the main roads of Kenya provide access to all regions of the country and constitute a well integrated network of national and regional roads. The historical development of the road network undoubtedly extends back several hundred years with many roads being the improvement of caravan and tribal trails and track, up to the extension of national routes during the colonial era, and the heavy investments following independence in 1964. With some few exceptions (e.g. the road link from Webuye to Malaba), today's road network existed prior to independence

although undoubtedly at a lower quality of service standard. Efforts to improve the road network to a modern level standard began around 1959, and following this period a series of stages of system development have been carried out.

2.2.1 Road Classification

Roads are generally classified into three levels namely:

- i) National or primary roads connecting capital cities, which serve as the main linkages to other countries, the sea, and other strategic points.
- ii) Departmental, provincial, regional or secondary roads connecting regions within the country.
- iii) Municipal, local and tertiary roads connecting towns within one province. Tertiary roads are again divided in rural and urban roads.

2.2.2 Urban Road Reserves

More generous space provision is required for urban road reserves. This is as a result of additional street furniture and infrastructural facilities that have been provided (Table 2.1 and 2.2).

2.2.3 Legal Responsibilities

In line with other modes, road fixed infrastructure is treated as a public commodity owned by the government. The financing, the planning of network development, the construction, the maintenance and the policing of the capital stock of the road network is the responsibility of the state through its appointed ministries.

- a) The Ministry of Roads, Public Works and Housing is responsible for all matters pertaining to road planning, design, construction and maintenance.

b) The Ministry of Transport and Communications is responsible for road system regulation and licensing within Kenya.

c) The Ministry of Local Government and the different Municipal Councils are concerned with road improvements within the Municipal boundaries.

d) The Office of the President has the responsibility of enforcement of all traffic regulations including police operations.

Table 2.1 Recommended Urban Road Reserve Widths

Description	Road Reserve
Primary Distributors:	
i) Major communication routes	60m
ii) Important through routes	30 - 36m
District Distributors:	
i) Spine roads and roads in commercial or industrial areas	25m
ii) Bus routes	18m
iii) Local distributor roads with no direct vehicular access to individual plots	18m
Local Distributors	
i) Major access road exceeding 150m in length	15m
ii) Access road not exceeding 150m in length (Normal residential Street)	12m
Access Roads	
i) Cul-de-Sac or short connecting road not exceeding 60m	9m
ii) Service lanes	6m
iii) Footpaths	2m

Source: *Physical Planning Handbook (1992)*

Table 2.2 Infrastructure Standards

Description	Carriageway widths
Trunk and Major roads	7.5m or more
Commercial and Industrial Streets	7.0m or more
Spine Roads & Bus Routes	7.0m
Access Roads (in residential areas)	5.5m
Cul-de-Sack (not exceeding 60m)	5.0m

Source: *Physical Planning Handbook (1992)*

2.3 Human Settlements

Human settlements are a complex phenomenon which touches on all aspects of human life and society. As such, any study of human settlement must necessarily be selective. In the broadest sense, human settlements should be understood to comprise the following aspects of human life and society: the spatial location and distribution of human habitation, shelter and the related facilities that enable human habitation to proceed smoothly, and the associated social, cultural, economic and political factors e.g. the availability and distribution of employment and other opportunities for earning income, availability of social services and amenities such as education and medical care, and the administrative structure among others (U.N.E.P., 1974).

Within this general framework, five elements of any human settlement can be identified. According to Doxiadis (1977) and Hughes (1976), these elements can be labeled as follows:

- i) Nature which comprises the patrimony of resources regardless of whether they are renewable or non renewable. What are commonly known as natural resources come under this label.
- ii) Anthropos or man, refers to the living human organism with its various biological requirements.
- iii) Society, alternatively labeled as the collectivity of man. This encompasses not only the human aggregation element, but also the accompanying community services such as education, health care, recreation and employment.
- iv) Shelter which are man made structures that provide or are aimed at maximizing human comfort.
- v) Networks which stands for the physical linkages comprising the transport, communication and distribution networks. Also included here is the system of water supply and drainage, the provision of energy, as well as the system of waste disposal.

Although human settlements possess these five basic elements, they are classified into various types. According to the manner of their geographical spread, a human settlement could be classified as dispersed or nucleated. The former shows even spatial spread, while the latter features pockets of marked human concentrations. Human settlements can also be classified according to whether they are planned or emerged spontaneously. Most human settlements have evolved spontaneously over time. In most of the developed countries, however, the urban human settlements have been evolved according to careful plans. Depending on their inter temporal stability, human settlements can also be classified as temporary or permanent (U.N.E.P., Op.cit). The emergent urban slums, which are perpetually being

demolished by the urban authorities, are an example of human settlements. For analytical purposes, however, the best classification of human settlements is according to whether they are urban or rural. The former are, on average, more reflective of the cultures of the developed countries, while rural settlement features are closer to the cultures of third world countries, including those in Africa. This urban rural classification is a dichotomy which appropriately applies to development patterns as well.

The first and prior goal of every state and for every government is the well being of the citizens. Citizens live together in small or greater number in human settlements. If life is for people more than a mere existence, if this life is to have some quality, the possibility of attaining this largely depends on the quality of the sphere in which they are living, from day to day, near each other, that is the human settlements.

It is clear and natural from this point of view that Habitat, the world – wide conference on human settlements, held in Vancouver in 1976, proclaimed as one of the general principles that, “ The improvement of the quality of life of human beings is the first and most important objective of every human settlements policy”.

2.3.1 Human Settlements Policy

A human settlement that really deserves this name has to be a comprehensive and integrated policy of different components. Hartveld (1978) argues in his study that a human settlements policy which has to be a national policy has to pay attention to the rural areas. Both urban and rural areas have their problems. In the cities the incessant stream of incoming people makes the burden of providing shelter,

work and education among others. The rural areas are by this same migration regularly losing people, that have initiative and skill, often young people that have left school and who all could play an active role in the community they are living. The migration problem has many aspects and the freedom of people to go where they like should generally be respected. From this study, it is clear that one of the main reasons for migration is the expectance that the city, with all the misery it often shows, offers more opportunity. This is to say in other words that if rural areas and small places could give the perspective of a job many people would prefer to stay there. So, a national human settlement policy has to be based on reliable prognosis of the population growth but also a wisdom of the best way to spread this population over the country. The latter aspect is directly related to the unemployment policy, that has as one of its aims creating jobs outside the urban areas.

Whether these jobs are created in existing settlements or in new ones, it is of high importance that they can be easily reached, especially by public transport. In the case of new settlements this is a major point to be taken into account in choosing the site of the settlement. For existing settlements, transport is a vital element which needs improvement in most cases. Among other advantages, good transport opens the opportunity for a wider rural area to make use of facilities in the central locations, such as health centres and schools among others.

The quality of the settlement largely depends on the way people are housed. Important aspects in that field are some minimum standards for shelter and the immediate environment. Much of this can be dealt with at the local level, but at national level, housing programme can only be realistic when it is

based on realistic standards. In this regard decisions have to be taken on the acceptability of upgrading squatter settlements as well as on the use of indigenous building materials.

2.3.2 Elements of a Human Settlements Policy

To the three elements of a human settlements policy briefly mentioned above that is housing, employment and transport, many others can be added for example the educational system, health service, social and cultural aspects. There is nevertheless one aspect without which a human settlements policy is even unthinkable, that is land policy. Kasozi (1978) in his study indicates that land is primary and plays a crucial role therefore it must be subject to proper legislation and tenure system and its acquisition and ownership must be regularized by among others adequate documentation and titles to ensure security. What is of importance here is the registration of land. A good registration system is a permanent institution and it provides regular, accurate and up to date information on the relationship between people and the land. Registration should be seen as a possibility to have a real insight in land ownership, the rights of immovable property and the transfer of those rights. So it can become a basis for a land policy aimed at a more just distribution of the land and at the control of prices. A human settlements policy to be effective has to be an integrated policy.

2.3.3 Coordination of Industrial and Settlement Policy

It is quite evident that the success of human settlements depends on the economic factors pertaining at the place of location. It is necessary to highlight the more important conclusions of the location theory

and to see how far these apply to Mlolongo market. Thereafter, an alternative method of reaching at a coordinated location decision, given the existing situation can be highlighted.

Location theory attracted interest from both geographers and economists in the late 19th century, and literature on the subject increased in volume and depth in the first half of the 20th century. Initially, names included those of economists as Wilhelm Launhardt (1882 and 1885), Alfred Weber (1909), Tord Palander (1935), Edgar Hoover (1937) and lately August Losch (1954). Their argument basically dwells on the economist concept of the equilibrium situation seen in relationship to a criterion of sales maximization. The detail of the work of these writers is necessary here. Only their fundamental conclusions, especially in as far as these have a bearing on location of human settlements. The possibility of utilizing the location theory as a medium for coordinating the location of human settlements has also been examined.

Edgar Hoover (1948) revealed that the concept of diminishing returns is involved and pointed out that transport costs vary over distance and by mode traveling over distance if rail and sea transport are used by raising over distance when air or road and trans-shipment are introduced. Former exponents had tended to regard costs as paramount and considered demand aspects as insignificant.

August Losch (1954) portrayed location decisions to be so complex that no one set of measurable factors may be regarded as determinant. He infact concluded that location decisions are a matter for trial and error and not a result of a careful set of mathematical calculations. However, it is possible to

identify some of the factors which have played a part in determining location of some of activities in Mlolongo, although their unexplained and subjective factors may have played a part.

2.3.4 Composition of Human Settlements

A human settlement which is a complex structure is mainly composed of houses or some form of shelter. In the ideal situation there are also schools and workshops, markets, health facilities and other amenities. There are also roads and streets, water and electricity, a sewerage system and so on. Being a human settlement, it also has to be a social structure, with many ties between families and groups, and relation of all kinds (Ibid).

2.3.5 Settlement Institutions

In order to be effective, human settlement policies and plans must be rooted in an appropriate institutional structure, embodying political, administrative, and technical instruments and arrangements. Without enabling legislations and without adequate administrative procedures, settlement policies and programmes can be either formulated nor implemented. The institutional arrangements adopted by nations to meet human settlement challenges inevitably display great diversity (Habitat, 1984a). The variations result from the way in which challenges and problems are perceived and defined, and from the process through which institutions and decision making arrangements have evolved. The diversity in responses and experience makes it difficult to isolate and generalize characteristics, and suggest that there can be little scope for deterministic blueprints for institutional design. Kenya has chosen to define settlement problems mainly in terms of the need to

provide affordable shelter and has tailored her institutional response to meet this narrow focus. While the complexity and trans sectoral nature of human settlement problems have to be recognized, it must also be admitted that comprehensive approaches add to the difficulties of horizontal and vertical coordination.

2.3.6 The Role of Human Settlements

Habitat (1987) documented some of the main trends and developments in human settlements in both the developed and developing countries. While it has been able to record encouraging progress in a number of areas, there is disturbingly little evidence in the vast majority of countries to suggest that negative trends are being reversed and that the human settlements situation in either urban or rural areas is being improved. The picture that emerges is overwhelmingly one of the challenges not being met, and of governments losing ground in their efforts to meet it.

2.3.6.1 The Economic Role of Human settlements

Grebler (1973), Burns (1974) and Habitat (1984 b) argued that investments in human settlements are not only in the quality of life and the well being of people: they also put labour that might otherwise be idle to work at low opportunity cost. These are investments in construction, and labour content in construction is high, providing substantial opportunities for labour absorption and the creation of employment. These investments in human settlements also have broad employment effects through direct and indirect multiplier effects (Makanas, 1974, Gorynski, 1971). The size of the multiplier effect varies from country to country and by type of project but tends to be highest in the case of housing for

low-income groups. The widely canvassed view that investments in human settlements should be regarded as welfare expenditures that absorb rather than generate resources has no basis in fact. There is a lot of evidence to show that such investments not only serve to stimulate growth but also can be used to affect both the pace and direction of growth. The production of manufactured goods in towns on the other hand promotes materials advancement in both rural areas and towns as well.

2.3.6.2 The Social Development Role of Human Settlements

Even though the economic reasons for human settlements policies and plans may be important, they are balanced by the role that human settlements play in promoting social development, in improving the quality of life, and in meeting basic human needs. Such considerations recognize that the promotion of the well being of the people is the central concern and purpose of all development efforts. There can be no discussion of increasing the welfare of human beings without consideration of the role and contribution of human settlements, no concept of social fulfillment without a concept of the way in which human beings meet and interact. Human settlements are history's most tangible evidence of efforts to meet individual and collective needs to improve the quality of life.

2.3.6.3 Human Settlements and the Development Process

The new concept of development that is urgently called for has human settlements as one of its central elements. Development strategies shaped by a concern for human settlements build development around people and the places in which they live and work (Ibid). Development cannot be defined in

terms other than these. Human settlements are an integrating concept that makes it possible to reconcile economic growth with the need for sustainable development.

2.3.6.4 Service Function

Human settlements facilitate the provision of schools, health services, public utilities, commercial banks, co-operatives, administration, judicial, recreational and other social services on an economic basis. These services not only serve the people in towns but also those in the surrounding rural areas (Physical Planning Department 1978: 31).

2.3.6.5 Residential Function

For the people working in non-agricultural areas or towns, human settlements always have a residential function. They can therefore be considered as focal points of commercial, industrial, administrative, health, educational and recreation activities required by the people. The demand for these activities will increase as economic development progresses and in turn will have a beneficial effect on the country side (Ibid). The role of the town as the consumer of agricultural production is enhanced and as such the interdependence between urban and rural areas grows in the process of development.

2.3.7 Factors Influencing Location of Settlements

Locational aspects of industries on the national and regional scale have been studied by Ogendo (1970). He has arrived at certain conclusions on locational considerations, sizes of industrial activity and

factors influencing development of industries at these levels. He has specifically concluded that factors which influence location may be summarized as follows: -

- i) "Historical, geolo-topographical and ecological influences.
- ii) A combination of processing and transfer costs – the transport costs of product and raw materials.
- iii) Influence of personal considerations and their interaction with governmental strategy on location.
- iv) The influence of spatial pattern of infrastructural facilities and markets.
- v) The influence of economies of agglomeration and/ or industrial linkage".

In the context of this study, it is found that factor (iii) above functions in Kenya at the regional level only while the strategy is not discernable at district level. In fact the emphasis has been, probably for lack of sufficiently large enterprises in rural areas, on the urban areas which form the corridors of industrial development. Although Ogendo throws a lot of light on the industrial configuration of major centres, deserved emphasis has not been laid on the rural aspects of industrialization. There is also the tendency to treat the settlement pattern as given. This study gives consideration to spatial factors which either affect the settlement pattern and are affected by it. In a developing country whose settlement pattern is fast evolving, new locational decisions may have strong influence on settlement locations. Examples are Webuye town in Western Kenya, where location of a paper mill has given rise to a new township. These examples illustrate that not only do agglomerative forces of an existing centre attract more activity, but that new location decisions also influence the choice of new centres. This correlation has not been dealt with at the level of the planning unit in Kenya which is the district.

2.3.8 Settlement Patterns

Friedmann (1964) notes that the clustering of population into communities is one of the basic forms of human settlement. It arises from man's need for cooperation in order to survive, from his gregarious instinct, from certain external economies that may be obtained when activities are centralized, and from the fact that distance is a physical obstacle that can be overcome rationally by centralizing certain functions within geographic space.

Roberts (1974) looked at some of the work done by early location theorists. The study notes that these location theorists drew attention to the various influences on location of economic activity, and the implications this had for settlement patterns. Von Thunen's well known analysis of a Prussian estate and Webber's work on manufacturing industry and its cost structure are some of the examples given. Their work is noted to have subsequently been taken up by economists such as Losch, by geographers, and by regional scientists, notably Isard. Even though these theories reflect the general economic structure of the time and place of writing, they provide useful bases and insights for a great deal of practical work.

Obiero (1978) in his study identified three main settlement patterns in Busia district. These are the linear, nucleated and dispersed settlement patterns. Linear settlements according to this study are found along major roads especially along A104 International Trunk Road between Bungoma and Malaba. Such roads act as urban centers where the interior inhabitants come to sell their produce while some settle along it to trade. This trend is very evident in most major roads in Kenya. This study also found

out that most people who move near the roads to trade in most cases settle in the market centers along these roads and form the nucleated settlement.

Ndegwa (1977) in his study on the 'Impact of Settlements on the Development of Nakuru District notes that there are two basic types of human settlements in the district. These are the dispersed settlements, the rural homesteads and the nucleated settlements consisting mainly of the designated growth centres. The author demonstrates that the rate at which these types of settlements have grown has been influenced by two factors. These are population and the resources of the district. The study revealed that the population grew rapidly with every passing decade. The study also examined the impact of settlements in the district which prior to independence, was reserved for white settlement. The opening of the district for all Kenyans set in motion a set of developments which have a significant impact on the economy and the pattern of the settlement that have evolved.

2.3.9 Origin of Human Settlements in Kenya

The early forms of settlements in Kenya were the temporary huts for example those constructed by the Maasai. The Maasai formed these settlements whenever they encamped for pasture. As soon as any area showed signs of exhaustion, or whenever disease struck, they moved away. This depended on nature's own way of maintaining ecological balances between the resources and the demands made upon them by man and his stock.

After 1897, the state of affairs changed. In this year, Lord Delamere set foot on the Kenya highlands during his expedition from Berbera on the Gulf of Aden to Eldama Ravine. He saw the Kenya

highlands as a country of great latent wealth only waiting for development; a friendly and temperate patch of Africa where a white man could feel alive and invigorated and could keep healthy; an empty land under populated every where and uninhabited altogether; a place in short of fine possibilities, but possibilities that could only be realized by large scale development (Nottidge and Gold, 1962). This idea of development animated Lord Delamere during the rest of his life. It was, however, through the efforts of Sir Charles Eliot, the then commissioner of East African Protectorate from 1901 to 1904 that this idea of development was translated into a government policy.

On the Kenya highlands where European settlements were, was first advocated in print in 1893 by Lord Lugard who considered that the Mau escarpment was the best place to make a beginning. He noted that this area was inhabited and was of great extent. It consequently offered unlimited room for the location of agricultural settlements or stock raising farms. He considered this to be a suitable site upon which to attempt the experiment of European settlement (Ibid).

Lord Delamere returned to the Kenyan highlands in 1899. By this time, reports from missionaries and explorers had encouraged white settlers to venture into the East African highlands. The first step in the promotion of white settlement was the re organization of the administration of East Africa. The British government had by 1901 built 580 expensive miles of railway line and every train that ran along it did so at a heavy loss. Once the railway had arrived, it was evident that the uninhabited country through which it passed would in one way or another be filled up and utilized.

The only hope for this territory according to Sir Charles Eliot was to fill up the empty dead spaces along the railway line with settlers who would turn the fertile but now wasted soil to useful account, grow crops for the railway to carry out and buy machinery and other goods for it to carry.

The railway was a development which had great influence in the development of white settlements in Kenya. Commenting on the importance of the railway, Sir Edward Grigg, Governor of Kenya between 1925 and 1930 considered that Kenya was not conquered by arms. It was conquered by one of the greatest forces of modern civilization and this was the railway.

Settlers established centres along the railway line. They obtained goods from the outside market from these centres. They also exported their produce to the markets outside the country through these centres. After the completion of the railway, the Indians who had come to provide labour for the construction of the railway declined to accept repatriation. Some of them were settled around Kibos in Nyanza province, filling a gap in the economic structure of the country by opening up shops in every embryonic township and trading to the natives (Winston and Lipscomb, 1972).

In summary, the factors mentioned above have caused the development of an incoherent settlement pattern with activities, although to a certain extent interrelated are spatially disorganized over a wide area. What emerged in Kenya was not a single spatial human settlement system but two sub systems which, although overlapped to some extent were by no means fully integrated. One served the needs of the colonial system while the other served the needs of the majority of the African population (Physical Planning Department Op. cit)

2.3.10 Choice of Place of Work and Residence

In the long history of urban settlements, it has been usual for people to live close to their place of work. As 19th century industrial plants grew, it became impossible for their entire employees to live nearby without considerable residence. At the same time, social reformers saw that the smoke and grim from nearby factories was not good for people's health. Improvements in transport provided the means by which people's dwellings could be separated from their places of work.

2.3.11 Theory of Residential Location

If a worker's job lies in an area of cheap low density housing which according to this theory means that it is probably in a place where jobs are few, conflict between housing costs and travel costs does not arise. The demand for space is also likely to increase with family size (Evans, 1973). The theory therefore predicts that those with the longest journeys to work will tend to be heads of families when only one adult works, while single parent workers and single people will try harder to save travel time.

The position is, however, complicated by the money costs of housing and travel. Low-income earners may not be earning enough to pay both for long journeys to work and to cover the mortgage on even the cheapest houses on the spacious fringe. Workers on low incomes may therefore squeeze their, perhaps large families, into cramped quarters within walking distance of work (Ibid). By contrast, the wealthy family man can afford a large purchase of space and the speediest form of travel. This may result in a long journey to work. However, at present levels of traffic congestion, there is a limit to the

extent to which money can buy speed, so some of the wealthy, particularly those with a taste for urban life, may opt to buy a house near their work place.

Accessibility to work is not the only consideration in choosing a place to live. There is also accessibility to other destinations, and the attractions they offer. For some people the immediate surroundings of the house are more important than its location in relation to the services and activities of the rest of the city (Ibid). Pleasant topography and prestigious neighbours are not necessarily incompatible with short journeys to work. People take travel into account when deciding where to live and work. As the journey to work lengthens, more and more people are put off by the time costs involved, and either looks for houses closer to their place of work.

Balchin and Kieve (1986) have stated that housing constitutes the largest urban land use (in some towns over 50% of the total area) and may account for over 25% personal expenditure. There is a great variety of type of housing but most residential land is fixed in area and location. Forced out of area of good business accessibility, housing land is less frequently redeveloped compared with other uses, but marginal changes may have important economic and social ramifications. Although there is a relationship between personal income, place of employment and place of residence, this relationship is subject to different and conflicting interpretations.

2.4 Influence of Road Transport System on Human settlements

A lot has been written about the systems approach in urban and regional planning, of particular note is the pioneering work of McLoughlin (1969) and the useful summary by Batty (1976). The systems wide

implications of the impact of a road can be assessed at several levels. Firstly, it will affect the transportation system in itself. Secondly, a major change in the transportation system will affect the advantage of the region relative to other such areas due to its enhanced accessibility. The findings of the study are examined within the context of changing accessibility patterns, with particular attention being paid to the ways in which the determinants of residential location patterns are themselves changing. The problems of the availability and suitability of data is also discussed, not only in terms of the mode's application, but also perhaps more importantly in the validation of the models output.

Sasaki substantiates his conclusions by positively relating the hierarchy of a settlement with its Cater (1981) carried out a study on the impact of M4 motorway on residential location in the Reeding Sub-Region. The aim of this study was twofold. The first was to examine the impact of a major change in the road network on residential location in a sub - region. The application of a disaggregated residential location model offered the opportunity for an assessment of such an impact, but also gave rise to the second focus of the study, namely that such an application should result in a deeper insight into the relationships between the variables specified in such a model, and problems of its empirical application and verification. To take this in turn, a major change in the road network will impact on all the components of the sub-regional system and the way that they interact one with the other.

A study done by Sasaki (1970) conducted at the Athens Centre of Ekistics correlated transport technology efficiency criteria to settlement size. Sasaki's thesis rests on the assumption that a given type and size of settlement requires a consonant type of transport mode, and that if the settlement's internal organization follows a hierarchical pattern, it may have several types of transport, serving

different functions and distances, operating at maximum efficiency. Correlating the two, he concludes that:

- i) the absence of a hierarchy of transport technologies consonant with the needs of a settlement hierarchy is the fundamental cause of many urban transport problems; and
- ii) since settlement growth and transport development are closely interrelated, urban transport technologies must match the needs of the settlements they serve.

Sasaki substantiates his conclusions by positively relating the hierarchy of a settlement with its constituent communities, to a hierarchy of trip distribution frequencies for each type of community. From this, he concludes that different kinds of communities within the same settlement generate a demand for consonant means of transport and that settlements, which vary in size and complexity, necessitate different types of services and infrastructure. Among other principal observations he made is that motorcar use is most operationally efficient for trip making differences in cities with populations in excess of 300,000. Sasaki furthermore argues that there is often no appropriate road transport mode for the kind of trip making usually associated with communities of 300,000 and less inhabitants. The use of the motorcar in such circumstances in industrialized countries, therefore, constitutes a 'sub-optimal use' of transport technology. His research also reveals that urban transport systems are typically mal-integrated and that this constitutes part of the urban transport problem. Because Sasaki's work was confined to cities in the industrialized world, his conclusions warrant re-examination in the light of different third world contexts.

(Hansen, op. cit.) demonstrates that locations with good accessibility due to good transport network have a greater chance of being developed, and at a higher density, than remote locations. The study indicates that trip and location decisions co - determine each other and that therefore transport and land use planning need to be coordinated. This would ensure that settlements along transport networks are planned in an orderly manner and activities properly coordinated.

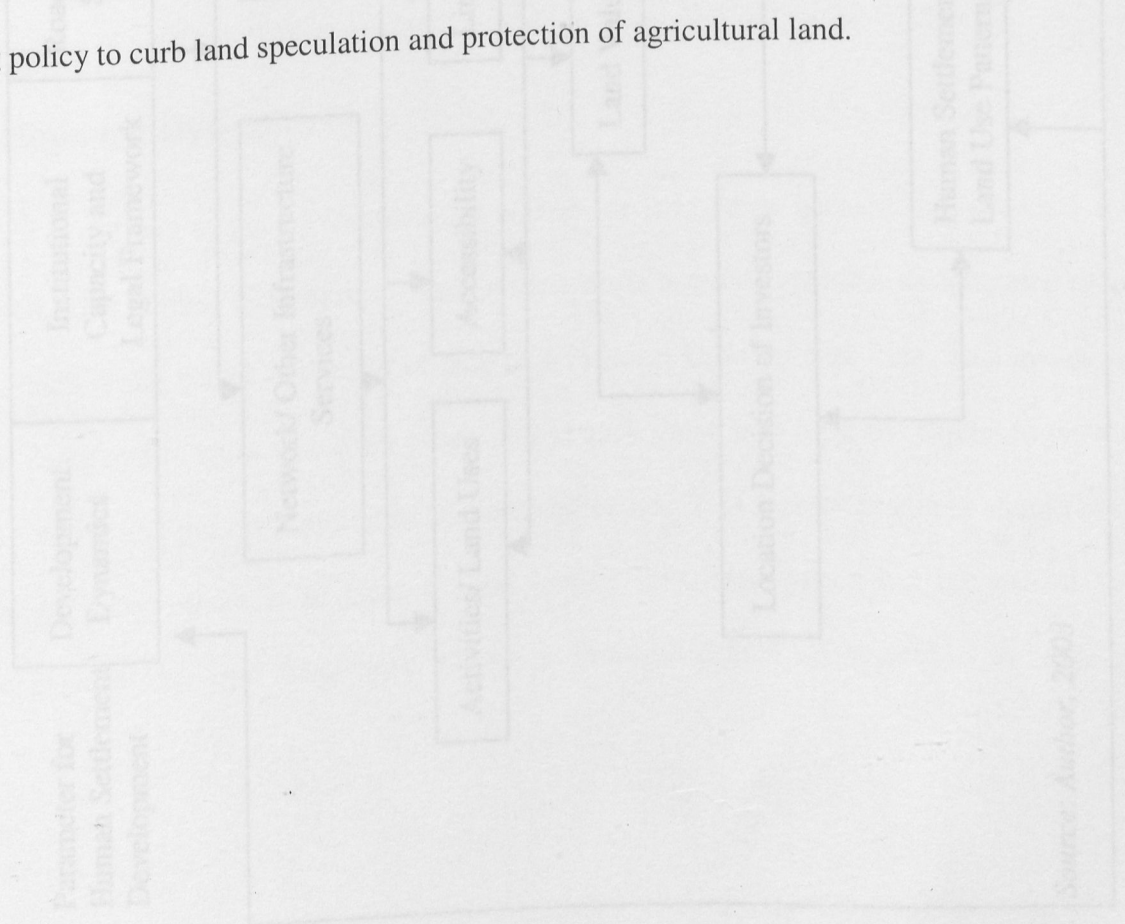
Wachira (1976) in his study looked at the impact of the road transport system on the existing settlement pattern in Kirinyaga district. The study found out that the higher the road concentration, the denser the settlement pattern. Alternatively, the greater the population concentration, the more satisfactory the level of accessibility and the greater the potential of an area for industrial location. The study also found out that in terms of intra - district trade, this zone is connected more effectively with the neighboring districts. Relative to the road system, activities oriented to local markets are at points with a good consumer base, which are also well served by the road network. This study concluded that all weather road services are important to firms which sell to external markets. Their general level of mechanization and sophistication is higher than that of the local market oriented activities. The author mentions activities such as motor and bicycle repairs as being a direct function of the efficiency of the roads. The author failed to understand that it is not possible to categorize these activities as local or external market oriented.

Dickinson (1951) notes that there are dormitory settlements which depend on the large urban area for job opportunities and many retail and service facilities have an excessively high proportion of land in residential use. In addition to sporadic development, expansion follows lines of least resistance,

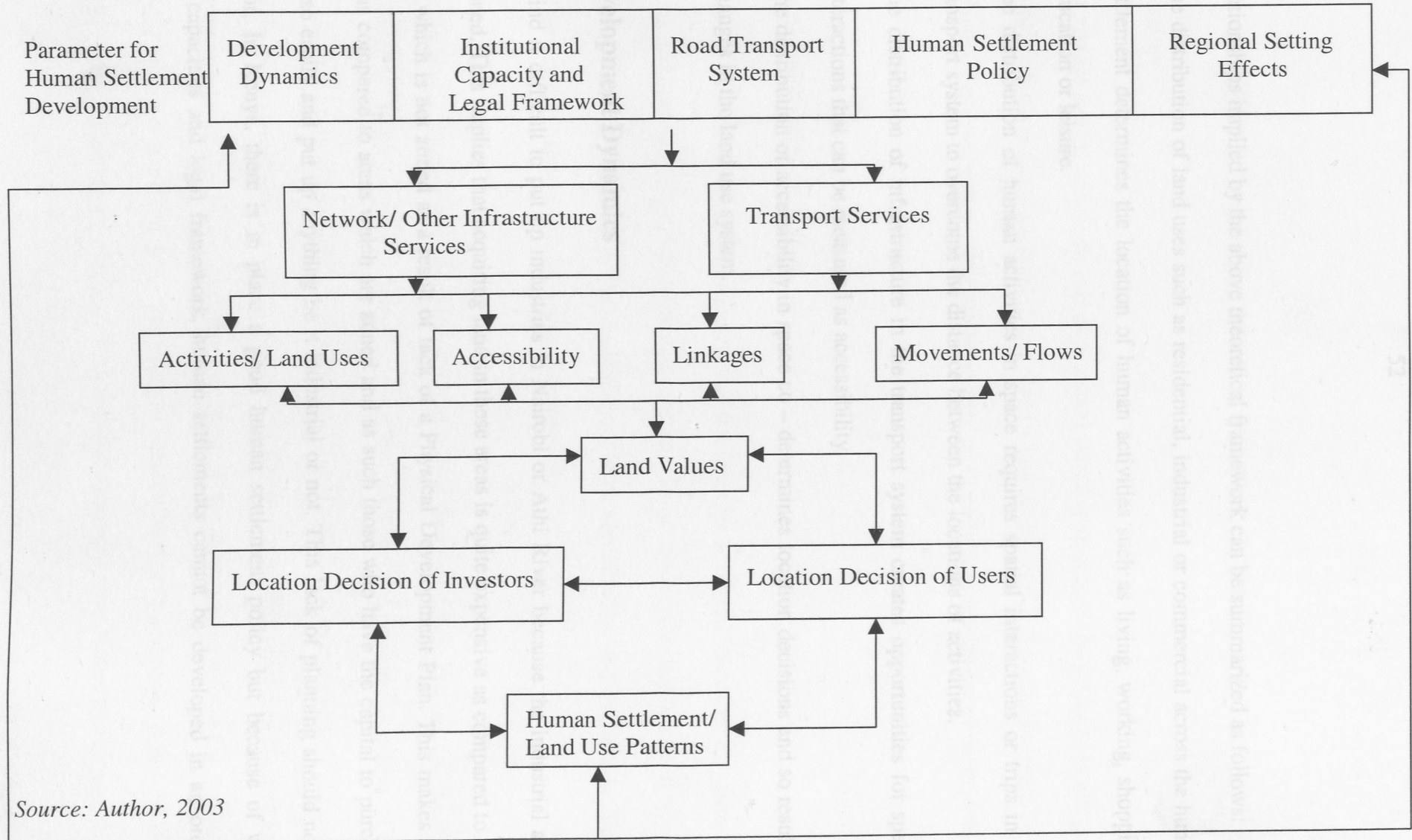
essentially major radial roads out of the urban areas. Ribbon development occurs when land on either side of the main road for considerable distances, into the countryside is converted to urban use. Low density continuous development may be recognized as a further major form of urban sprawl.

Kinyanjui (1976) in his study on the impact of a new road through the hinterland of the western side of Nairobi on land uses, examines the development of settlements in the area by people trying to exploit the Nairobi housing problem in building rental houses for the working population. The study identifies road transport as a key factor in the development of these rental houses. In this study, the author expresses the fear of these settlements with no employment centers of their own and lacking in planning and management. Decline in agricultural production is also noted in the study and it argues for a planning policy to curb land speculation and protection of agricultural land.

2.4.1 Theoretical/Conceptual Framework



2.4.1 Theoretical/ Conceptual Framework



Source: Author, 2003

The set of relationships implied by the above theoretical framework can be summarized as follows:

- i) The distribution of land uses such as residential, industrial or commercial across the human settlement determines the location of human activities such as living, working, shopping, education or leisure.
- ii) The distribution of human activities in space requires spatial interactions or trips in the transport system to overcome the distance between the locations of activities.
- iii) The distribution of infrastructure in the transport system creates opportunities for spatial interactions that can be measured as accessibility.
- iv) The distribution of accessibility in space co – determines location decisions and so result in changes in the land use system.

2.4.1.1 Development Dynamics

Developers find it difficult to put up industries in Nairobi or Athi River because the industrial areas have been zoned. This implies that acquiring land in these areas is quite expensive as compared to land in Mlolongo which is not zoned as a result of lack of a Physical Development Plan. This makes land quite cheap as compared to areas which are zoned and as such those who have the capital to purchase land can do so easily and put up anything be it industrial or not. This lack of planning should not be advocated for. In Kenya, there is in place a good human settlement policy but because of weak institutional capacities and legal framework, human settlements cannot be developed in an orderly manner.

CHAPTER 3: BACKGROUND TO THE STUDY AREA

3.1 Introduction

Mlolongo is a vibrant market centre. Its role as a market centre is reinforced by its location along the Nairobi - Mombasa highway (International Trunk Road Class A109) which links larger towns in the country like Nairobi and Mombasa. This market centre is essentially a market-based town with no administrative functions.

3.2 Historical Perspectives

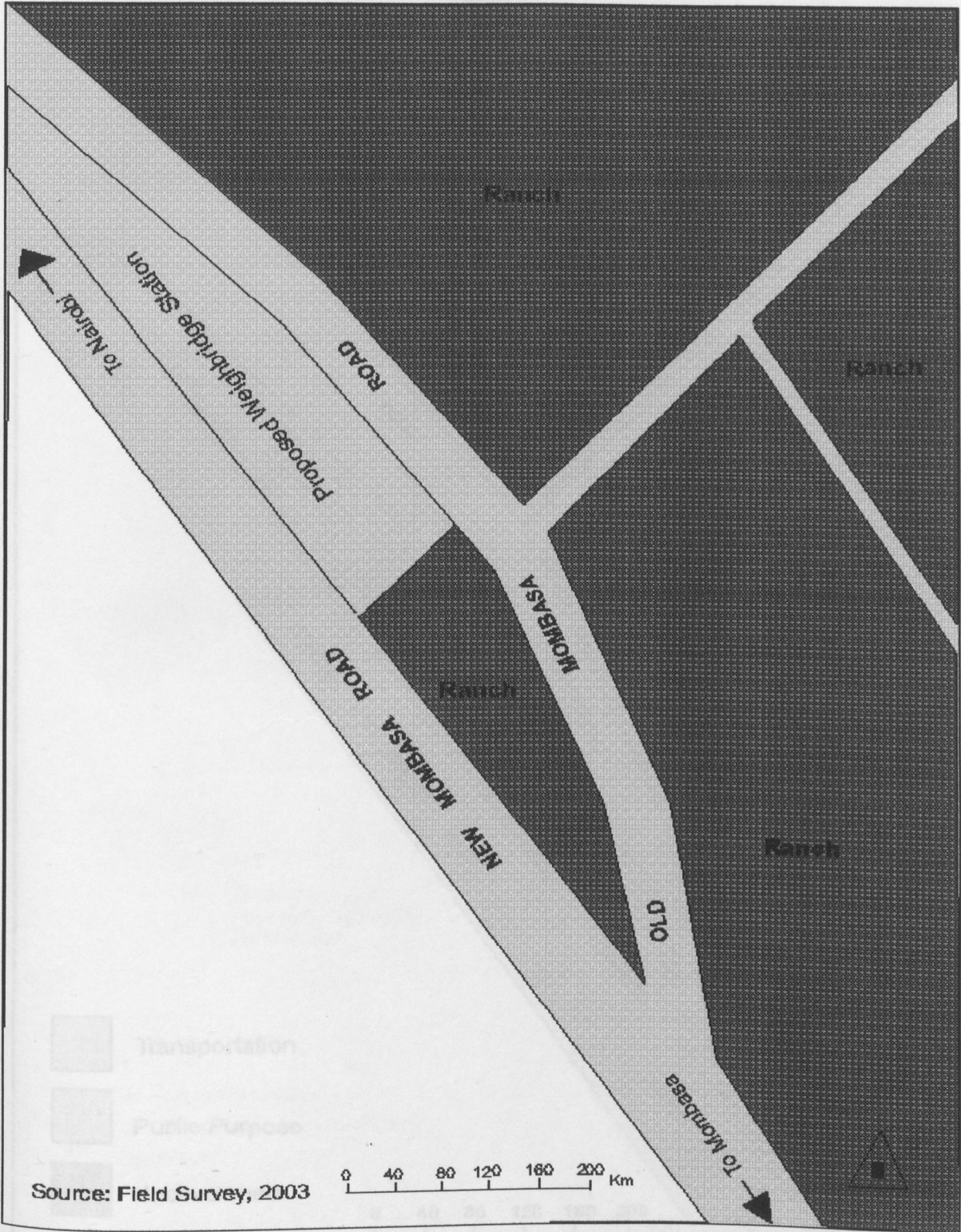
The importance of historical changes in the area are pertinent to actual incidence of the growth in Mlolongo's size and commercial activities primarily and later in its small-scale industries and services. Population increase can be attributed to the availability of land, accessibility, and nearness to Nairobi and industrial area rather than to major economic development.

Mlolongo is a relatively young market centre which has grown very fast during the last ten years. The first people settled in Mlolongo in 1992. Initially, it was located where the present Directorate of Civil Aviation is. This was up to around 1990. The structures which used to be here were small kiosks for selling groceries. A Commonwealth meeting was held in Kenya during this year. It is claimed by the first people to settle in Mlolongo that the then president of the Republic of Kenya His Excellency Daniel arap Moi passed at this place as he was going to attend the meeting and directed that the kiosks be moved to the present location of Mlolongo. This was because there were industries that had already

been set up around this place and the iron sheet buildings and the kiosks were not blending well with the environment there.

The present Mlolongo market used to be a livestock grazing area which had no buildings at that time. It was a holding ground for cattle which belonged to the Kenya Meat Commission. Map 3.1 gives a sketch of how it looked in 1982. Following the directive of the president, they were moved to the weighbridge area along the old Mombasa road. Only 49 people were allocated plots in Mlolongo under leasehold. Later on, the councilors allocated other people land in the remaining area towards Kasina. After this plots had been allocated, and given the fact that the toll station was already in operation, developments started taking place at a very fast rate. The old Mombasa road was constructed in the early 60s where as the new Mombasa road was constructed in the late 70s. The weighbridge, which is said to have led to the spontaneous growth of Mlolongo market, was set up in the mid 1980s. When the first people were settled in Mlolongo in 1992, the area become known as Weighbridge. Map 3.2 gives an idea of how it looked during this year. There are two versions given on how the name Mlolongo came about. The first is from the Swahili word Mlolongo meaning queue. This is because of the long queue made by vehicles as they enter the weighbridge area for weighing. The second is that it acquired it from the KANU system of nomination used in 1992 where voters had to queue behind their candidates. This is because it was initially allocated Asians who had voted for KANU during the general elections.

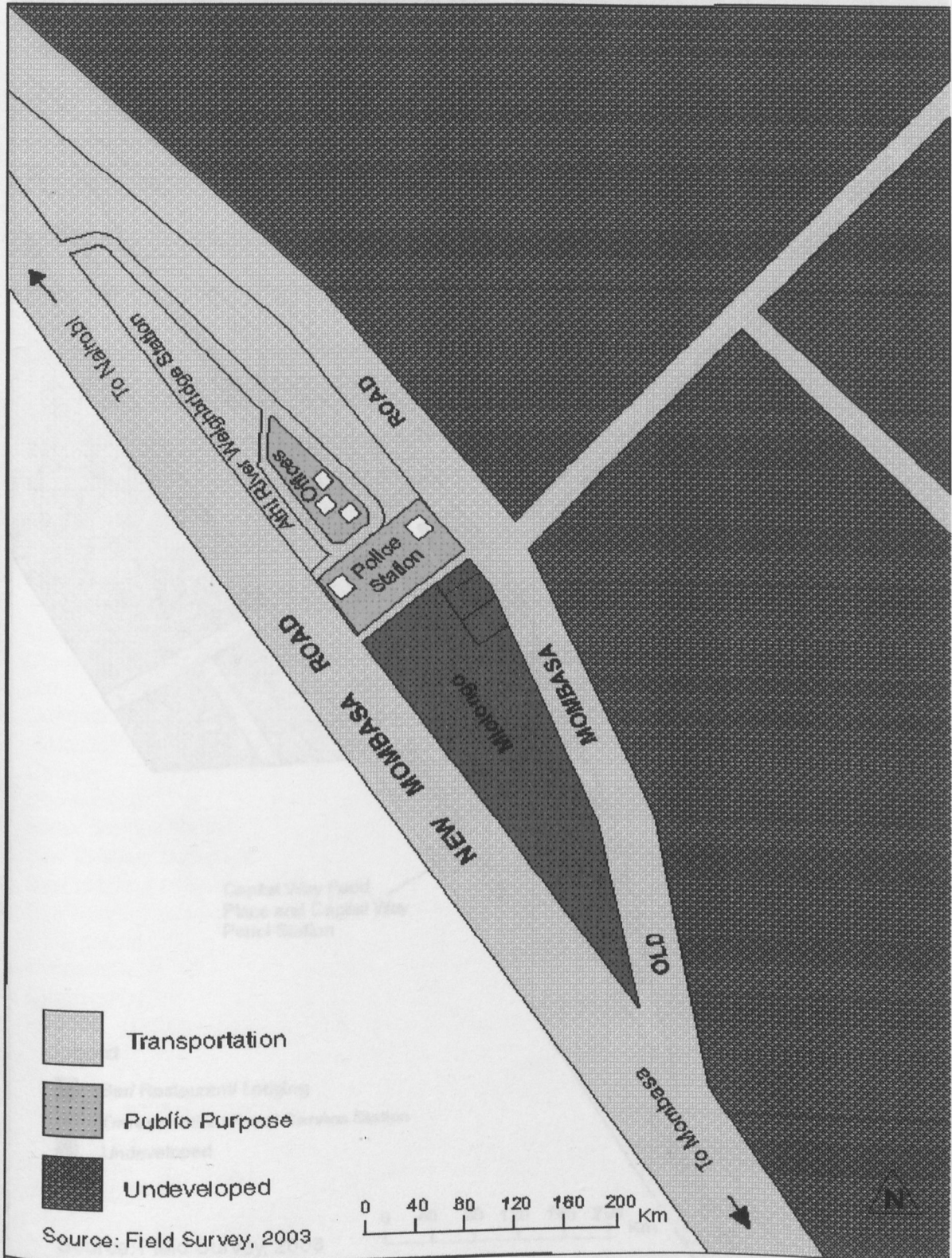
Map 3.1 Mlolongo in 1982



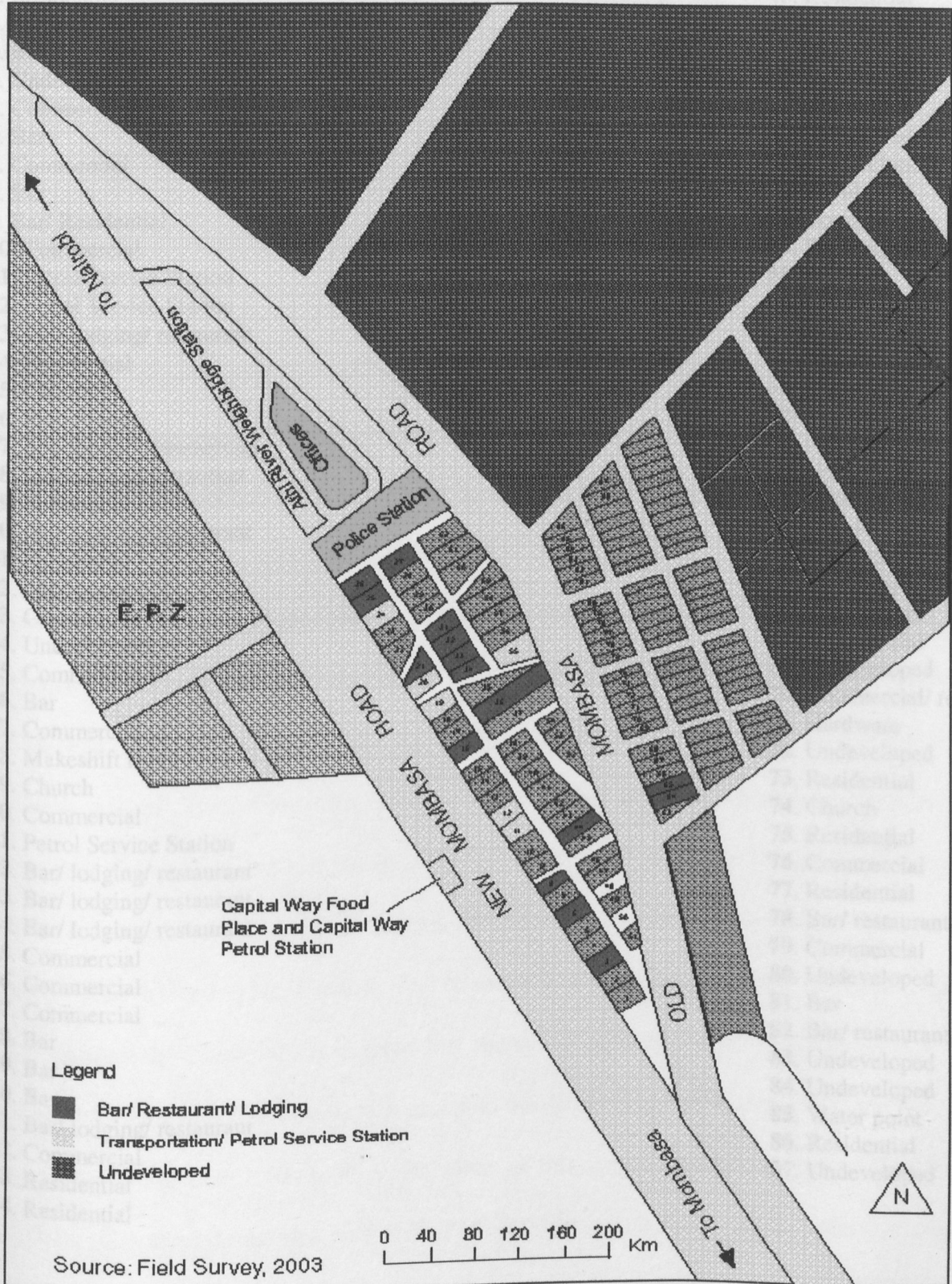
Source: Field Survey, 2003

0 40 80 120 160 200 Km

Map 3.2 Mlolongo in 1992



Map 3.3 Mlolongo in 2003



Source: Field Survey, 2003

Legend

1. Residential
2. Residential
3. Bar
4. Undeveloped
5. Commercial
6. Bar
7. Commercial
8. Bar
9. Bar/ Residential
10. Commercial
11. Petrol Service Station
12. Petrol Service Station
13. Bar/ lodging/ restaurant
14. Residential
15. Church
16. Maize farm
17. Residential/ commercial
18. Bar/lodging/ restaurant
19. Residential
20. Bar/ lodging/ restaurant
21. Residential
22. Auto garage
23. Commercial
24. Undeveloped
25. Commercial
26. Bar
27. Commercial
28. Makeshift kiosks
29. Church
30. Commercial
31. Petrol Service Station
32. Bar/ lodging/ restaurant
33. Bar/ lodging/ restaurant
34. Bar/ lodging/ restaurant
35. Commercial
36. Commercial
37. Commercial
38. Bar
39. Bar
40. Bar
41. Bar/ lodging/ restaurant
42. Commercial
43. Residential
44. Residential
45. Residential
46. Residential
47. Commercial
48. Residential
49. Bar
50. Residential
51. Undeveloped
52. Residential
53. Commercial
54. Bar/ lodging/ restaurant
55. Barber
56. Residential
57. Residential
58. Residential
59. Commercial
60. Residential
61. Commercial
62. Commercial
63. Commercial
64. Residential
65. Hardware
66. Hardware
67. Auto garage
68. Commercial
69. Undeveloped
70. Commercial/ residential
71. Hardware
72. Undeveloped
73. Residential
74. Church
75. Residential
76. Commercial
77. Residential
78. Bar/ restaurant/ lodging
79. Commercial
80. Undeveloped
81. Bar
82. Bar/ restaurant
83. Undeveloped
84. Undeveloped
85. Water point
86. Residential
87. Undeveloped

Ngwata, also known as the new Mlolongo belonged to Asians. This land was leased to them in 1992. By this time there was only one location known as the settled area. In 1994, the settled area was made a division and had three locations. These were Katani, Muthuani and Township locations. In 1995, an interview to appoint the area chief was conducted and Mr. Amos Kilonzo became the first chief of Mlolongo. This was also the year when the Nairobi Water Project reached Mlolongo. The Asians had by this time started quarrying in the area. The quarrying activities used to interfere with the Directorate of Civil Aviation operations, the nearby Jomo Kenyatta International Airport and the residents of Mlolongo. The chief being the chairman of the Locational Development Committee wrote a letter to the Athi River District Officer concerning this issue. The chief and other two businessmen in the area proposed that the Asians be allocated an alternative site. This was approved and minuted at the divisional level. The site where the Asians were to be settled was at a place known as Katani which is approximately 12 km from the Old Mombasa Road. The Asians were not happy with this decision and appealed to the government asking to be allocated Mlolongo officially. This was because they no longer wanted to use it as a quarry but put up light industries. The rest of Mlolongo could then be given to the 'wananchi'. Councilors held a meeting and discussed what the Asians had suggested. The Asians were only eight in number and the people who had already settled in Mlolongo were approximately 3,500. To solve this problem, the residents formed a society which also included the councilors. The Asians went to court but because the committee had minutes which had been approved, the Commissioner of Lands informed them that there was nothing his office could do but to go by the 'wananchi's' decision. The Asians thus accepted the decision and asked for a compensation fee of Ksh. 58 million. There were 1,500 plots in the whole of this area. Those who occupied the frontage had to pay Ksh. 25,000 while the rest paid Ksh. 19,000. This was to cater for the council's annual rent and

compensation for Asians as per agreement. This committee which was formed was known a Mavoko Quarry Site Self Help. It comprised of eighteen members. They had to pay 15% of the total amount agreed as compensation fee then pay the rest in six months time. After this agreement, private developers started putting up their structures in the year 2001. At the moment the place is extensively developed. Map 3.3 gives an idea on how the place looks spatially at the present. The problem is that it is not planned at all and lacks the necessary services like water and sewerage. The Mavoko Municipal County Council Surveyor claims that it was planned by councilors during plot sub division. Plots have also been put aside by the councilors to put up a school, a hospital, an open-air market, churches and a jua kali shed. The District Physical Planner has not been consulted to determine the suitability of these sites for these uses. The most common plot sizes are 40m by 60m housing a maximum of nine families.

3.3 Analysis of the Existing Situation

In physical planning, analysis of the existing situation are factual and based on the information from surveys, interviews, reconnaissance, consultations and documents. The information sources or the indicators are both human and physical elements of the rational and realistic growth models, goals and strategies to be formulated. In the case of Mlolongo, the information space and analyses thereof must of necessity cover both the market centre itself and the regional aspects. Mlolongo cannot be treated in isolation of its surrounding region since they exert mutual influences on each other. Therefore, in understanding the past, present and future development of Mlolongo, the effects of activities located in its surrounding hinterland are identified. Mavoko Municipality in general and Nairobi provides the immediate employment for the residents of Mlolongo. Mlolongo on the other hand acts as a dormitory town for Nairobi and the neighboring centres. Hence this chapter contains analyses of the related

growth or development factors in the region as a whole and in Mlolongo where detailed studies were undertaken.

3.3.1 Physical Attributes of the Study Area

3.3.1.1 Location and Size

Mlolongo, which is the area under study, is situated on the north western part of Machakos district at about 40 km from Machakos town along the Nairobi – Mombasa road. It is bordered on the northern part by the Jomo Kenyatta International Airport, on the western part by Nairobi National Park, on the south by Kitengela and Athi River town on the eastern part. Mlolongo occupies approximately 8 ha of land. It is in Syokimau sub location, Katani location, Athi River Division, Machakos district in Eastern province. It falls within Kathiani constituency.

3.4 Settlement Patterns

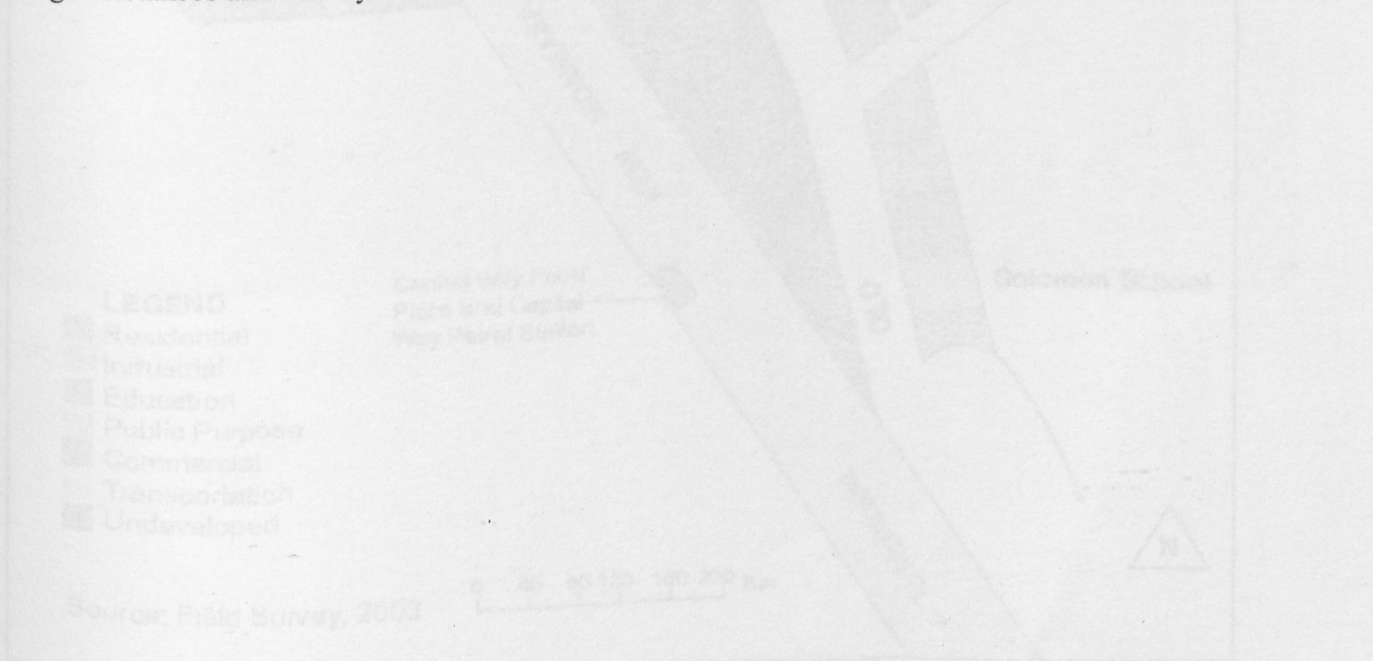
The settlement patterns have been influenced by the influx of residents from Nairobi and Athi River into Mlolongo. Those who want cheap rental accommodation and ease of commuting to the city centre, settle in Mlolongo along the major transport route, which is the Nairobi - Mombasa road. The settlement pattern in Mlolongo is very dense. In general, the resulting settlement pattern has no clear point of expansion but tends to spread out in most areas.

3.5 Existing Land Use Patterns

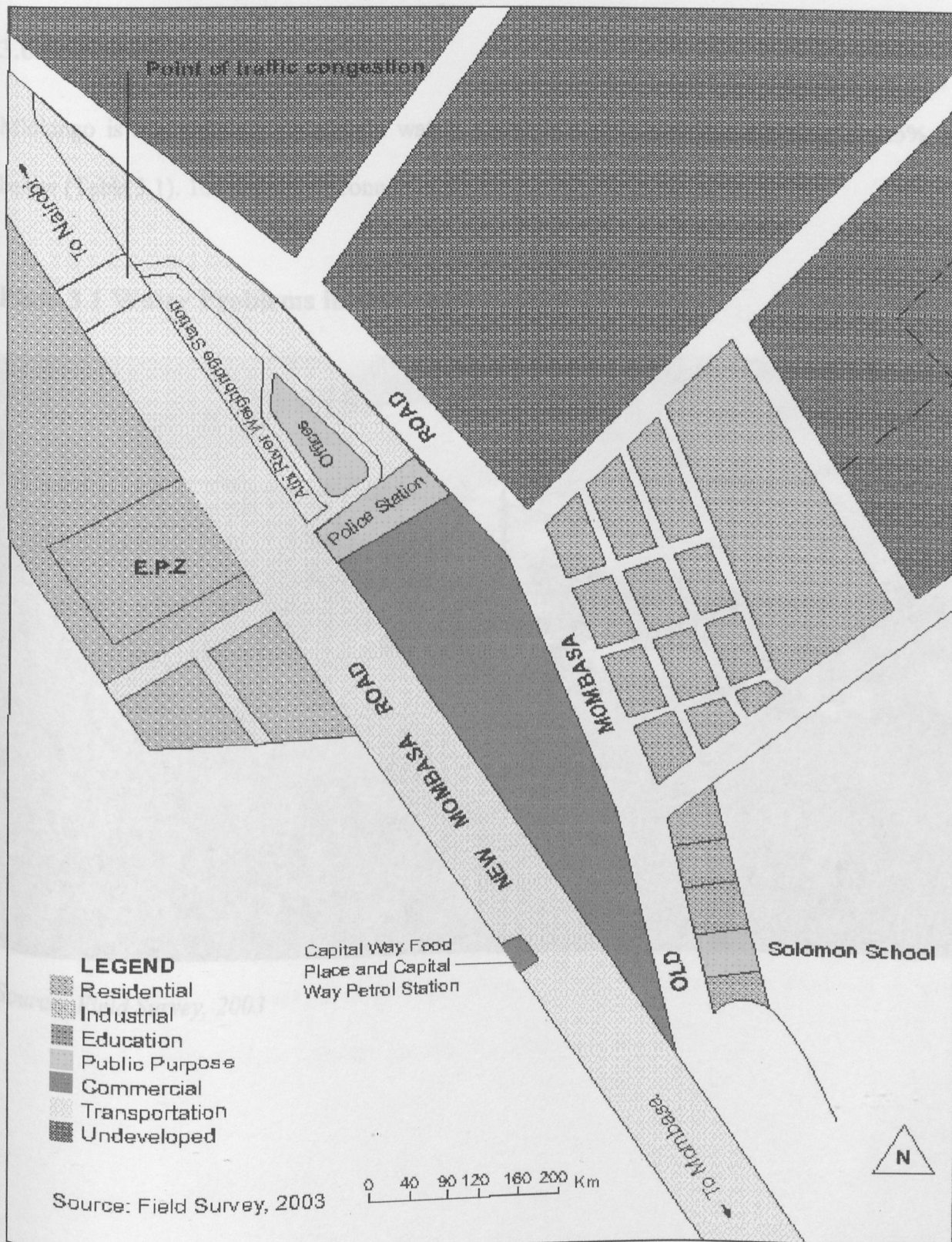
The present land use pattern is predominantly residential and commercial (Map 3.4). In most cases, the two land uses are seen side by side. These commercial enterprises have risen to serve this residential populace and the travelers who are mainly truck drivers. Immense quarrying activity has been realized in the neighbourhood.

3.5.1 Communication Systems

Mlolongo is adequately linked with all the communication systems with the rest of Kenya and Mavoko as shown in Map 1.3. Within itself, the road network is quite poor because of its sporadic development and lack of a Physical Development Plan. Jomo Kenyatta International Airport is in close proximity to Mlolongo and serves both the national and international communities. Perhaps the development of tourist activities in Mlolongo would enhance air travels by hopping that tourists may wish to cover longer distances and variety of attractions in the country without spending much time on the itinerary.



Map 3.4 Existing Land Use Patterns



3.6 Public Utilities, Infrastructure and Roads

3.6.1 Water

Mlolongo is inadequately served with water. Those who are connected account for 2.5% as shown below (Table 3.1). 100% of those connected do not receive water regularly.

Plate 3.1 Water Problems in Mlolongo



Source: Field Survey, 2003

Table 3.1 Source of Water

	Frequency	Percent
Individual water connection	2	2.5
Bore hole	7	8.8
Water vendors	71	88.8
Total	80	100.0

Source: Field Survey, 2003

Plate 3.1 indicates the level of water problems in Mlolongo. Most of the residents get water from water vendors who sell it very costly to them. Water is only available in Old Mlolongo. New Mlolongo is not serviced at all. This problem is compounded by the fact that developments have already come up and as a result, providing water in this area might mean demolishing so many structures to allow for laying down of the water pipes.

3.6.2 Drainage and Sewerage

Mlolongo is not served with any sewerage system. 100 % of those interviewed indicated that they use pit latrines. On overall, the market centre has a very poor drainage system.

Plate 3.2 shows how poorly drainage is in Mlolongo. This is not only an environmental hazard but also breeding ground for vectors such as mosquitoes. All the roads in Mlolongo are poorly drained apart from the Nairobi - Mombasa road. This is as a result of lack of foresight on what was bound to happen after the construction of the weighbridge which required services.

Plate 3.2 Poor Drainage System



Source: Field Survey, 2003

3.6.3 Garbage Disposal

There did not seem to be any clear procedure for the collection and disposal of garbage from homes and the commercial centre. It was noted that garbage were either heaped (Plate 3.3) and later burnt or left to decompose.

Plate 3.3 Garbage Menace

Plate 3.4 Nairobi - Mombasa Road



Source: Field Survey, 2003

3.6.4 Roads and Traffic

The Nairobi - Mombasa road is the main road linking Mlolongo to other areas (Plate 3.4). As far as this road is concerned, the volume of traffic according to recent counts by the Roads Department and personal observation seem to be very high. It might seem desirable for the long term that the road is widened.

Plate 3.4 Nairobi – Mombasa Road



Source: Field Survey 2003

By the physical planning standards the local, primary and access roads systems are not very satisfactory in terms of extent, standard and capacity. There is no local public transport system serving Mlolongo alone despite the fact that the settlement is big enough to warrant this. The majority of traffic in Mlolongo is heavy commercial. At the moment, most services and places of work are conveniently accessible. Parking facilities are lacking at the moment for reasons that the roads are too narrow for convenient curb parking on each side and there are no developed off street parking spaces. Parking on the verges which are not paved destroys road sides and creates erosion.

3.6.5 Recreation

Mlolongo lacks recreational facilities and activities. The only popular evening places in Mlolongo therefore remain the bars and restaurants.

3.6.6 Places of Worship

By their number and locations, Mlolongo seems well provided with places of worship. The only problem noticed with some of the places of worship is with their location (See plate 3.5).

3.6.7 Housing

The quality of housing is taken as an indicator of the standard of living where as the quantity of supply of it indicates the level of development taking place. In Mlolongo, the housing situation indicates a relatively low level of the two features. The situation was typified by the spontaneous semi permanent and dense housing areas within the survey area. It was evident from the study that there exists low quality of housing and shortage of decent housing as shown on plate 3.2 and 3.5. The housing stock constituted of each household's dwelling unit in the survey area. These were located in the spontaneous settlements and the commercial areas. Of these, 66% were semi permanent and 34% were permanent (Fig 3.1).

Plate 3.5 Incompatible Use Occupied by Household

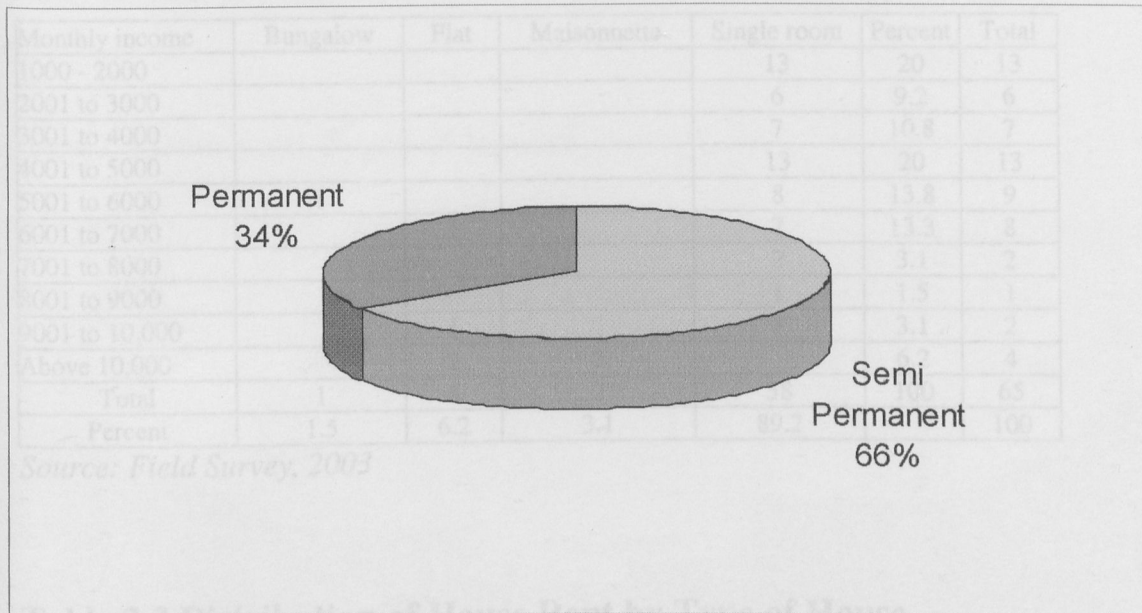


Source: Field Survey, 2003

Some are located where residences are and this creates incompatibility or conflicts.

At certain incomes, the relationship between quality of dwelling and income seems to have been that those earning between 1,000/- and 2,000/- per month lived in semi permanent houses whereas the majority of those earning above 10,000/- lived in permanent houses. The majority of the households, 89.2% had one habitable room (Table 3.2). This means that for the majority of the households, the mean number of habitable rooms was one.

Figure 3.1 Type of House Occupied by Household



Source: Field Survey, 2001

3.6.7.1 Housing Condition

Housing conditions in the survey area reflects the traditional relationship between income, rents, density and quality.

At certain incomes, the relationship between quality of dwelling and income seems to have been that those earning between 1,000/= and 2,000/= per month lived in semi permanent houses where as the majority of those earning above 10,000/= lived in permanent houses. The majority of the households, 89.2% had one habitable room (Table 3.2). This means that for the majority of the households, the mean number of habitable rooms was one.

Table 3.3 above indicates that majority of residents in Mlolongo live in semi permanent single rooms and pay house rents of between 300/= and 1,500/=. This accounts for 87%. Those who reside in

Table 3.2 Relationship Between Quality of Dwelling and Income

Monthly income	Bungalow	Flat	Maisonnette	Single room	Percent	Total
1000 - 2000				13	20	13
2001 to 3000				6	9.2	6
3001 to 4000				7	10.8	7
4001 to 5000				13	20	13
5001 to 6000	1			8	13.8	9
6001 to 7000		1		7	13.3	8
7001 to 8000				2	3.1	2
8001 to 9000				1	1.5	1
9001 to 10,000		1		1	3.1	2
Above 10,000		2	2		6.2	4
Total	1	4	2	58	100	65
Percent	1.5	6.2	3.1	89.2		100

Source: Field Survey, 2003

Table 3.3 Distribution of House Rent by Type of House

Rent per month	Bungalow	Flat	Maisonnette	Single room (Semi permanent)	Percent	Total
Ksh. 700				4	6	4
Ksh. 800				11	14	11
Ksh. 900				4	6	4
Ksh. 1,000		2		7	11	9
Ksh. 1,200				13	16	13
Ksh. 1,500				11	14	11
Ksh. 1,800				8	10	8
Ksh. 1,900				1	1	1
Ksh. 2,000		1		5	8	6
Ksh. 2,500	1			3	5	4
Ksh. 3,000		1			1	1
Ksh. 3,500				1	1	1
Ksh. 4,000		1			1	1
Zero	4		1		6	5
Total	5	5	1	68	100	79
Percent	6	6	1	87		

Source: Field Survey, 2003

Table 3.3 above indicates that majority of residents in Mlolongo live in semi permanent single rooms and pay house rents of between 800/= and 1,500/=. This accounts for 87%. Those who reside in

bungalows and maisonnettes do not pay rent because they own these houses. The semi permanent houses are made of 'mabati' and are in very poor condition as in plate 3.6 below.

Plate 3.6 Dominant Types of Houses



Source: Field Survey, 2003

3.7 Income Levels

Incomes vary with the nature of employment of residents in Mlolongo. There is the indigenous population whose incomes range from extremely low to a few landlords and businessmen. The indigenous population include those who are self employed and own businesses like shops, bars and

restaurants. They have some of the highest incomes in the study area. There are also those who are engaged in the monetary sector in middle and high level jobs. A strong reliance on the formal sector for employment is very typical of any urban area, together with attendant high wages. This economic pattern is probably the reason for the rising social needs and demands by the resident population. The high income levels also form the basis upon which the local authority can create the finance necessary for creating an enabling environment for the provision of infrastructure services. Most of the residents in Mlolongo, however derive these services from Nairobi which is closer to them than Mavoko.

3.8 Commuting Patterns

Commuting patterns reveal that Mlolongo evolved into a dormitory area for Nairobi's residents. Matatus and public buses ply the route from Nairobi to Athi River and Kitengela with some terminating at Mlolongo. The patterns show a heavy flow of commuters from Mlolongo to Nairobi area. A commuting labour force is a strong indicator of the urbanization process and that Mlolongo is actually home to urban workers who by extension transfer urban activities and behavior to the area, transforming it into a suburban enclave of Nairobi city. This trend is confirmed by the field survey with 3.8%, 12.5% and 31.3% working in Nairobi (JKIA area), Nairobi, Industrial area and other Nairobi respectively (Table 3.4). In total respondents who work within Nairobi account for 47.6% while only 35% work within the study area.

Table 3.4 Place of Work

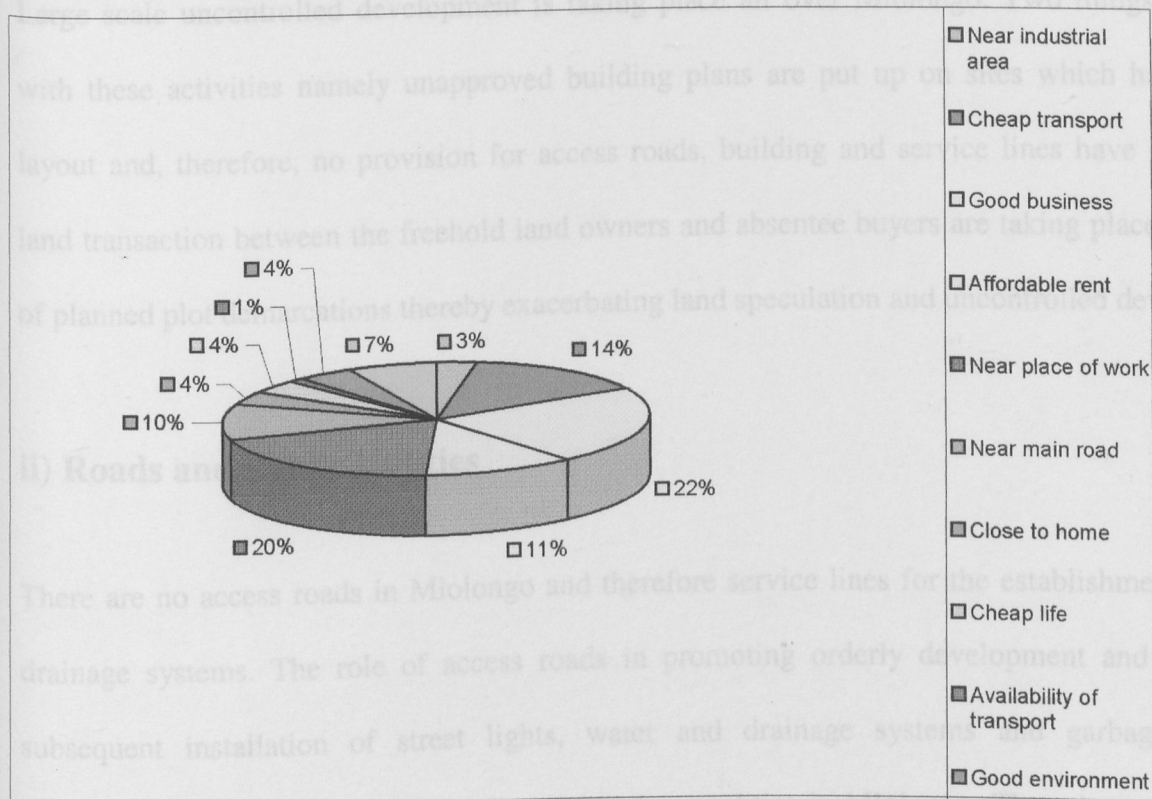
Place of work	Frequency	Percent
Nairobi (JKIA area)	3	3.8
Nairobi Mombasa Road	9	11.3
Nairobi Industrial Area	10	12.5
Other Nairobi	25	31.3
Mlolongo	28	35.0
Mavoko	1	1.3
Kitengela	2	2.5
Does not work	2	2.5
Total	80	100.0

Source: Field Survey 2003

3.9 Migratory Patterns

Out of 80 households interviewed, 11% preferred to live in Mlolongo because of the attraction of cheap rents. 14% indicated that they preferred to live in Mlolongo because of cheap transport as a result of good accessibility. All transport related factors accounted for the highest percentage which was 25%. 22% preferred Mlolongo because it is a good area for carrying out business. This can be attributed to the fact that many travelers mainly truck drivers stop in the study area and require services making the place boom in business. The rest indicated other reasons for preferring to stay in Mlolongo. These ranged from nearness to home area to being near place of work. This is well brought out in figure 3.2. A generalization of the field results show that Mlolongo has attracted more people from Nairobi than other market centres in Machakos. This perhaps is due to land pressure and high rents in Nairobi.

Figure 3.2 Reasons for Choice of Place of Residence



Source: Field Survey, 2003

3.10 Summary of the Existing Land Uses

The total picture of the existing land uses in Mlolongo is indicated structurally in Map 3.4. This land use relates only to the survey zone pertaining to the existing urban type of development. In the study area, the following problems have been noted.

i) Uncontrolled Development

Large scale uncontrolled development is taking place all over Mlolongo. Two things are associated with these activities namely unapproved building plans are put up on sites which have no detailed layout and, therefore, no provision for access roads, building and service lines have not been made, land transaction between the freehold land owners and absentee buyers are taking place in the absence of planned plot demarcations thereby exacerbating land speculation and uncontrolled development.

ii) Roads and Public Utilities

There are no access roads in Mlolongo and therefore service lines for the establishment of water and drainage systems. The role of access roads in promoting orderly development and facilitating the subsequent installation of street lights, water and drainage systems and garbage collection is fundamental in stimulating development of higher qualities in Mlolongo. The other advantages are to the land owners due to increase land values and for the authority due to higher revenues accruing from higher rates.

iii) Building Standards

The uncontrolled development aspects of Mlolongo have encouraged relatively low building standards for the majority of the residents. This situation should not be allowed to go on unabated. Similarly, in the commercial area, there exists semi obsolescent to obsolescent structures of low scale development.

Hence the need for upgrading and redevelopment of the substandard structures need to be examined and enforced.

DEVELOPMENT OF MLOLONGO

4.1 Road Transport System

As was noted in the introductory chapter of this thesis, growth and development of human settlements usually goes hand in hand with transportation system. There are various centres which have grown as a result of transportation system. Examples of these centres are Dudi and Kadiaga, along the Kisumu - Busia Road and Mito Andei and Mariakani along the Mombasa Road.

Mlolongo's growth has mainly been influenced by the weighbridge and the Nairobi - Mombasa Road. All the developments in Mlolongo revolve around these two transport systems. 51% of the respondents indicated that the weighbridge was the main factor which influenced the growth of Mlolongo whereas 25% indicated that it was the highway (Figure 4.1). The weighbridge was constructed in the mid 80s after the construction of the New Mombasa Road. These two led to the construction of petrol service stations and garages where by other services could be provided to the users of these systems.

There arose the need for housing so that those who were employed to provide these services could be accommodated. Truck drivers also had to be catered for because they traveled long distances and needed to rest and have some refreshments. This called for the construction of hotels, bars and lodgings. These hotels were also used by the employees in these service industries. Mlolongo was an isolated place and the nearest housing units were in South B Estate which is approximately 10 km away. These were middle class houses which could not be afforded by the low income earners in

CHAPTER 4: FACTORS WHICH HAVE INFLUENCED GROWTH AND DEVELOPMENT OF MLOLONGO

4.1 Road Transport System

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Mlolongo and as such, developers had to put up so many single housing units to meet the demand which had become so high.

Mombasa road has also influenced the growth of Mlolongo because of accessibility and affordable transport to places of work. This is because of close proximity to Nairobi and Industrial area where the majority of those who reside in Mlolongo work. The road has been able to encourage the growth of businesses because transporting goods in and out of Mlolongo is made easy. This has led to booming business along the road side and construction of more business premises.

4.1.1 Chi – Square (X^2) Test for Influence of Road Transport System on Growth and Development of Mlolongo

Chi – Square test (X^2) was used to establish the relationship between road transport system and growth and development of Mlolongo. The study endeavoured to test the hypothesis that there is a significant relationship between road transport system and growth and development of human settlements. The technique compared the proportion observed in each category with what was expected under the assumption of independence between the two variables.

i) Null Hypothesis (H_0):

There is no relationship between road transport system and growth and development of human settlements along major roads.

ii) Alternative Hypothesis (H_i):

There is a significant relationship between road transport system and growth and development of human settlements along major roads.

iii) Model specification and assumptions:

- Categorical variables: Road transport system and growth of settlements
- X² distribution
- Random sample

iv) Significance level: α 0.05

$$\text{Degrees of freedom (d.f)} = n-1 = 1$$

$$\text{Critical value of } X^2 = 3.84 \text{ (from } X^2 \text{ - tables)}$$

v) Computing X² statistic

Table 4.1 Road Transport Systems Leading to Growth of Mlolongo

	Observed N	Expected N	Residual
Main highway	59	40.0	19.0
Weighbridge	21	40.0	-19.0
Total	80		

Source: Field Survey 2003

vi) Decision:

$$X^2 \text{ observed} = 18.050 > X^2 \text{ expected} = 3.84$$

Ho is rejected meaning that road transport system has a significant influence on the growth and development of human settlements along major roads.

4.2 Influence of Nairobi

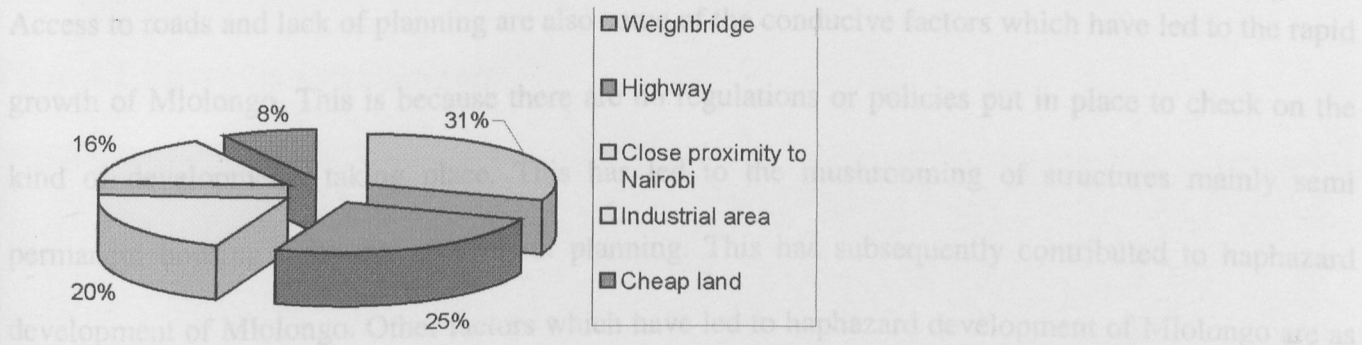
Mlolongo's growth has been significantly influenced by its proximity to the city of Nairobi. 20% of the respondents attribute the growth of Mlolongo to its closeness with Nairobi. It is nearer to Nairobi than Machakos town which is its administrative centre. Transport to Nairobi is also cheaper as compared to Machakos town. This is also attributed to the fact that the road to Nairobi is in good state thus making the fares cheaper as well. Most of the problems influenced in Nairobi are also influenced in Mlolongo. The larger population in Mlolongo was once Nairobi's population and still continues to be Nairobi's. Mlolongo will always depend on Nairobi for high order goods. Mlolongo is faced with a shifting population base heavily dependent on the city of Nairobi for employment.

4.3 Close Proximity to Industrial Area

The industrial centre which has significantly influenced the growth of Mlolongo includes manufacturing industries such as mechanical engineering industries, tobacco processing, printing and diverse crafts. The commercial sector includes general retailing, hardware, household goods, kiosks and catering. The service goods include restaurants, hotels, transportation, metal goods repair, petrol stations, barbers and religious services. Industrial area which is located in Nairobi employs some of Mlolongo's residents. Some respondents moved to Mlolongo because it is close to their place of work

which is the industrial area and as a result led to demand for housing. 16% of the respondents attributed Mlolongo's growth to its close proximity to Industrial Area.

Figure 4.1 Reasons for Growth of Mlolongo



Source: Field Survey, 2003

4.4 Cheap Land

Land in Mlolongo has been quite cheap until around 1999 when land values shot up as a result of high demand. 8% of the interviewees indicated this to be a factor leading to growth of Mlolongo. Cheap land meant that many people could afford to buy land and put up structures very fast thus speeding up the growth of Mlolongo.

4.5 Flat Land

This is one factor which was not mentioned by any of the respondents but was observed as being one of the conducive factors for the growth of Mlolongo. The whole of Mlolongo is flat thus making

construction work quite cheap. This is because it does not require a lot of excavation and leveling. It is also a factor which has made many landowners prefer to buy land in Mlolongo.

4.6 Lack of Planning

Access to roads and lack of planning are also some of the conducive factors which have led to the rapid growth of Mlolongo. This is because there are no regulations or policies put in place to check on the kind of developments taking place. This has led to the mushrooming of structures mainly semi permanent housing units put up without planning. This has subsequently contributed to haphazard development of Mlolongo. Other factors which have led to haphazard development of Mlolongo are as discussed below.

4.6.1 Lack of Development Control

Control over land and the property development process is crucial in creating a better environment, not just in terms of historic buildings or even civic design. The quality of the built environment affects us all and is central to our every day lives, for example the degree of frustration as we go about daily necessities such as shopping or simply moving from place to place, and in lack of economic effectiveness that such frustration signify. Improvements, however, will be difficult if not impossible to achieve without proper control not just in terms of what gets built and where, but also of cost and land values. For it is high land values and speculation in them which very often determine both the way human settlements look and who has access to central sites.

Private land owners do anything they feel with their land yet this should not be the case. In Mlolongo, land in Ngwata or the New Mlolongo is privately owned and this has contributed to the unplanned and sporadic development of Mlolongo. Plate 4.1 is an indication of how fast buildings are coming up in Mlolongo.

Plate 4.1 Sporadic Development



Source: Field Survey, 2003

Inability to enforce Public Health legislation explains why 100% of the tenants who rely on pit latrines for sewage disposal drain the sewage contents from the pit latrines to the open drains. This poses a health hazard to children playing on the streets and adults walking along the streets, since human excreta forms a good medium for transmission of diseases from unhealthy people to healthy ones. This explains why malaria, respiratory tract infections, skin infections, intestinal worms and diarrhea are the most prevalent diseases in Mlolongo (Figure 4.1).

The Public Health Act prohibits disposal of sewage in a manner likely to create a nuisance. It also prohibits occupation of domestic or public buildings without proper and sufficient latrine accommodation located conveniently as to be accessible to residents. It further provides that each dwelling house shall be provided with proper, sufficient and separate latrine accommodation. It also gives local authorities powers to require the owner of such building to provide the latrine. In Mlolongo, more than nine households are sharing one pit latrine therefore flouting the law.

The study also found out that tenants dump the solid waste on the roadside (Plate 3.2) and this results in a number of problems namely insects, rodents and flooding. The rodents scatter the solid waste into the open drains and these results in flooding when the rains set in making roads impassable and at the same time acting as breeding ground for vectors.

Owing to poor enforcement of the Public Health act, landlords rarely clear the drains near their compounds therefore, worsening the problem further. The Act gives powers to local authorities to require owners of building without a drain to make a drain emptying into any sewer belonging to the

authority and to maintain it. This is not possible in Mlolongo because there is no sewer line in the area belonging to the local authority. The Public Health Act also makes it illegal for anyone to allow presence of water that can allow breeding of mosquitoes.

4.6.1.2 Weak Institutional Framework

The cost of treatment for sanitation related diseases is an opportunity cost for residents in terms of money that would have been spent on other needs such as development projects. An unhealthy population cannot contribute to nation building and so the sanitation situation is contributing to losses in terms of man hours lost when the people are sick. Urgent attention is therefore required to address the causes of sanitation related diseases rather than treating the symptoms.

4.6.1.1 Lack of Planning Awareness

Lack of public awareness of planning issues and law particularly by members of the public in joint planning exercises mar efforts to control the use of land in Mlolongo. In this instance, the study discovered that respondents within the study area rarely have permission for development on their land just because they are not aware that they need permission to carry out developments on their private plots. Consequently, the field survey revealed that 73% of the respondents were not aware of what planning entails and those who made attempts at envisaging what a planner does were of the opinion that planners are meant for cities only and not market centres like Mlolongo. The few who had knowledge about planning were represented by 27% and were quick to point out its failures. Most of the people who have known planners take them simply as people who subdivide land. They are not able to distinguish between planners, surveyors, architects and land officers and their various mandates.

Lack of knowledge on who the planner is contributes to the planning problems experienced in Mlolongo and most of the market centres along major transport systems in Kenya.

4.6.1.2 Weak Institutional Framework

Machakos District Physical Planning Office

Machakos District Physical Planning Office is short of staff to carry out planning duties in the district. The whole issue of development control according to the District Physical Planning Officer rests with the local authority in Mavoko. Controlling development in Mlolongo has not been a very easy task because the enforcement section of the Mavoko Municipality is not adequate. The Physical Planning Officer lamented that there are various problems faced in trying to control development in Machakos district as a whole and Mlolongo in particular. These problems include:-

- i) People not attending stakeholders meetings so as to be informed on planning issues and their effects on the people,
- ii) Lack of political will. The politicians including councilors in the area put up any developments including on road reserves by force. They are the once who are to be at the forefront in helping the Physical Planner and the council to control developments,
- iii) Corruption whereby the council officials are bribed by developers in order for them to put up buildings without plan approval,

- iv) Insufficient funds which makes it impossible to fuel government vehicles in order to travel round the district to check on how developments are coming up and whether they are following building regulations or not,
- v) The government not clearly specifying the department involved in development control. This leads to conflicts between the Physical Planning Department and the Mavoko Municipal Council resulting in ineffective development control and
- vi) The Physical Planning Act not empowering the Physical Planner to control development.

Mavoko Municipal Council

The council is located in Athi River town. It operates five major departments: Town Clerk's Department, Treasurers Department, Sanitation Department, Education and Social Services Department and Engineers Department. In total the council has 208 members of staff which is quite adequate according to the administrative officer. Mavoko Municipal Council is responsible for provision of services such as cleansing, water and garbage collection, sewer line, maintenance of market facilities and town infrastructure, trade and business application fees, rents and charges, town plans and market supervision.

On matters pertaining to physical planning, Mavoko County Council usually liaises with the Machakos District Physical Planning Officer. At the present it does not have a planning department yet it is responsible for enforcing development in its area of jurisdiction. It also does not have adequate machinery for road maintenance and garbage collection and that is why they are not able to collect garbage in places such as Mlolongo which are far away from it. The council urgently requires an

engineer and some technical staff in building and water. The council intends to pick the current development to aid in the preparation of a Physical Development Plan of Mlolongo. This cannot be possible until a planning department is established in Mavoko or the work sub contracted to a private practitioner.

The council has played a major role in land use development in Mavoko even though nothing has been implemented. The problems that the council faces in enforcing building regulations include rigidity by the people to follow the by laws. They disobey the regulations and at times go as far as putting up structures on road reserves or on other people's plots without permission. An example of such a structure in Mlolongo is Capital Way Petrol Station and Capital Way Food Place which was put up on Mombasa Road reserve (See plate 4.2).

In order to control developments in Mlolongo, the council intends to do the following; -

- i) Set up an office in Mlolongo where the council can have some officers to control and check the upcoming developments.
- ii) Sensitize people on the need to follow planning regulations. This is because it is the people themselves who will end up being affected by poor planning.
- iii) Ensuring that the government issues ownership documents.

Plate 4.2 Development on Road Reserve



Source: Field survey, 2003

4.7 Effects of Road Transport System

4.7.1.1 Pollution

Road transport is one element of societies process of converting natural resources into things and activities which are of value to humanity. From this stems the concept of road transport as a derived demand, a service which is carried out because it is desirable to move an object or person from one place to another to enable some activity at the destination to be engaged in.

The technology of road transport like our technologies for producing most things of value, has the often undesirable characteristic that it not only produces the desired movements of persons or goods, but also can produce other outputs which are undesirable and sometimes dangerous, such as noise and air pollution. Such pollutants are reaching levels which are often objectionable and in some cases physically harmful. As a result, changes in the technology of road transport or the way in which particular parts of the system are to be used must be made in order to reduce the undesirable outputs. Such mismatches between the transportation system and its environment, for essentially non-transport reasons, will probably dictate changes in the transportation system to an increasing extent in future.

4.7.1 Environmental Impact

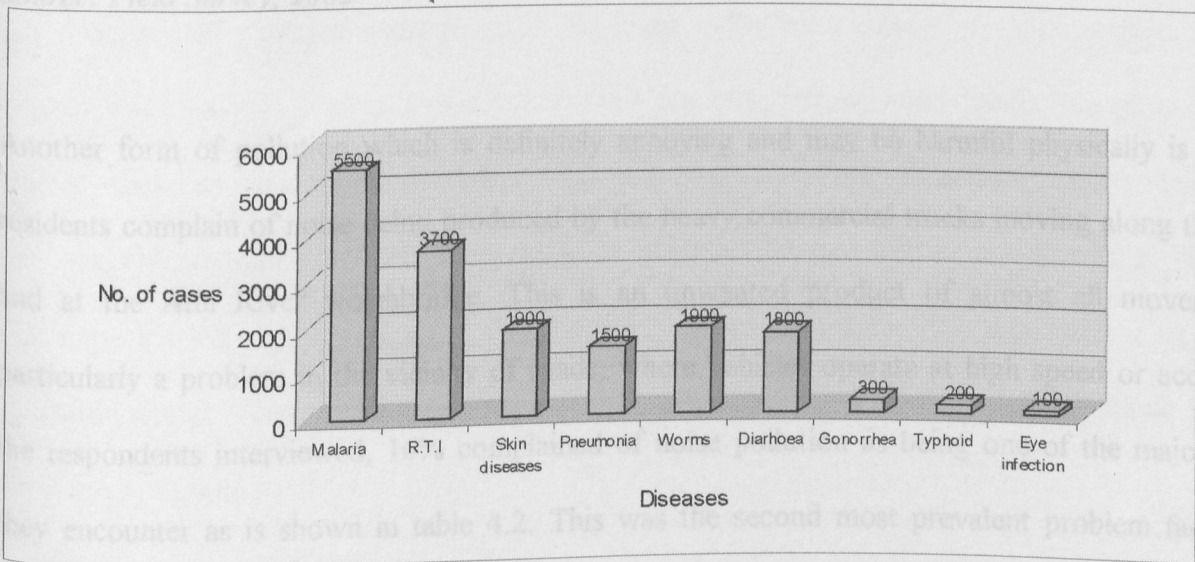
Short run gains from road infrastructure should not obscure wider or long run damage that may be associated with it. The aim is to limit and where possible reduce damage to the environment, taking account of all relevant environmental policies such as those on climatic change, local air quality and biodiversity.

4.7.1.1 Pollution

This is one of the most unwanted by products of transportation. The most serious form of this pollution, and the one most difficult to deal with, is the contamination of the air by various particles and gases. Forms of transport which employ internal combustion engines on the vehicles seems to emit the greatest amount of pollutants, especially in areas of population concentration like Mlolongo where the pollutants are actually injurious to health in some cases. Included among these are highway motor

vehicles of all types like the heavy commercial vehicles which pass through Mombasa Road. Most of these vehicles use diesel and pollute the air a lot. When the output of these vehicles is added to the pollution from other sources, the resulting total concentration can be annoying or actually dangerous to health. Residents of Mlolongo mainly those who live along the road complain a lot of this problem. Data from one of the private hospitals namely Shalom confirmed the same. Respiratory Tract Infection (RTI) was one of the top ten diseases in Mlolongo (Figure 4.2). The number of cases recorded in the year 2002 was 3,700. It was the second most prevalent disease recorded. These diseases are caused by pollution of the air by vehicles and dust emanating from the parking area and roads at the Athi River Weighbridge as is evidenced by plate 4.3.

Figure 4.2 Cases of Prevalent Diseases in Year 2002



Source: Shalom Medical Clinic, 2003

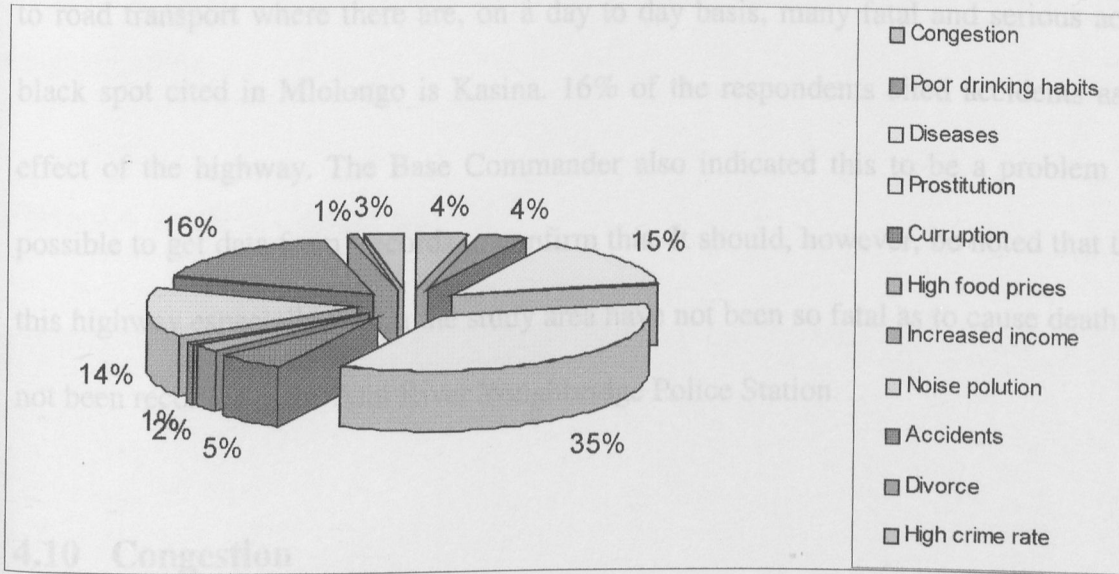
Plate 4.2 Dust at the Athi River Weighbridge



Source: Field Survey, 2003

Another form of pollution experienced in Mlolongo is the transmission of vibration from the right of way of land transport systems to activities which are hampered or made ineffective by such vibration. Another form of pollution which is definitely annoying and may be harmful physically is noise. The heavy trucks moving along the main road produce this vibration which is very annoying and residents complain of noise being produced by the heavy commercial trucks moving along the highway and at the Athi River weighbridge. This is an unwanted product of almost all movement. It is particularly a problem in the vicinity of roads, where vehicles operate at high speed or accelerate. Of the respondents interviewed, 16% complained of noise pollution as being one of the major problems they encounter as is shown in table 4.2. This was the second most prevalent problem faced. It is a problem mainly encountered by the residents who reside along the transport channel. In Mlolongo, there are residential and commercial buildings directly fronting the Nairobi Mombasa Road and are in very close proximity to it. This is against planning standards and regulations.

4.9 Accident Risk

Figure 4.2 Negative Effects of Road Transport

Source: Field Survey, 2003

Another form of pollution experienced in Mlolongo is the transmission of vibration from the right of way of land transport systems to activities which are hampered or made ineffective by such vibration. Heavy trucks moving along the main road produce this vibration which is quite deafening and annoying. Mostly this vibration affects activities which are located next to the Athi River Weighbridge. The impact is felt on the foundation of buildings located in this area. This is because it weakens these foundations and given the fact that most of these buildings do not follow the building regulations, accidents are prone to occur.

4.9 Accident Risk

Transport is an extremely dangerous activity. From a statistical perspective, it is mainly seen in relation to road transport where there are, on a day to day basis, many fatal and serious accidents. The main black spot cited in Mlolongo is Kasina. 16% of the respondents cited accidents as one of the major effect of the highway. The Base Commander also indicated this to be a problem though it was not possible to get data from records to confirm this. It should, however, be noted that the accidents along this highway especially within the study area have not been so fatal as to cause deaths. Such cases have not been recorded at the Athi River Weighbridge Police Station.

4.10 Congestion

This is primarily an urban transport issue. It is becoming an increasing problem at the entrance to the Athi River Weighbridge from Nairobi. This brings about inefficient use of valuable time and environmental damage caused by atmospheric pollution, accidents, noise and excessive fuel use.

Plate 4.4 indicates how this problem is in Mlolongo. Strictly, excessive traffic congestion, while an externality in the economic sense, really involves a lack of internal efficiency of the transport operations rather than being a form of environmental problem as conventionally understood. It is the fact that it is closely associated with and generally highly correlated with pollution and other environmental concerns.

It is not easy to quantify levels of excess congestion given the difficulty of defining the optimal level to use as a benchmark. The average traffic speeds at the weighbridge are as low as 25km per hour. Heavy commercial drivers spend an average of 45 minutes from the entrance to the weighbridge and the weighing office.

Plate 4.4 Traffic Congestion



Source: Field Survey, 2003

Plate 4.4 indicates how serious this problem is in Mlolongo. Strictly, excessive traffic congestion, while an externality in the economic sense, really involves a lack of internal efficiency of the transport operations rather than being a form of environmental problem as conventionally understood. It is the fact that it is closely associated with and generally highly correlated with pollution and other environmental concerns.

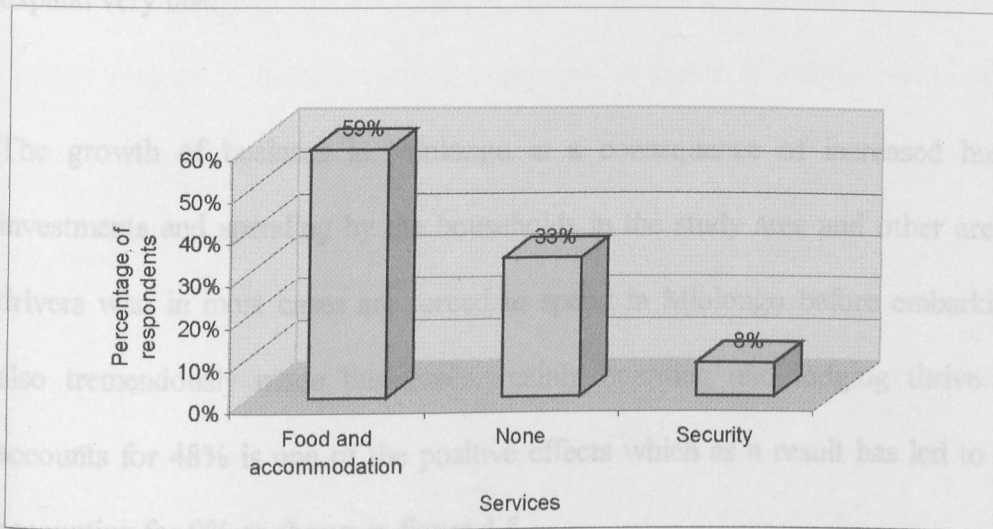
It is not easy to quantify levels of excess congestion given the difficulty of defining the optimal level to use as a benchmark. The average traffic speeds at the weighbridge are as low as 25 km per hour.

Source: Field Survey, 2001

4.7.4 Health

Pollution which accounts for 14%, prostitution 35% and poor drinking habits 4% have resulted into deterioration of the health status of residents in Mlolongo. All these three factors account for 53%. Prostitution has been rampant in Mlolongo as a result of the long distance truck drivers who park at Athi River weighbridge and spend in Mlolongo. 57% of the truck drivers interviewed preferred stopping in Mlolongo to receive services such as catering and accommodation as indicated in figure 4.4. This is because some of them travel as far as from Zambia and need time to relax before embarking on their journey. They usually carry a lot of subsistence money which they end up spending with ladies in Mlolongo. Coupled with high unemployment levels in the country, ladies engage in this practice which as a result leads to various diseases such as sexually transmitted diseases including AIDS. People who have lived in Mlolongo for long call it a ladies town because of this habit.

Figure 4.4 Services Truck Drivers Receive in Mlolongo



Source: Field Survey, 2003

4% of respondents indicated that truck drivers who spend in Mlolongo and who have made the place have so many bars have contributed to the residents poor drinking habits. This can also be attributed to the fact that road transport has led to increased income levels in Mlolongo and as such there is a lot of money to spend. This was acknowledged by 16% of the sample population. This poor drinking habits leads to poor health standards.

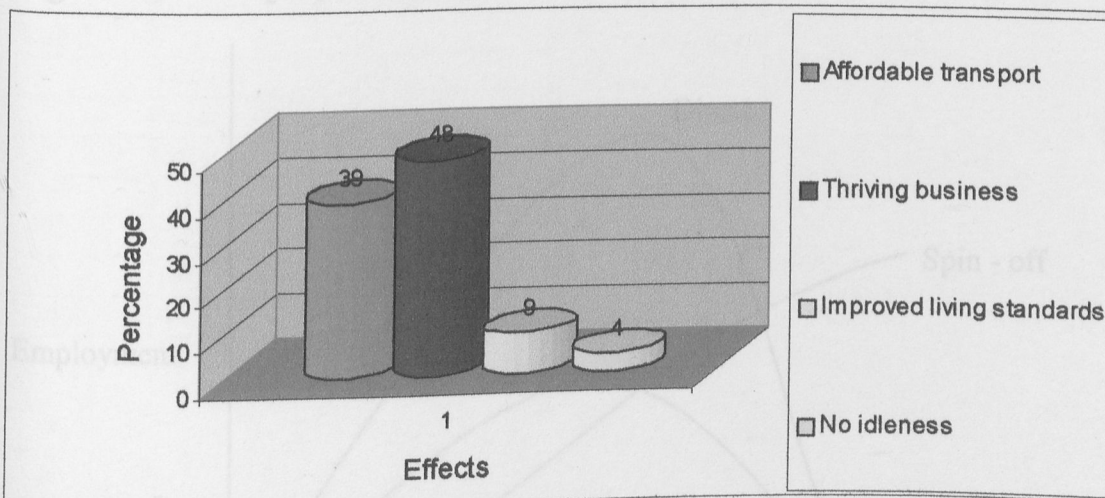
4.7.5 Economic Development

Improved accessibility is one of the causes for economic development from transport. Any observer passing through Mlolongo market notices intensive economic activity that is not highly diversified. There are a number of new business premises which have opened up recently mostly bars and lodgings.

There is also evidence of increasing economic activity which implies that the market centre is yet to expand very fast.

The growth of business in Mlolongo is a consequence of increased human activity, and related investments and spending by the households in the study area and other areas such as Nairobi. Truck drivers who in most cases are forced to spend in Mlolongo before embarking on their journeys have also tremendously made businesses, mainly boarding and lodging thrive. Thriving business which accounts for 48% is one of the positive effects which as a result has led to improved living standards accounting for 9% as shown in figure 4.5.

Figure 4.5 Positive Effects



Source: Field Survey, 2003

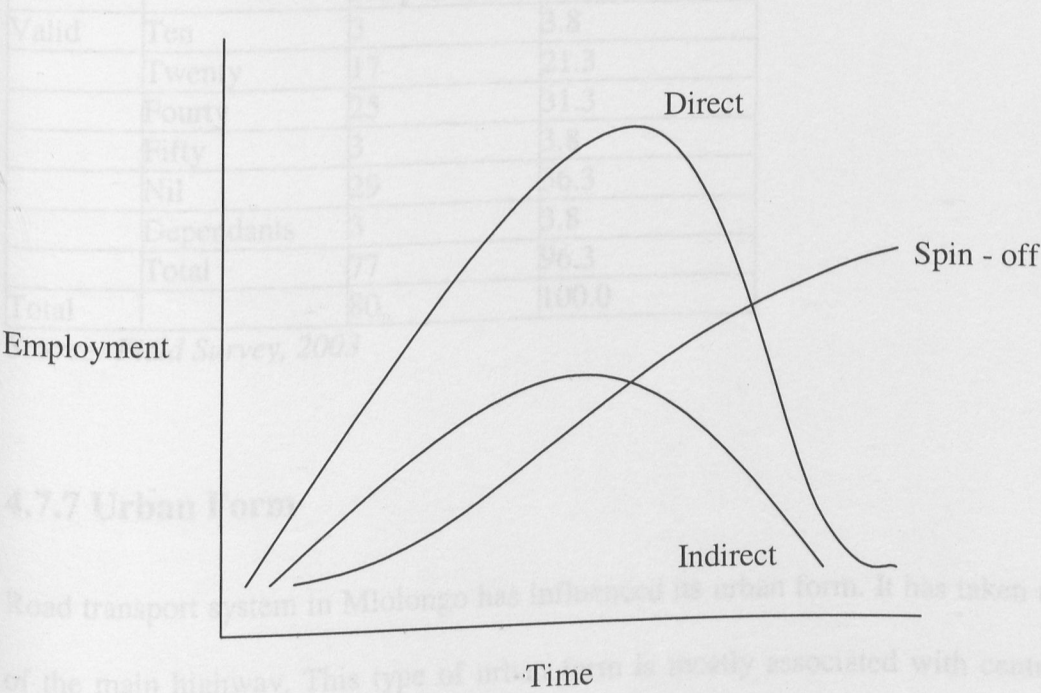
Transport systems have exerted a lot of influence over economic location and development of Mlolongo. In practice, of course, economic activity is often clustered and these clusters tend to be

around these transport systems. Bars, lodgings and hotels are clustered around the Weighbridge, Mombasa Road and Petrol Service Stations which are the major transport systems in the area. The spatial impact multiplier, usually expressed in terms of employment creation, is the workhorse in assessment of the effect that transport system development has had in Mlolongo.

Figure 4.6 offers a fairly standard diagram depicting the employment impacts of any major transport investment over time. There are the direct jobs which have been created in association with the construction of the system, the indirect effects of the construction on local industries and people and the longer term spill over effects from new activities moving to the area.

Table 4.2 Cost of Transport to Place of Work

Figure 4.6 Employment Impacts Over Time



Source: (Banister, 1995)

4.7.6 Affordable Transport

Table 4.2 shows that 29% of respondents indicated that transport to other areas from Mlolongo is quite affordable due to accessibility as a result of the transport network. 11% of residents in Mlolongo stated that affordable transport was one of the reasons which made them prefer to reside in Mlolongo (Figure 3.1). The majority who account for 36.3% do not pay any transport to their places of work. 3.8% paid fifty shillings to their place of work. This was the highest transport paid by residents in Mlolongo. Dependants who do not go to work account for 3.8%.

Table 4.2 Cost of Transport to Place of Work

		Frequency	Percent
Valid	Ten	3	3.8
	Twenty	17	21.3
	Fourty	25	31.3
	Fifty	3	3.8
	Nil	29	36.3
	Dependants	3	3.8
	Total	77	96.3
Total		80	100.0

Source: Field Survey, 2003

4.7.7 Urban Form

Road transport system in Mlolongo has influenced its urban form. It has taken a linear form as a result of the main highway. This type of urban form is mostly associated with centres located along major transport routes. It was observed that all the buildings along the main highway are fronting it and this is

against planning regulations. This problem ensues mainly because the planning of these centres are never integrated into the planning of road transport system.

5.1 Synthesis

The study found out that Mlolongo market centre was planned long ago during the last few years. The first people settled in Mlolongo in 1910. Before that time, it was an area which was used as a holding ground for cattle belonging to the Kikuyu people. The area was known as waibridge which was later on changed to Mlolongo in 1960. Mlolongo market centre was planned in 1960 when the area voted for KANU during the 1960 general election. The market centre was planned in a place known as Katani and Mlolongo market is the type of market.

Mlolongo has attracted so many people because of its location. It has good road network planning standards due to lack of a proper planning standards. The market centre has problems in the provision of services such as medical services, police, fire, and other services. One of the major findings was that the growth of Mlolongo market centre was not planned properly. This was indicated by 31% and 75% of the respondents who indicated that the market centre was not planned. These two transport systems were not planned properly. The market centre has many problems which in turn influenced the growth of Mlolongo market centre.

Mlolongo road was found to have problems of growth of market centre. The market centre has problems of accessibility and affordable transport to people. The market centre has problems of growth of Mlolongo has been significant. The market centre has problems of growth of Mlolongo has been significant. The market centre has problems of growth of Mlolongo has been significant. The market centre has problems of growth of Mlolongo has been significant.

CHAPTER 5: SUMMARY AND RECOMMENDATIONS

5.1 Synthesis

The study found out that Mlolongo market centre has grown very fast during the last ten years. The first people settled in Mlolongo in 1992. Before it was settled, it was an area which was used as a holding ground for cattle belonging to the Kenya Meat Commission. The area was known as weighbridge which was later on changed to Mlolongo in 1992. Initially, Mlolongo was allocated to Asians who had voted for KANU during the 1992 general elections. The Asians were later moved to a place known as Katani and Mlolongo leased to the local people.

Mlolongo has attracted so many developments which unfortunately do not meet the physical planning standards due to lack of a Physical Development Plan. As a result of this, there have been problems in the provision of services such as infrastructure, public utilities and access roads. One of the major findings was that the growth of Mlolongo revolves around the weighbridge and the main highway. This was indicated by 31% and 25% of the respondents respectively as shown in figure 4.1 in chapter four. These two transport systems led to other developments such as petrol service stations and garages which in turn influenced construction of hotels, bars, restaurants and housing for their users.

Mombasa road was found to have influenced the growth of Mlolongo because of accessibility and affordable transport to places of work for the residents. The study also found out that the growth of Mlolongo has been significantly influenced by its proximity to the city of Nairobi, industrial area and cheap land in that order of importance. The larger population of Mlolongo was found out to be once

Nairobi's population and still continues to be Nairobi's. Another factor of significance which was observed was that the area is flat and this makes construction cheap because it does not require too much excavation and leveling. The last but not least factor was lack of planning which impacted negatively because it led to haphazard development of Mlolongo. This haphazard development was found to have come about as a result of various factors. These were lack of development control which resulted in land owners putting up developments without following any planning standards and regulations.

Most members of the public interviewed indicated that they were not aware of planning issues. Due to lack of planning awareness, members of the public rarely have permission for development on their land. Weak institutional framework both in the Physical Planning Department and Mavoko Municipal Council was found to be a major factor contributing to haphazard and uncontrolled development of Mlolongo.

The study also endeavored to find out the effects of road transport system. There were both positive and negative effects. The negative impacts included pollution and accidents. Congestion and health problems were also mentioned as negative effects of road transport system. The positive effects included improved economy in Mlolongo leading to increase in the people's living standards and affordable transport as a result of accessibility. Road transport also influenced Mlolongo's urban form which is a linear type of development.

5.2 Recommendations

The following recommendations are not only intended to control growth and development of Mlolongo but also to provide a general policy guideline to control and guide development of human settlements along all the major road transport systems in Kenya.

5.2.1 Road Transport System

Nairobi – Mombasa road is a major trunk road. Fatal accidents have not yet been recorded within Mlolongo but it is likely that they will occur as Mlolongo market centre continues to grow without proper management. The main transportation systems in Mlolongo affecting other land uses are roads, weighbridge, petrol service stations and pedestrians on which action proposals are required.

5.2.2 Roads

Access roads need to be provided and roads in the commercial area paved giving allowance for curb parking and pedestrian pavements. Priority should be given to provision and upgrading of access roads and local distributors in the residential areas. All the roads within the residential area are earth, narrow and undeveloped.

Nairobi – Mombasa road need to be made a dual carriageway and a fly over provided to link Mlolongo with the industrial zone so as to avoid accidents which are likely to occur in the near future and also encourage development in that zone. The dual carriageway will also reduce the level of congestion in this area.

5.2.3 Bus and Taxi Parks

There is no parking in Mlolongo. The present parking by the market is undeveloped and haphazard. Vehicles park anywhere because there is no site specifically set aside for parking. This is one factor which leads to congestion in Mlolongo. From the year 2002, vehicles specifically destined for Mlolongo from Nairobi were introduced and so there is an urgent need to provide parking space for this vehicles.

5.2.4 Pedestrian Pavements

The great majority of pedestrian movements in Mlolongo is local in nature and takes place on footways adjacent to the carriageway. It therefore follows that the vehicular – pedestrian conflict must be an important consideration in traffic management. Secure, adequate and convenient pedestrian facilities should be provided in Mlolongo and protected. Justification for pedestrian facilities in Mlolongo include high pedestrian and vehicular flows, favourable topography and anticipated high accident rates in the future.

5.2.5 Pedestrian Crossings

Various types of crossings should only be considered at sites where positive benefits for the convenience and safety of pedestrians are likely to be obtained. Zebra crossings can be provided at relatively low costs but are unsuitable in Mlolongo since the traffic is heavy and fast moving. The pedestrians willing to cross therefore find it difficult to judge the speeds and stopping distances of approaching vehicles. This research therefore recommends as had been stated earlier, a fly over.

5.3 Management

It is understandable that the present financial capability and manpower of Mavoko Municipal Council do not seem to be adequate for it to assume large-scale project implementation, maintenance and administrative costs which are traditional with such status. If it is to execute real development programmes in providing and maintaining services and infrastructure, there will arise the need to create and adequately man or equip the relevant technical departments which are at the moment lacking. These are roles and responsibilities which the municipality has to assume ultimately. Hence the likely increase in financial input and its sources have to be evaluated.

5.4 Human Settlement

Service centres along major transport systems need to be integrated into the transport system. All settlements of this nature should be controlled, integrated, sustainable and be in a livable environment.

There was no Physical Development Plan prepared to aid in the development of Mlolongo after the construction of the weighbridge which is one of the major factors contributing to its growth. The study recommends that a Physical Development Plan must be prepared in any case a major development like the weighbridge is set to be established in an area. This is because it is obvious that it will attract developments. Without a Physical Development Plan, then we are sure of having unplanned and haphazard growth of centres. Mavoko Municipal Council is losing a lot of revenue as a result of lack of a Physical Development Plan for Mlolongo. If a plan is prepared, then the council will be able to charge Unimproved Site Value (U.S.V.) which can be used to improve services in Mlolongo.

An environmental Impact Assessment also needs to be carried out immediately a major transport system is earmarked for an area.

There is need to urgently put in place a good management plan to guide the growth and development of Mlolong.

5.4.1 Physical Thresholds to Development

As the absolute population numbers, economic activities and the development of infrastructure for social and utility services increase in a centre, the demand and conflict for space use increase horizontally and vertically. The choice for overcoming such increase in space demand and conflict in Mlolongo is through maximizing use of the existing space. Besides, there may also be constraints due to large scale private land ownership within the area. Some implications may arise as was observed in Mlolongo, for instance a partial slow down in development activities as planning services cannot rapidly be executed within the area. To avoid haphazard and illegal development in the extended areas, temporary embargo on new development has to be imposed by the relevant authority which is Mavoko Municipal Council.

In choosing to maximize use of the space within the existing boundary, the following things are bound to happen: -

- i) Land values will rise due to drastic increase in density,
- ii) The high density increased through smaller land sub divisions, erecting high-rise buildings and using most of the open spaces raise serious environmental and skyline issues.

iii) Concerted redevelopment would have to be undertaken involving the demolition of obsolescent and low-density structures, street widening and interference through re location of service lines.

5.4.2 Structural Threshold

Land within the central area of Mlolongo for commercial, residential and services development are already fully and partially built up or earmarked for specific projects. The alternative is setting up of a redevelopment policy for lots on which leases have expired or the structures are obsolete especially in the commercial centre; to carry out subdivision of existing under developed lots; to redevelop or develop existing pockets of vacant land with high-rise density structures; or to open up new areas for additional development.

5.5 Existing Extent and Capacity of Utilities

The limited extent and capacity of existing utilities such as water and sewerage systems and roads militates against development and extension of services. Such thresholds have to be overcome at high costs in order to encourage development beyond their limits.

Roads or transportation thresholds in Mlolongo exist in the sense that some roads are too narrow and cannot be widened without overall redevelopment in the area; off street parking hardly exist and curb parking take place along narrow roads thus contributing to congestion; pedestrian walk ways are not developed; and a number of junctions are potentially dangerous.

Access roads in the residential areas, mainly Ngwata do not exist. Therefore, if further development and increase in activities are to take place in these areas as is anticipated, the present road standards will not cope up with the likely increase of traffic. This therefore calls for re-examination and planning of the road network system.

In managing rapid urban growth as is with the case of Mlolongo, an investment in improved tools such as Geographic Information System (GIS) would increase the ability to link together different data sets and present them clearly and concisely in a variety of ways. GIS systems can equally aid short-staffed local governments in managing this rapid and uncontrolled growth, which planners find themselves in. It would be hoped that GIS system would greatly assist in planning, development control, the elimination of the large backlog of development applications and the need to address improved land registry functions.

In terms of delegation of powers, the local authorities need to be de-linked from the controls of the central government. Sporadic and fast growing market centres, such as Mlolongo may need market specific regulatory powers and decisions, which avoid the costs and delay in referring cases to higher levels of government. A wider involvement of planners, local communities, CBOs, NGOs and entrepreneurs in the preparation of Physical Development Plans must be encouraged through an appropriate analysis of stakeholders and the encouragement of partnership build up. With the time the institutionalization of the plan preparation as a 'process' rather than a 'product' would go a long way in terms of gaining a broad consensus for compliance. A parallel overemphasis of local based community

involvement at an early stage in the planning process would greatly reduce the problem of non-compliance and increase ownership of existing plans by the entire community.

The build up of technical capacities in the local authorities and government ministries would greatly improve the development control measures such as the response towards, say, the needs of small businesses, hawkers and vendors. In an effort to ensure that illegal developments are controlled there is a need to ensure that development permits are not delayed. The Physical Planning Act should incorporate penalties for the contravention of the specified period.

5.6 Towards a Human Settlement Growth Policy

Forces need to be set in motion to permit the establishment of a national human settlement growth policy – a policy that will not view human settlements as isolated developments responding only to local market forces, but as parts of a broader national and state framework for human settlements growth.

A national human settlement growth policy is essentially a concern for achieving more efficient and desirable patterns of human settlement than would occur without conscious effort. It needs to recognize that virtually every major state action that allocates resources on a significant scale has implications for settlement patterns, whether intended or not.

Urban problems cannot be solved in an uncoordinated approach within each separate political jurisdiction. Unless a coordinated attack is mounted on the problems of rural, suburban and urban

development, there will be continued disappointment by the small return on the public investment for problem solving in the human settlements.

5.6.1 Controlling Human Settlement Growth

A national human settlement growth policy must address itself to the problem of uneven population distribution within market centres such as Mlolongo. There is need for effective regional government, revenue policies and land use controls responsive to local needs, transit tied to and planned with community development, and more effective techniques to reserve land in open space and control the pace of development.

5.7 Proposed Plan

The basic components of the development proposal of the study area consists of the projections of growth in population, employment and services as well as broad guidelines on the major land uses. It is considered that the question of determining the detailed amount of land to be required for most categories of development can only be relevant at the stages when:

- i) Specific project decisions, locations and implementation are forthcoming.
- ii) The administrative and policy decisions on existing land use conflicts, under developed sites, redevelopment and land ownership are resolved. This would enable a realistic land budget to be drawn in relation to future short term and long term development proposals.
- iii) Since the density issue can be resolved by developing vertically or horizontally, the options for amount of land required for various development remain speculative rather than definite.

Besides, the constraint imposed on spatial content of development by the extension of service networks and their capacities render the estimation of additional land for development academic.

5.7.1 Land Use Proposal

Although in this attempt no effort has been made to quantify and project the additional amount of land that will be required for each use, consideration has been to a broad determination of the structural pattern of land use for residential, commercial, industrial, public purpose, recreation, education and roads requirement for the long term period upto 2030. The reasons for this approach are that:

- i) Unless the scales of development to be adopted in Mlolongo in terms of high rise and low rise is decided, no realistic allocation of land relating floor space, rooms and hectares can be made. Thus the actual land size required is better left to be determined on a specific project requirement.
- ii) For sometime, most development in Mlolongo will be private and individual especially for commercial and residential development. Besides, these will take place within the vast freehold lands. Hence the need is more to specify the user zones and produce detailed plans for roads and minimum/ maximum plot sizes to facilitate approval of development plans than to delimit the boundary of additional specific development land required in future.

However, the general locational pattern of the major land uses have been made. The criteria governing the location of these land use patterns are:

- i) The existing direction and location of nuclei of such land uses.

- ii) The extent of existing service lines and roads that could meet additional development without high cost of servicing the area.
- iii) The terrain condition that would make the relative development costs of the various housing types for the low, medium and high income population commensurate with their affordability.
- iv) Accessibility to places of work, without incurring high transportation costs especially for the low and medium income community.

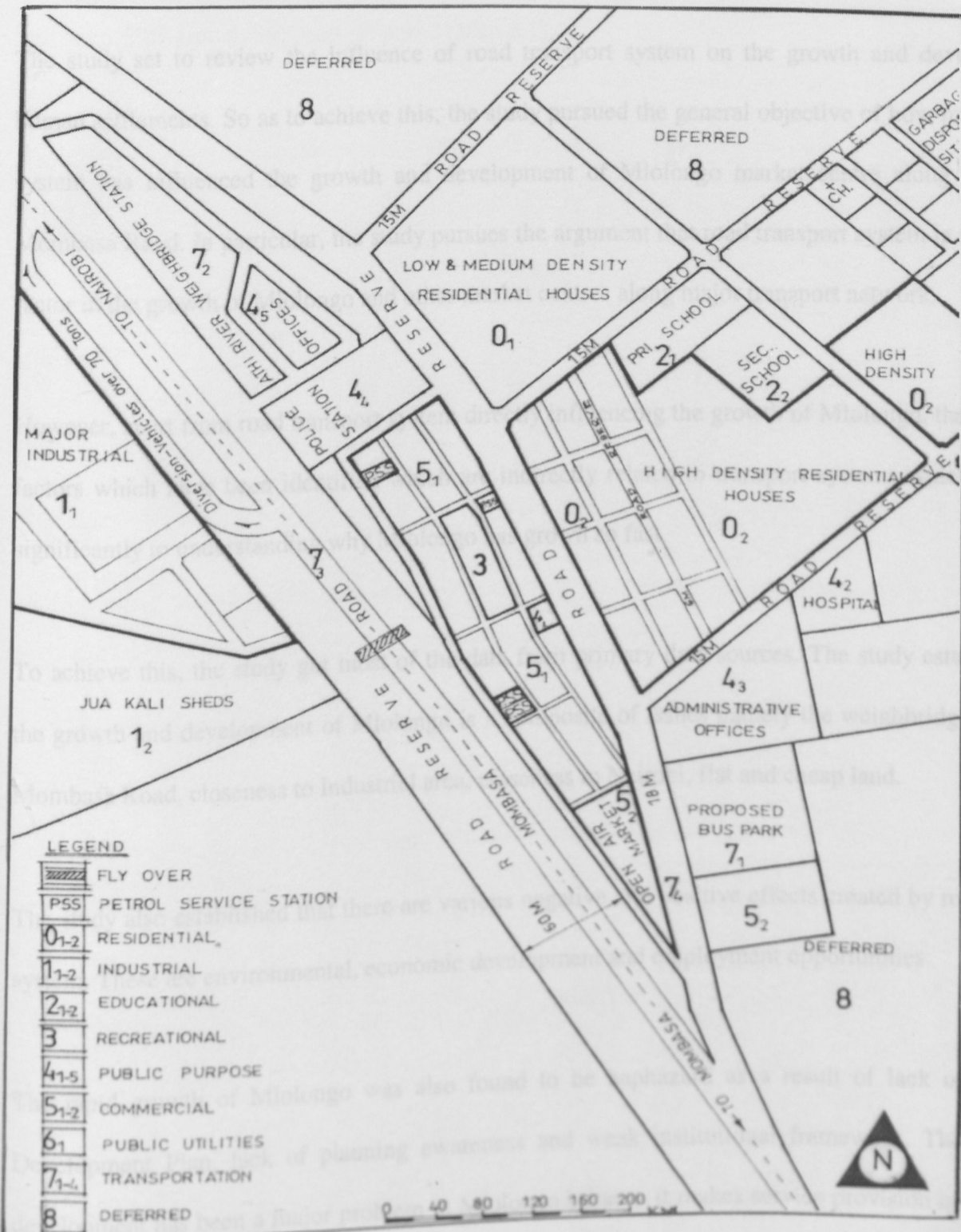
The pattern of land use for the long term period is contained in Map 5.1.

5.8 Areas for Further Research

There are a number of issues that require further research in this area of study. These are described below.

- i) The role of the community in planning and development control in areas along major road transport system.
- ii) Research required to understand the nature and costs of environmental effects of road transport system.
- iii) The impacts of haphazard development along major road transport system.
- iv) The dynamics of urban growth.

Map 5.1 Proposed Structure Plan



Source: Omondi, F. O., 2003

5.9 Conclusion

The study set to review the influence of road transport system on the growth and development of human settlements. So as to achieve this, the study pursued the general objective of how road transport system has influenced the growth and development of Mlolongo market centre along the Nairobi Mombasa Road. In particular, the study pursues the argument that road transport system is a significant factor in the growth of Mlolongo and other market centres along major transport network.

However, apart from road transport system directly influencing the growth of Mlolongo, there are other factors which have been identified which are indirectly related to transport systems which contribute significantly to understanding why Mlolongo has grown so fast.

To achieve this, the study got most of the data from primary data sources. The study established that the growth and development of Mlolongo is a composite of issues namely the weighbridge, Nairobi – Mombasa Road, closeness to Industrial area, closeness to Nairobi, flat and cheap land.

The study also established that there are various negative and positive effects created by road transport system. These are environmental, economic development and employment opportunities.

The rapid growth of Mlolongo was also found to be haphazard as a result of lack of a Physical Development Plan, lack of planning awareness and weak institutional framework. This haphazard development has been a major problem in Mlolongo because it makes service provision quite difficult.

A Local Physical Development Plan which is urgently required to aid in redevelopment of Mlolongo and control its growth has been proposed (Map 5.1).

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Respondent's name (Optional)

Sex

A. Household details

Serial	Relationship to household head	Sex	Age (Yes)	Marital status	Occupation	Income per month (Ksh)
1 (Resp)						
2						
3						
4						
5						

Legend

Relation to household head

- 1. Self
- 2. Spouse
- 3. Son
- 4. Daughter
- 5. Other relative
- 6. Others (Please specify)

Sex

- 1. Female
- 2. Male

Occupation

- 1. Teacher
- 2. Farmer
- 3. Clerk/secretary
- 4. Student
- 5. Others (Specify)

Educational level

- 1. University
- 2. Secondary
- 3. Primary
- 4. None

Marital status

- 1. Married
- 2. Single
- 3. Widowed
- 4. Divorced/Widowed

2. When did you start residing in Mshwaga?

Appendices

Appendix A

**University of Nairobi
Department of Urban and Regional Planning
Faculty of Architecture, Design and Development**

M. A. (Planning) Thesis Project

Influence of Road Transport System on Growth and Development of Human Settlements: A Case of Mlolongo Settlement in Machakos District, Kenya

Household Questionnaire

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

Name of interviewer.....Date.....

Respondent's name (Optional).....Sex.....

A. Household details

Serial	Relationship to household head	Sex	Age (Yrs)	Marital status	Occupation	Income per month (Ksh)
1(Resp)						
2						
3						
4						
5						

Legend

Relation to household head

- 1. Self
- 2. Spouse
- 3. Son
- 4. Daughter
- 5. Other relative
- 6. Others (Please specify)

Sex

- 1. Female
- 2. Male

Education level

- 1. University
- 2. Secondary
- 3. Primary
- 4. None

Occupation

- 1. Teacher
- 2. Farmer
- 3. Civil servant
- 4. Student
- 5. Others (Specify)

Marital status

- 1. Married
- 2. Single
- 3. Widowed
- 4. Divorced/ Widowed

2. When did you start residing in Mlolongo?.....

3. What made you choose Mlolongo as your area of residence?

4. Where do you work?

- i) Nairobi. JKIA area
- ii) Nairobi Mombasa Road
- iii) Nairobi Industrial Area
- iv) Other Nairobi
- v) Within Mlolongo Settlement
- vi) Mavoko
- vii) Kitengela
- viii) Other

5. Why live in Mlolongo?

- i)
- ii).....
- iii).....
- iv)..
- v).....

6. Which of the following services are you offered with?

- i) Communications
- ii) Power supply
- iii) Sanitation

7. Does the road contribute to any of your income sources? i) Yes ii) No

8. If yes, explain its contribution.

9. Which factors have favoured growth and development of Mlolongo?

- i)
- ii).....
- iii).....
- iv).....
- v).....

10. How can developments be controlled in Mlolongo?

- i)
- ii).....
- iii).....
- iv).....
- v).....

11. What positive and negative effects have been brought about by road transport in Mlolongo?

- i)
- ii).....
- iii).....
- iv).....
- v).....

B. Housing

12. What type of house do you occupy?

- i) Bungalow ii) Flat iii) Maisonette iv) Single room

13. How much rent in Kshs do you pay per month?

Number of housing units used by the household	Number of rooms per unit	Functions of the rooms	Roofing materials	Walling materials	Floor materials

C. Land Tenure

14. Does this land belong to you? i) Yes ii) No

15. If yes, how much did you purchase it? Kshs.....

16. What size is it in acres?

17. Do you have a title deed? i) Yes ii) No

D. Transportation

18. For the household members who work, which modes do they use?

Household member	Place of work	Mode of transport	Cost

19. What problems do you face in transportation?

- i) Poor roads
- ii) Inadequate transport network
- iii) Inadequate public transport
- iv) High transport costs
- v) Inaccessibility

20. What are your suggested solutions to the above problems?
- i)
 - ii)
 - iii)
 - iv)
 - v)

21. How many family vehicles do you own?

E. Health

22. What are the five most prevalent diseases in your household?
- i)
 - ii)
 - iii)
 - iv)
 - v)

23. Which is the most common facility that you seek medical services?
- i) Private hospital
 - ii) Government hospital
 - iii) Nursing home
 - iv) Health centre
 - v) Dispensary
 - vi) Clinic
 - vii) Others (Please specify).....

24. Name them and indicate where they are located.

Name of facility	Location

F. Worship

25. What is your religion?
 i) Christian ii) Muslim iii) Hindu iv) Other (Specify).....

26. If Christian, which denomination do you belong?
 i) Catholic ii) Protestant

27. Where is your place of worship located?.....

G. Recreation

28. Do you have recreation facilities around here? i) Yes ii) No

29. If no, do you feel there is a need for one? i) Yes ii) No

I. Water Supply and Sanitation

30. Where do you get your water?

- | | |
|-----------------------|--------------------------------|
| i) Natural water body | v) Individual water connection |
| ii) Well | vi) Piped communal water point |
| iii) Borehole | vii) Roof catchment |
| iv) Water vendors | viii) Others (Specify)..... |

31. What are the problems in your water supply?

- i) Irregular ii) Dirty iii) Other Specify).....

32. Do you experience storm water drainage problems? i) Yes ii) No

33. Which ways of waste water disposal do you use?

- | | | |
|--------------------|-----------------|---------------------------|
| i) Sewerage system | ii) Septic tank | iii) Conservancy tank |
| iv) Pit latrines | v) Flush toilet | vi) Other (Specify) |

34. Where do you dispose your household garbage?

- i) Open pit ii) Dust bin iii) Collected by local authority

35. What sanitation problems do you face in this area?.....

36. What are your suggested solutions to these problems?

THANK YOU

Appendix C

University of Nairobi
Department of Urban and Regional Planning
Faculty of Architecture, Design and Development

M. A. (Planning) Thesis Project

Influence of Road Transport System on Growth and Development of Human Settlements: A Case of Mlolongo Settlement in Machakos District

Mavoko Municipal Council Town Clerk's Interview Schedule

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

Name of interviewer.....

Respondent's name (Optional).....Date.....

1. Please fill in information on your responses to the following questions.

Serial	Department	No. of Chief Officers	Other Officers
1			
2			
3			
4			
5			
6			
7			
8			
9			

2. Which of the following facilities are available in Mlolongo?

Facility	Yes	No	Land size	Ownership	Remarks
Treatment works					
Stadium					
Designated open space					
Differed land					
Garbage disposal site					

3. Do you provide sanitation services in Mlolongo? i) Yes ii) No

4. What problems do you face in the maintenance of roads in your area of jurisdiction?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

5. Which type of machinery do you have at your disposal to discharge your duties (e.g. machinery for road maintenance and garbage collection)?

Serial	Machinery	Number of machines	Use	Condition
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

6. What is your capacity to discharge your responsibilities?.....

7. What is your revenue base?.....

8. Which development problems are you facing as a municipal council?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

9. Which measures have you taken to solve these development problems?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

Appendix D

10. Which factors have favoured growth and development of Mlolongo?

i)

11. Which measures can be put in place to guide and control developments in Mlolongo?

i)

ii)

iii)

iv)

v)

12. How much land do you have as a municipal council?.....

13. Of the trust land you have, how much is in Mlolongo?.....

14. What is the distribution of this land in Mlolongo?.....

Serial	Centre (Optional).....	Amount of land	Type of centre e.g Market, Township e.t.c.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

15. Do you provide water to the residents of Mlolongo? i) Yes ii) No

16. How much water do you supply to the residents?

17. What has been the councils role in land use development in Mlolongo?.....

18. What are some of the problems you face in enforcing building regulations?.....

THANK YOU

Appendix D

University of Nairobi
Department of Urban and Regional Planning
Faculty of Architecture, Design and Development
M. A. (Planning) Thesis Project

Influence of Road Transport System on Growth and Development of Human Settlements: A Case of Mlolongo in Machakos District

Machakos District Physical Planning Officer's Interview Schedule

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

Interviewer.....Date.....

Respondent's name (Optional).....

1. Which are your concerned land uses in Mlolongo?

- i)
- ii)
- iii)
- iv)
- v)

2. How many Physical Development Plans have been made for the district over the last ten years?

Type of Development.	Year.	In Mlolongo.	The Wider Machakos.
	2002		
	2001		
	2000		
	1999		
	1998		
	1997		
	1996		
	1995		
	1994		
	1993		

3. What are your tools for development control?

- i)

4. Which problems do you face in development control?

- i)
- ii)
- iii)
- iv)
- v)

5. What solutions are you able to offer to control development problems?

- i)
- ii)
- iii)
- iv)
- v)

6. What are the main development types in Mlolongo?

- i)
- ii)
- iii)
- iv)
- v)

7. Who are the main developers in Mlolongo?

- i)
- ii)
- iii)
- iv)
- v)

8. What factors have favoured growth and development of Mlolongo?

- i)
- ii)
- iii)
- iv)
- v)

9. What are the impacts of road transport network on land values and their implications on land use planning in Mlolongo?.....

10. What principles, standards and development control measures are applied for guiding development of settlements?

- i)
- ii)
- iii)
- iv)

11) Which intervening policy framework can be advanced to control and guide development in Mlolongo?

- i)
- ii).....
- iii).....
- iv).....
- v).....

12. What is the extent of your services as regards planning the district and its environment?.....

13. What are some of the problems you face in enforcing building regulations?.....

14. What has the council done or intends to do to avoid effects of high density unplanned settlements in Mlolongo?.....

and not for any other purpose.

Interviewer..... Date.....

Respondent's name (optional).....

Type of business..... Plot No.....

1. When was this business established?

2. Averagely how many litres of fuel do you sell per day?

Serial	Fuel	Amount in litres
1	Petrol (Regular)	
2	Petrol (Premium)	
3	Diesel	
4	Paraffin	

3. Where do you get your stock from?

4. Who are your main customers?

- i) Passenger car owners
- ii) Mini bus including matatu owners
- iii) Bus owners
- iv) Heavy goods vehicle owners
- v) Light goods/ pick up owners
- vi) Motor cycle owners

5. Where do they come from?

.....

THANK YOU

Appendix E

University of Nairobi
 Department of Urban and Regional Planning
 Faculty of Architecture, Design and Development

M. A. (Planning) Thesis Project

Influence of Road Transport System on Growth and Development of Human Settlements: A Case of Mlolongo Settlement in Machakos District

Petrol Service Station Questionnaire

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

Interviewer.....Date.....

Respondent's name (optional).....

Type of business.....Plot No.....

1. When was this business established?

2. Averagely how many litres of fuel do you sell per day?

Serial	Fuel	Amount in litres
1	Petrol (Regular)	
2	Petrol (Premium)	
3	Diesel	
4	Paraffin	

3. Where do you get your stock from?.....

4. Who are your main customers?

- i) Passenger car owners
- ii) Mini bus including matatu owners
- iii) Bus owners
- iv) Heavy goods vehicle owners
- v) Light goods/ pick up owners
- vi) Motor cycle owners

THANK YOU

5. Where do they come from?

- i)

6. Which type of taxes do you pay?

Type of tax	License	Amount

7. Which problems do you experience in your daily operations?

- i)
- ii)
- iii)
- iv)
- v)

8. Which are the best possible solutions to these problems?

- i)
- ii)
- iii)
- iv)
- v)

Name of industry.....

1. What do you manufacture?

Type of finished product	Quantity in a year	Value of quantities	Market	Means of transport

2. When did you locate your business in Mkolongo?

3. Do you own this enterprise? i) Yes ii) No

4. Is the land on leasehold or freehold?

5. What are your raw materials?

- i)
- ii)
- iii)
- iv)
- v)

THANK YOU

6. How many employees do you have?.....

7. Where do you get your raw materials?.....

8. What means of transport do you use in your business needs?.....

Means	Place of entry	Place of departure
Road		
Railway		
Air		
Water		

9. In what ways has road transport affected your business?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

10. Have you got a wastewater treatment plant? i) Yes ii) No

11. If no, where do you dispose your wastewater?.....

12. What is your main market?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

13. What problems are you faced with in your production?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

15. What measures have you taken to tackle these problems?

- i).....
- ii).....
- iii).....

16. Do you provide transport to your employees? i) Yes ii) No

17. Do you require any services from the county council? i) Yes ii) No

18. If yes, what services do you require?
i) Sewerage treatment iv) Markets vii) Others (specify).....
ii) Solid waste disposal v) Fire protection
iii) Water supply vi) Roads

19. What kind of contribution can you make towards the realization of one or of all of these facilities?
i).....
ii).....
iii).....
iv).....
v).....

Interviewer:

Respondent's Name (Optional):

1. When did you first travel along Mombasa road?

2. Who is your employer?

3. Which services do you get in Mlolongo?

4. Do you prefer stopping in Mlolongo before you embark on your journey? i) Yes ii) No

5. If yes, why do you prefer Mlolongo to other areas?

6. How frequent do you travel along Nairobi Mombasa road?

7. Does the weighbridge affect you in any way? i) Yes ii) No

8. If yes, how does it affect you?

9. What are the reasons which make you prefer Mlolongo?

i).....

ii).....

THANK YOU

THANK YOU

Appendix G

University of Nairobi
Department of Urban and Regional Planning
Faculty of Architecture, Design and Development

M. A. (Planning) Thesis Project

Influence of Road Transport System on Growth and Development of Human Settlements: A Case of Mlolongo Settlement in Machakos District

Transporters Questionnaire

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

Interviewer.....Date.....

Respondent's Name (Optional).....

1. When did you first travel along Mombasa road?

2. Who is your employer?

3. Which services do you get in Mlolongo?.....

4. Do you prefer stopping in Mlolongo before you embark on your journey? i) Yes ii) No

5. If yes, why do you prefer Mlolongo to other areas?.....

6. How frequent do you travel along Nairobi Mombasa road?

7. Does the weighbridge affect you in any way? i) Yes ii) No

8. If yes, how does it affect you?.....

9. What are the reasons which make you prefer Mlolongo?

i).....

ii).....

THANK YOU

Appendix H

University of Nairobi
Department of Urban and Regional Planning
Faculty of Architecture, Design and Development

M. A. (Planning) Thesis Project

Influence of Road Transport System on Growth and Development of Human Settlements: A Case of Mlolongo Settlement in Machakos District

Land Owners Questionnaire

Confidential: The information provided under the survey shall be used for this study (Research) only and not for any other purpose.

Interviewer.....Date.....

Respondent's Name (Optional).....

1. When did you buy your land?

2. How much did you buy your land? Kshs.....

3. How big is your piece of land in acres?

4. What made you buy land in Mlolongo?.....

5. What type of development are you planning to put up in Mlolongo?.....

6. How has the road affected land values in Mlolongo?.....

7. Would you prefer to buy land closer to the road or away from the road?.....

8. Give reasons to your answer.....

9. How difficult is it to acquire land in Mlolongo?

10. Was Mlolongo developed before you acquired your land? i) Yes ii) No

11. If yes, which were the major developments during that time?

i).....

ii).....

12. What factors have favoured Mlolongo's growth?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

13. How can growth and development of Mlolongo be controlled?

- i).....
- ii).....
- iii).....
- iv).....
- v).....

THANK YOU