

// ESTABLISHING THE NEED FOR
PUBLIC TRANSPORT SERVICE IN
THIKA TOWN

by

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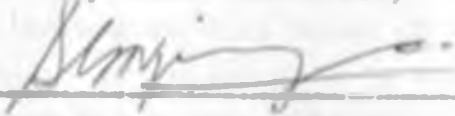


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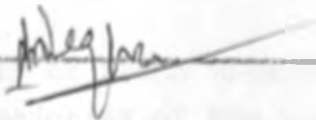
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(iii)

ABSTRACT:

Intra - urban public transport service is a significant input in the development of any town. It is that means of travel which facilitates faster mobility of the people wishing to travel to places within and about the town for which a government controlled tariff is charged. This input is however lacking in medium size towns of many developing countries. It exists only in the main capital cities and big towns. The study undertaken by the author endeavoured to establish need for establishing public transport service in Thika town one of the medium size towns in Kenya.

Lack of intra-urban public transport service in Thika has resulted into long travel times due to long travel distances to activity areas found in Thika. The fact that these activity areas (land uses) are located in different sites within the town enhances need to travel and hence increases travel demand. The travel times and distances are increasing due to the rapid growth of the town. The town's growth is ensured by its industrial development which is on the increase.

Majority of trips made in Thika are on foot as the vast majority of the residents cannot afford to own cars. Walking the predominant mode of travel was found to be costly in terms of time and inconvenience. In view of the anticipated future growth of the town, walking would therefore be more costly and inadequate. Consequently an alternative mode of travel which would be less costly, reliable and convenient is needed

(iv)

Thika town was found to have conditions which are necessary for the establishment of intra-urban public transport service such as high level of business and employment activities, low level of car - ownership, steadily increasing urban population and increasing travel distances. On the basis of these conditions, establishment of an internal public transport service involving small public transport vehicles (mini-buses) was found necessary.

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CHAPTER ONE:

GENERAL INTRODUCTION

1.0: Introduction

In this chapter, a statement on transportation in general is made. An attempt to say what public transport entails and how it has been conceived and developed in Kenya is also made.

In the same chapter, statement of the problem is presented together with brief outlines on the objective, assumption, significance, relevance, scope and limitations of the study. Theoretical framework and methodology are also covered in the same chapter.

1.1: Transportation in General

Transportation is essentially a service which enables people, firms and various other entities to carry on activities at sites selected for these purposes in different locations.

One of the major considerations in selecting a site is accessibility that any particular activity has to other activities. The very heart of transportation planning is therefore concerned with the design of circulation systems which maximize accessibility for essential movements between linked activities, giving due consideration to safety, comfort and amenity as well as cost.

Public transport service has been equated with "collective transport" or "mass transport" by many people.

Many scholars seem to agree that it is that organized means of travel which is intended for the general public use for travelling from one location to another for various activities and for which a government controlled price or tariff is paid. It is therefore a self-supporting system which is provided by private, corporate or public concerns. Private concerns are like the "Matatu"* operators or private bus services in the case of Kenya. Corporate concerns are like the Kenya Bus Services (Nbi.) where the Nairobi City Council owns 25% of the shares or Kenya Bus Services (Msa. Ltd.) where the Mombasa Municipal Council owns 49% of the shares and the rest is owned by an Overseas Company. Public concerns are those in which the state owns all the shares like the Usafiri Dar Ltd. (U.D.A.) of Tanzania. Various modes are included in public transport namely the bus, mini-buses, trains, trams, etc.

Public transportation involves the institution of rules, laws and other appropriate control measures. It is a policy of ^{the} our government to ensure that a viable and efficient public transport system in the country is created and managed. This is evident in the manner ^{the} our government allocates funds for the construction of new roads linking hinterlands with the growth centres which are also linked to the capital city.

* "Matatu" - a public transport vehicle of less than 6,720 pounds weight which are exempted from the Public Service Licence.

It is also seen in the way the government endeavours to promote Air and Railway modes of travel. In this way inter-urban transportation is enhanced.

The 1974/78 Development Plan recognized the importance of creating transportation system that would keep transportation costs and travel as low as possible and also be available to all transport users. (1)

However, public transport can be basically categorized into two forms of services namely intra-urban and inter-urban transportation services. The former refers to the haulage of people and goods within the boundaries of the urban centres while the latter refers to the haulage of goods and people into the urban centres from outside the urban boundaries. This study is concerned with the former.

In Kenya, the development of inter-urban transportation service seems to be more advanced than the intra-urban one. The government lays a lot of emphasis and invests heavily on the construction of new roads which are designed to open up the hinterlands and link them with the growth centres (as observed above) which are in turn linked to Nairobi, the capital city by road, railway and/or Air. Along these links, numerous public service vehicles in form of buses, taxis and "matatus" are seen daily commuting between the rural and urban areas.

(1) 1974/78 Kenya Development Plan PP. 343.

It is only in Nairobi and Mombasa in case of Kenya where information exists on what type of Public transportation systems exist there. But in other medium size towns like Eldoret, Kisumu, Nakuru and Thika no information exists implying that there are no public transport services in the towns. This study therefore attempts to establish need for public transport services in Thika town. Following which, it will make general statements on the criteria which could be adopted in establishing the same need in other similar towns.

1.2: Statement of the Problem:

Transportation within Thika Town is problematic because there is no established form of intra-urban public transportation service. Consequently a good link between the inter-urban transportation service and the various destinations of passengers within the town is lacking. There is a very good inter-urban transportation service originating from the hinterland - Mangu, Gatanga, Muranga, etc. - and Nairobi City and terminating in the Bus/Matatu terminal in the town centre. It has been found out from the surveys done that over 70% of the passengers alighting at the Bus/Matatu terminal are workers in the offices, institutions and industries. Some of the industries are located far away from the town centre. For example Kenya Cannery, the leading industry from an employment point of view (employing about 6,000 people) is located about 10 kilometres from the town centre. Although Kenya Cannery provides housing for its workers, a good number of workers (3,500)⁽¹⁾ still come from outside Thika Town. - *hooked*

(1) From the author's field survey.

People working in such far away located industries or institutions (schools) have to walk long distances since there is no form of public transport service for them to use.

Similarly, some of the residential areas in Thika are situated far away from the offices, industries, schools, hospital and market. The residents in these areas also encounter transportation problems as they travel to these places.

Car-ownership in Thika is very low (11.3%) considering that the majority of workers are semi-skilled manual workers whose incomes are low. The majority of them fall in the low and medium income brackets earning less than 1,200-00 per month. Consequently, they cannot afford to buy cars and have to walk or use bicycle to go to work and other activity areas. But as the town continues to grow rapidly, distances between activity areas will become longer and the present predominant modes of travel namely foot and bicycle, will become inefficient and inadequate. It is therefore essential to look for an alternative mode of travel which will be more efficient, reliable, convenient and safe.

Nevertheless, it is important to note here that Thika town is growing very rapidly. It has the second biggest industrial growth rate in Kenya next only to Nairobi, the capital city. Its 20 major industries employ more than 20,000 people. The population growth rate observed between 1962/69 was 4.1% per annum.

But the current population is estimated to be about 43,000 people with an estimated population growth rate of 8% per annum. This is an indication of the rapid population growth which is mainly due to the rapid industrial growth of the town. Thika town has a suitable site for location of industries and has as a result attracted a lot of industrial investments. It functions as an industrial satellite for Nairobi city being only a few kilometres from it (47 kms). It is well linked to Nairobi by railway and a dual carriageway. Its agriculturally rich hinterland makes it a very busy town both as a service and marketing centre supporting nearly 500,000 people from the surrounding districts - Kiambu, Muranga and Machakos. All these factors however seem to ensure the future growth of Thika town.

Noting that high population densities and high level of business activity and employment are some of the major conditions for the establishment of any form of public transportation service in towns, Thika town seems to satisfy these conditions to some extent. The author therefore feels very strongly that lack of organized public transport service in Thika town is a major problem. This study therefore attempts to establish the need for establishing such an organized public transport service in Thika town.

1.3: The Objective of the Study:

Besides addressing ourselves to the issues raised above, the study endeavours to determine

threshold conditions for the establishment of public transport services in Thika town.

1.4: The assumption of the Study:

The main assumption of the study is that there is need for establishing public transport service in Thika town. This assumption is derived from many factors including the following:-

1. The present population of 43,000 and the high rate of population growth of 8% per annum due to the rapid industrial growth of the town.
2. The anticipated population growth and physical development of the town as outlined in the town's Development Plans including the Master Plan.
3. The employment opportunities created by industrialization leading to an increased travel demand.
4. The role the town plays as a business centre for its agriculturally rich hinterland - Kiambu, Muranga and Machakos.

1.5: Significance and Relevance of the Study:

Intra-urban travel problems in fast growing medium size towns where no organized public transport services exist, are inevitable. Very little work has been done to appraise them and find ways and means of alleviating them. This study is expected to provide guidelines and principles for establishing public transport services in the medium size towns such as Thika, Kisumu, Nakuru and Eldoret. Its findings and conclusions will be useful in the

overall planning process of urban centres where transportation studies should be seen as an integral part of the overall planning process.

1.6: Scope and Limitations of the Study:

The study covers the entire area of Thika town plus the catchment areas of the traffic that has Thika destination. The latter are the immediate environs of the town such as Muranga town, Gatanga, Nairobi and Ruiru among others. The study focuses mainly on the intra-urban passenger public transportation service.

The study is comprised of five chapters organized as follows:

Chapter One is the general introduction;

Chapter Two gives a general overview of public transport service both in a global and national context but more emphasis is on the national context where Nairobi and Mombasa public transport services are looked at more closely;

Chapter Three gives background information of the study area;

Chapter Four is the analysis of the transportation system in Thika town and

Chapter Five gives the conclusions and recommendations arising from the analysis of transportation system in Thika.

It was not possible for the researcher to have a very big sample in the households' survey as this would have been very expensive. Time was also a major constraint.

However the information from the traffic counts, secondary data and Thika local authorities was adequate supplementation. Adequate data on public transportation service in an East African context or Kenyan context was generally lacking. Consequently, the writer had to depend on what was available and his findings and assessment of the situation on the ground.

1.7: Theoretical Framework:

Public transport service is essential because it facilitates movements of people, goods and services from one place to another. It should therefore be safe, efficient, reliable convenient and comfortable. It increases efficiency and mobility of the town dwellers and can only be effectively operated where routes with high traffic densities are possible. It should be noted that for any public transport service to be established, there must be a demand for it. This demand is measured in terms of peoples desires to make trips for different purposes and their decisions to use public transport service.

Public transport service saves time and reduces strain and loss of energy of the users and this leads to more efficiency in work and ultimately to more output.

With the growth of urban populations, movement within and about the urban areas becomes problematic. Transport planning process has therefore been developed in an attempt to alleviate these problems.

It has been realized by transport planners and land use planners that transport has potential to shape the urban environment by influencing the accessibility of locations within the urban environment.

The urban transport planning process is based on a range of assumptions and principles the most of which are that: ⁽¹⁾

- (i) Travel patterns are tangible, stable and predictable.
- (ii) Movement demands are directly related to the distribution and intensity of land uses, which are capable of being accurately determined for some future date.
- (iii) The transportation system influences the development of an area as well as serving that area.

Movement desires can be manipulated by controlling the land uses that represent the origins and destinations of journeys. Therefore, if the land use patterns of a town or city could be defined for future date, the associated traffic pattern could also be determined and a suitable transport system designed to fit it. Trip generation and trip distribution are used to forecast the future origins, destinations and distribution of movements associated with the developed land - use forecasts. Also demands for movement are related to activities pursued by people and these activities are reflected in the distribution and characteristics of a range of different land uses.

(1) Michael J. Bruton: Introduction to transportation planning (1975) PP.16

The provision of mobility and equality of access to the employment, health, educational and cultural opportunities is the most cited benefit of public transport (1). An efficient and convenient public transport service will attract demand from individual car-owners who if it will meet their requirements will tend to use it more often than their own cars because it will be cheaper, convenient and efficient.

The following conditions are highly favourable for mass transportation:

- (a) A steadily increasing population concentrated in a densely developed urban area.
- (b) A high level of business activity and employment.
- (c) Car ownership.

Population size and density, age and form of the urban settlement are recognized as variables which help to explain public transport's share of the total journey - to - work trips made. For instance, the higher the population and its density, the more able are operations to justify high frequency and closely enmeshed services leading to a stimulation of demand. In the case of the age and form of the urban settlement, it has been observed that the older cities tended to be densely populated, with activity areas concentrated in one place. Hence heavy congestion was a consequent. But the more modern cities are built for the use of the car and are therefore more spread. With better transport in these cities the advantages of

(1) Nancy W. Sheldon, Robert Brandwin: The economic and social impact of investments in public Transit (1973) PP.5

centrality are diminished and the disadvantages of distances between land uses are reduced.

Journeys made can broadly be categorized as "production" or "consumption" oriented. Journey to work and those made in connection with work during business hours can be said to be "production" oriented. The costs attached to these trips are likely to be insignificant in relation to the rewards anticipated and therefore, demand will not be very sensitive to changes in travel costs. They could be said to be essential journeys. "Consumption" oriented trips such as for leisure, social or recreational purposes, are "optional" rather than "necessary" and demand will therefore be more sensitive to the costs of the trips. It could be deduced from this that "production" oriented journeys are more fixed and can therefore be easily determined. They are more reliable in measuring demand for a public transport service and affordability to sustain it.

The strength of the desire to make a particular trip by public transport is related indirectly to the purpose, and the choice between modes is largely determined by the costs attached to them including non-money costs such as time. The best mode of travel is the one which tries to minimize both the costs incurred and time spent during travel and which ensures convenience.

1.8.0: Methodology:

The information contained in this Thesis was gathered both in the field and in the offices

including the libraries and archives. Four techniques of collecting data were employed:

- (1) Personal Interviews with Local Authority Officials e.g. the Town Clerk, Mayor, Town Engineer, Town Planner and Town Treasurer; Nairobi City Council Officials; Kenya Bus Services Officials and the General Public in the streets and Market places in Thika town.
- (2) Secondary Data: This came mainly from Bureau of Statistics, Physical Planning Department, Thika Local Authorities, Thika Development Plans including the Master Plan, Ministry of Works, Kenya Bus Services, Libraries, Archives and Railways.
- (3) Questionnaire Method: Two sets of questionnaires were used namely:
 - (i) Individual household questionnaire and
 - (ii) A questionnaire for institutions and commercial establishments.

The individual household questionnaire was meant to establish the characteristics of travel by Thika town residents. It therefore aimed at finding out: the number of trips made by each household, the trip purposes such as for work, school, market, hospital, etc., the time taken in each trip, the distance for each trip purpose, the cost of each trip, the mode used, mode preference for each trip purpose, income of the trip makers, routes taken during trip making (so that desire lines could be established) and car-ownership.

The second questionnaire was meant to show the working population in the industries, offices institutions, etc.; the number of those living within and outside Thika Municipality Boundary and their predominant mode of travel. It was also intended to establish:

- (i) The workers who are provided with company or institution transport and how this is managed and financed.
- (ii) Whether lack of public transport service in Thika Town had any adverse effects in the employment sector in terms of workers' lateness to work, absenteeism and productivity.

In the institutions such as schools and hospitals, the questionnaire was intended to establish the predominant mode of travel for students living within and outside the municipality boundary. In the case of the hospital, it was also necessary to know the number of outpatients and their predominant mode of travel.

(4) Traffic Counts: These were taken in order to establish traffic volumes according to different modes at different times of the day and week (peak and non-peak hour periods) along the major transportation routes in Thika town. We considered it important to establish the traffic at peak hour periods because peak hour demands place the greatest load on transport system and are therefore useful to establishing overall transport pattern and capacity.

Demands for movement at other times of the day (non-peak period) are also important especially

in establishing the quality and routing of public transport. The peak hour periods were taken to be between 7 and 8.30 a.m. when the majority of the people are moving to activity areas such as work, school, business, etc.; between 12.00 noon and 2.00p.m. when back from lunch; 4.00 p.m. to 6.00 p.m. when people and students are leaving work and school respectively for home. The non-peak hours were taken to be any other times of the day other than the peak hour periods.

Traffic counts were taken at three points along the major transportation routes within the internal cordon of Thika town. These are the routes of high traffic densities. The first point was along the major road from Muranga and Nyeri side catering for traffic emanating from that area. The second point was at the junction of Garissa Road and Kenyatta highway catering for traffic from White Sisters' Road (Mangu and Gatukuyu area) and Nairobi. The Third point was along Kenyatta highway, the main spine road through the CBD. All the traffic from CBD to the eastern side of the town uses this road. Most of the industries, schools and residential places are found in this side of the town.

1.8.1: Sampling:

The individual household questionnaire was administered in the residential areas and covered all the income groups - the high, medium and low- found in Thika town. The aim was to get response from different income groups because their views towards public transport service may differ.

The sampling took into account the location in the town centre, while others are away from the town centre. Consequently, half of the interviews were conducted in the residential areas in or near the town centre. The rest were carried out in residential areas far away from the town centre.

The institutions and commercial establishments questionnaire covered 60% of the industries, 50% of the schools in the town and majority of Government Offices and public institutions. The industries and schools included in the sample were randomly selected.

CHAPTER TWO:

A GENERAL OVERVIEW OF PUBLIC

TRANSPORT SYSTEM:

2.0: Introduction

This chapter briefly reviews some of the existing literature on public transport systems in East Africa and other parts of the world. It aims at identifying broad criteria used in establishing and operating public transportation systems. In the first few pages, it looks briefly at works done in other parts of the world so that we can have a general global understanding of public transportation systems. A detailed discussion on East African public transportation systems follows with more details given for Nairobi and Mombasa transportation systems. These were the towns where data on public transportation services were more available. Finally, a statement on the already defunct Nakuru internal bus services is made. The author thinks this statement as being particularly important because Nakuru is regarded as a medium size town just like Thika, Kisumu and Eldoret, and this study is addressed to intra-urban public transportation in towns of that size.

2.1: Review of Related Literature:

Public transit has been conceived by many planners as an essential service and a continuing responsibility for all metropolitan centres.

This is so because it is in these centres where highway congestion, parking problems, air pollution among others are prevalent according to the argument raised by Charles River and Associates (1). They argue that improved urban transportation service would divert travellers from auto to public transit reducing highway congestion, parking problems, air pollution etc. which are evident in cities of industrialized societies.

It has been noted by Lowdon Wingo Junior that while congestion is the main problem in urban transport in industrialized societies, lack of established transport service is the main problem in the less developed societies especially in the medium size towns (2). This point confirms the author's observation in chapter one that no information on public transportation exists for medium size towns in Kenya or East Africa as a whole. The explanation seems to be that established public transport services are lacking in these towns. From the argument advanced by Charles River and Associates above and Wingo's view, it could be argued that different factors prompt the need to establish public transport services in industrialized and less industrialized countries. While in the industrialized societies the aim is to curb traffic congestion, parking problems, etc., through an improved public transport service,

(1) Charles River Associates Research Study -
"Free Transit" - (1970) PP.2.

(2) Lowdon Wingo Jr. - Transportation and Urban Land.

the aim in the less developed societies is to increase urban mobility for the majority of people who do not own cars through establishment of an organized public transport service. The question of traffic congestion, parking problems and air pollution does not arise in less developed societies especially in medium size towns where car-ownership is very low due to low incomes of the majority of the people.

Peter J. Hovel and Associates have argued that mobility is one of the most precious achievements of modern civilization.⁽¹⁾ Mobility referred to here is the ability of people to move from one location to another through use of auto or public transit. The use of auto or public transit is a technological achievement of the modern civilization which facilitates faster mobility than the old modes of travel namely walking or riding horse/donkey drawn carts. Peter and Associates have further argued that the success of public transport is dependent on relatively high population, work place and shopping, and residential densities. Public transport is particularly vital in dealing with mobility problems in cities as cities or towns cannot be built or rebuilt in such a form that all journeys can be made by private car, bicycle, or on foot. The physical space and economic resources required to rebuild or build them in such a form are lacking. Furthermore, a large number of urban population comprising of the old, young and economically weak people must be considered since they are the ones who experience

(1) Peter J. Hovel, William H. Jones and Alan J. Moran --
"The Management of Urban Public Transport, a
marketing perspective" (1975) PP.4. /20

mobility problems in towns as they do not own cars. Public transport service is particularly intended to solve their mobility problems in many cases.

Travers Morgan and Partners (1) in designing the Belfast Transportation Plan noted that predicted values of population and land uses give predictions of travel generation. The travel model they advanced therefore converted estimates of future population and land use into future general travel pattern on the basis of the relationships of travel generation and distribution to land use. This would seem to agree with our assumption that if future traffic pattern could be determined, a suitable transport system could be designed to fit it. They worked according to this model to establish travel patterns for the year 1986. Some of their findings indicated that the daily demand for public transport (by bus and train) was expected to have decreased by 12% by 1986 (as compared with 1966 demand) (2). A prime factor causing this reduction was attributed to greater car ownership. The above finding does not appear to agree with our earlier observation that one of the major concern for the metropolitan centres is to divert travellers from auto to public transit in order to reduce traffic congestion, parking problems and other associated problems (3).

(1) Travers Morgan and Partners (N.J.) - "Belfast Transportation Plan" (1969).

(2) Travers Morgan and Partners' - "Belfast Transportation Plan" (1969) PP.106.

(3) Refer to PP.

In this latter case, demand for public transport would be expected to increase and not decrease.

Among many factors considered in the Belfast Transportation Plan were the existing regional plans, the urban area land - use plan, future households, employment structure, distance from CBD, future work places and future car-ownership. These seem to be important variables to examine when considering future travel patterns of any town.

A similar plan was undertaken for Milton Keynes by Milton Keynes Development Corporation in 1970⁽¹⁾. The proposed public transport system for Milton Keynes was to use buses running at frequent intervals with stops within easy walking distances. The buses were to connect all residential areas conveniently to all the points to which people would wish to go - to jobs, health centres, schools, shops, etc. and inter-connect all the residential areas so that social contact between all parts of the city would be easy.

According to the Milton Keynes Plan, origins and destinations of journeys by public transport are diffused over the whole city given the goal of freedom of choice. Employment sites are distributed fairly widely and located around the city reducing the journey to work and spreading the traffic load evenly. This seems to enhance the idea that urban form is an important factor in determining travel pattern in a town.

(1) Plan for Milton Keynes Vol. 1 and 2 (1970) by Milton Keynes Development Corporation.

The following goals for transport were considered for Milton Keynes by the Milton Keynes Development Corporation and the author thinks they could be cited for other towns.

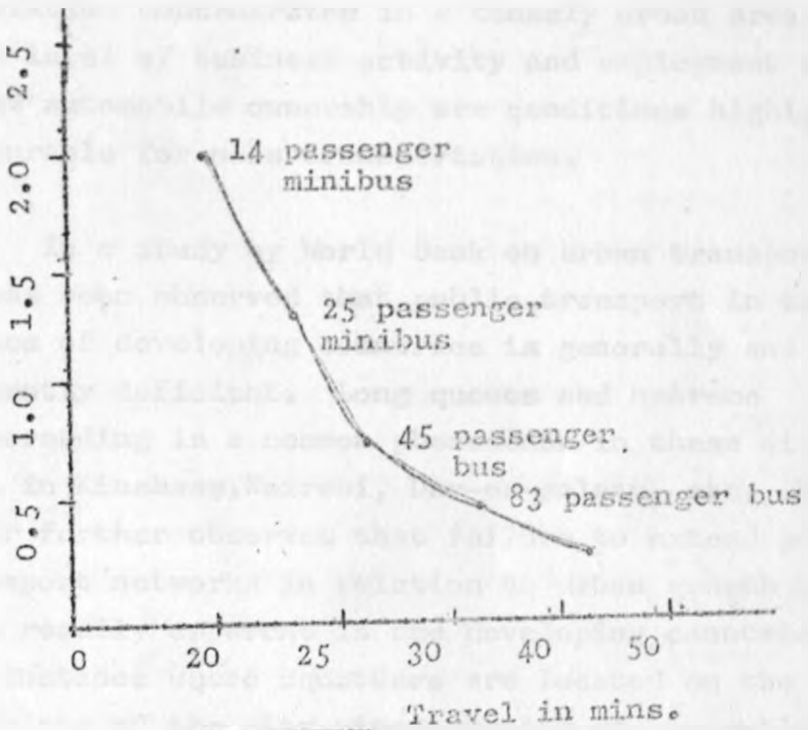
- (1) To provide a high degree of accessibility between all activities and places making up the city; homes, jobs, education, health, shopping, etc.
- (2) To provide freedom of choice between public and private methods of transport.
- (3) To provide a high quality public transport system from the beginning of development not only for those who need it but for those who might choose to use it instead of private transport.
- (4) To provide flexibility in the transport system to allow for expansion and change.
- (5) To give provision for free and safe movement as a pedestrian.

In order to evaluate the Milton Keynes Plan from a transport point of view, the area of the city was divided into zones and both population and employment were allocated to these zones. Work trips patterns were determined respecting the goal of freedom of choice in location of work, place and residence. These trips were translated into the total number of trips which could be expected to take place during the peak period of work travel. It was found that 20% of all journeys in the peak hour were catered by public transport. The number of people who chose to go by bus rather than by car depended very much on how much longer it took to go by public transport as opposed to private means.

For relatively short journeys it was unlikely that the public transport journey would generally be as quick as by car. Hence many people who owned cars tended to use their cars for short journeys and buses for long distances (in Milton Keynes). But for Thika town where car-ownership is very low (11.3%), public transport would still be very much in demand even for relatively short distances.

✓ Milton Keynes Development Corporation also found that the smaller the passenger vehicle, the shorter its travel time is but the more expensive its maintenance is. On the other hand, the bigger passenger vehicles are cheaper to maintain but have longer travel time. This explains why smaller vehicles like "Matatus" in the case of Kenya charge more than buses for the same distance travelled. It would therefore appear that for any operator of public transport service to establish his services in a town, a cost benefit analysis is essential in determining the size of the vehicle to operate with.

Fig.1: Public transport system cost and service relationship.



Source: Plan for Milton Keynes Vol. 2 (1970)

Wilbur S. Smith in his study on mass transportation for Hong Kong ⁽¹⁾ observed that a steadily increasing population concentrated in a densely urban area, a high level of business activity and employment and a low automobile ownership are conditions highly favourable for mass transportation.

In a study by World Bank on urban transport, ⁽²⁾ it has been observed that public transport in the cities of developing countries is generally and evidently deficient. Long queues and extreme overcrowding is a common phenomenon in these cities e.g. in Kinshasa, Nairobi, Dar-es-salaam, etc. The paper further observes that failure to extend public transport networks in relation to urban growth is less readily apparent in the developing countries. For instance where squatters are located on the outskirts of the city, inadequacies of the public transport system exist and long journey times could effectively preclude participation in many employment opportunities and thus aggravate income maldistribution.

It is suggested in the same paper that low rates of public transport use may reflect either high level of private automobile ownership or poor public transport service or low incomes such that residents cannot afford to use public transport. It is therefore important to know the level of private automobile ownership and incomes of the people in a town when considering establishing any form of public transport service. Low incomes often mean that the bus fares will account for a big percentage of the incomes of the majority of the poor.

(1) Ekistics Vol.27 (1969) PP. 124

(2) World Bank sector policy paper - Urban Transport,
July 1975. /25

Consequently, the poor will opt to walk or use bicycle.

In most developing countries, walking and cycling are usually more important modes of travel than public transport in terms of number of trips though not in terms of distance travelled. (1) Travel to work trips are made on foot or by bicycle. In a Town like Kinshasa, as much as $\frac{2}{3}$ of trips have been recorded as on foot. (2)

2.2: Public Transport in East Africa:

Public transport services in East Africa (on the mainland) came with the completion of the Kenya - Uganda Railway at the turn of the century. With the introduction of the railway services in the region and subsequent expansion of the system, more goods and passengers could be transported. The railway provided the most important inter-urban and inter-regional transport services.

The railway played a very significant role as a mode of public travel up to the first half of the century when the motor-car started to present a meaningful challenge as an alternative mode of public transport. This challenge has been enhanced by the development of roads leading to an increase in use of the motor-car due to its flexibility and speed. This has consequently led to the declining significance of the railways and increased significance of the roads.

(1) World Bank, sector policy paper - Urban Transport
July 1975, PP.19.

(2) Ibbi

Transportation in Kenya and East Africa in general is categorized into two forms of services: the intra-urban and inter-urban transportation services. The latter is a sub-sector of the whole transportation industry and its function is to transport people and goods between urban and rural areas, and between urban areas themselves (i.e. between one urban centre and another). It is characterized by country buses, matatus and trains.

The intra-urban public transportation service is characterized mainly by buses, taxis and matatus. In most cases these buses are corporately or individually or state owned as is the case of Tanzania.

Matatus could be categorized in two groups:

- (1) Those partially satisfying most conditions which classify an economic activity as belonging to the formalized sector e.g. vehicles operated by registered companies such as Rift Valley Pugeouts (R.V.P.), etc.
- (2) Those falling totally in the informal sector characterized by single proprietorships and are: not registered (licensed) Public Service Vehicles or insured to cover passengers in case of a road accident or have scheduled terminals.

The traffic Act governs the conduct of motor vehicles on the roads. In Kenya before 1973 Presidential decree, for any vehicle to operate as a passenger carrier, it had to obtain an operating licence.⁽¹⁾

(1) Transportation Licensing Act, Revised 1962

But after the June 1973 Presidential decree, a Legal Notice (2) was issued by the Minister for transportation allowing all vehicles (private or public) to operate as passenger carriers provided their tare weight was under 3 tons or its passenger seating capacity was less than 15 seats and were roadworthy.

According to this study, the main concern is on intra-urban public transportation services. It is however noted that information on intra-urban public transportation systems in East African countries exist only for the big towns namely Dar-es-salaam, Kampala, Nairobi and Mombasa. This is where organized intra-urban public transport systems exist.

2.2.1: Public Transport in Dar-es-salaam:

Dar-es-salaam city services were introduced in 1949 under the name Dar-es-salaam Motor Transport Company Limited (D.M.T.C.) and was changed to Usafiri Dar-es-salaam Limited (U.D.A.) in 1974. It was introduced as a recommendation of 1949 economic plan. The service commenced with two buses and increased to 9 buses by the end of the year. United Transport Overseas (U.T.O.) Company was responsible for the management and operation of Dar Motor Transport Services until 1st April 1970 when Dar Motor Transport was nationalized.

In 1953, Dar Motor Transport Company extended its town services to the country services. In 1965,

(2) No.89 in Supplement Gazette issue No. 27

the now defunct City Council of Dar-es-salaam acquired 25% share holding in the company. In 1970, D.M.T.C. was nationalized. Four years latter in 1974, National Transport Corporation (parent company of U.D.A.) decided to split its subsidiary transport company (D.M.T.C.) into two companies: one to deal with city services - U.D.A. - and the other with country services - National Bus Services Company Ltd. U.D.A. was granted monopoly by the government to operate public transport in Dar-es-salaam in September 1974 with the abolition of "Thumni" "Thumni" -- the Tanzania Counterparts of Kenya "Matatus"

In his thesis, ⁽¹⁾ Edgar Herman Berege has noted that steady increase in demand for mass transportation is due to:

- (1) Concentration of work centres and recreational facilities in certain specific places away from the residential colonies in the suburbs and the increasing distance between home and work.
- (2) Increase in population and density besides rising trend in employment which results in rising per capita income.

Where the above conditions are present, public transport services are often needed according to Berege's experience in Tanzania.

(1) Edgar Herman Berege: "Promotion of an efficient and effective urban - Transport system in Dar: A case study of U.D.A." (1977) PP.34

2.2.2: Mombasa Public Transport System:

In 1972, a Mombasa transportation study was carried out at the request of the Government. The Government required this study to be undertaken with the prime objectives of evaluating alternative strategies for the development of a main road network for Mombasa and recommending the optional system for the time Mombasa would have a population of 1,000,000.

It was observed that the anticipated population growth and increase in prosperity would bring with it a rise in the demand for public transport travel. According to the findings of the study, a transportation plan should form part of an integrated plan designed to enhance the quality of urban life. It is therefore necessary to understand the geographical and historical aspects which affect land use and activities and distribution and hence the requirements for transportation. Population, employment, educational attendance, income and car-availability were considered as necessary planning inputs to a transportation study. The distribution of employment by place of work was used as the main basis for the distribution of trip attractions in the transportation model.

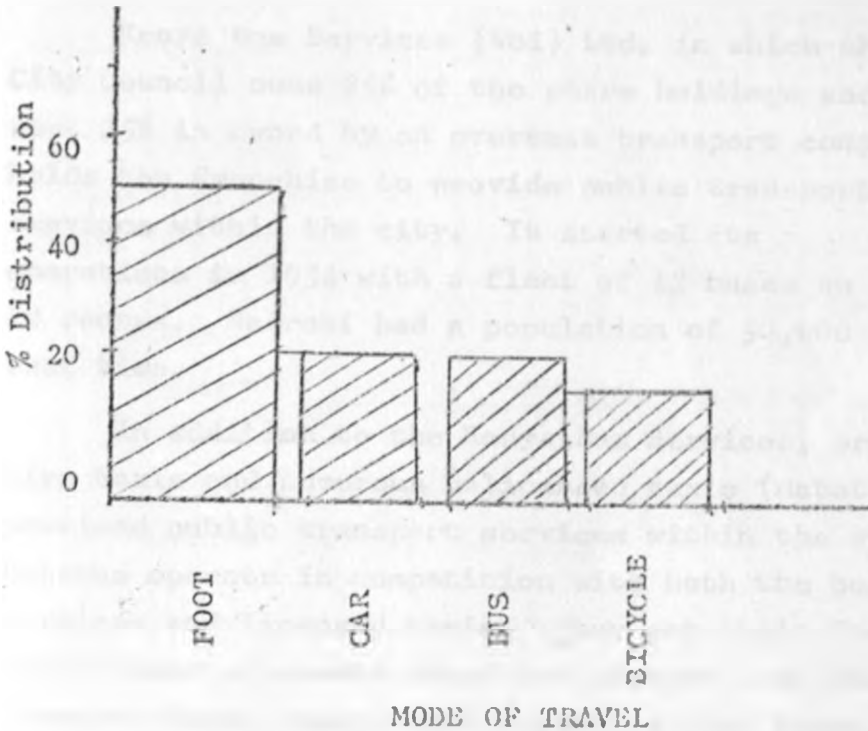
The Kenya Bus Services (Msa) Ltd. partly owned by Municipal Council of Mombasa and an Overseas Trading Company has the franchise to provide local bus services within Mombasa Municipal area. According to the Mombasa Transport study, 65 local buses were operated as at 1972. ⁽¹⁾

(1) Mombasa Transportation Study Vol.2 (1972)

Matatus and taxis also provide public transport services in the town. Other private bus operators provide service between Mombasa and areas outside the Municipality.

From the study, it was found that 622,500 internal person trips by all modes of travel were made on a typical week day. 61% of these daily trips were made by pedestrians, 18% by car, 14% by bus and 7% by bicycle. Out of all the motorized internal person trips, 57% were made by car and 43% by bus. It was also found that 3.25 kms is the average walk trip to work. 76% of all walk trips to or from work were less than 4 kms. Average school walk trips length was found to be 1.35 kms. and 95% were less than 2 kms. For other purposes, average trip length by foot was found to be 1.77 kms. As for the vehicle trips, 5.39 kms. was the average walk trip length, 4.15 kms. was the average for school trips and 5.12 kms. was the average trip length for other vehicle trips. 67% of work trips by vehicle was less than 6 kms. and 95% less than 14 kms. For school trips, 66% of vehicle trips were less than 3 kms. and for other purposes, 66% were less than 6 kms. It should however be noted that foot is the most common mode of travel in Mombasa although the Mombasa transportation study states that 99% of the Island's population has public transport available to it. The chart below clearly shows this.

Fig. 2: Trip distribution by mode.



SOURCE: MOMBASA TRANSPORTATION STUDY(1972)

This could be explained in terms of incomes of the residents being too low to afford public transport services. It is also important to note that 85,900 internal bus passenger trips are made on a typical week day. Out of these, 78,200 (83%) have their origin and/or destination on the island. Furthermore, 44,900 bicycle trips and 379,000 walk trips are made on a typical week day according to the findings of Mombasa Transportation Study.

2.2.3: Nairobi Public Transport System:

Kenya Bus Services (Nbi) Ltd. in which the City Council owns 25% of the share holdings and the rest 75% is owned by an overseas transport company,* holds the franchise to provide public transport services within the city. It started its operations in 1934 with a fleet of 13 buses on 12 routes. Nairobi had a population of 50,000 at that time.

In addition to the Kenya Bus Services, private hire taxis and numerous unlicensed taxis (matatus) provided public transport services within the city. Matatus operate in competition with both the bus services and licensed taxis. They set their fares by informal agreement which are cheaper than the licensed taxis though more expensive than buses. Some operate along fixed routes while others have no fixed routes. Initially, they charged a flat rate of 30 cts. and that is how they came to be called "Matatus". Today, their charges vary with the distance and are usually higher than the bus charges.

2.2.4: Kenya Bus Services Operations in Nairobi

As stipulated above, Kenya Bus Services (KBS) Nairobi Limited holds the franchise to operate internal services in Nairobi. By end of last year (1978), it had a fleet of 290 buses. 53 new ones were expected early this year (1979)

* United Transport Overseas Limited (U.T.O.) of London.

These buses serve the estimated population of Nairobi of over 850,000 people. They serve the whole of Nairobi area covering all the feeder roads.

According to the traffic manager (KBS), four factors are central to the operation of internal public bus services namely:

- (1) Population: The population must be large enough to ensure demand for services.
- (2) Utility of buses and staff: The buses and staff must be utilized in such a way as to ensure highest returns.
- (3) Location of activity areas: This is necessary in designing bus routes and schedules for operations. Where activities go on for 24 hours as in Kenyatta National Hospital, Bus services are provided for 24 hours.
- (4) Distance: This is important so that travel time and fare for each route can be established.

The average minimum distance for which a bus services is required is 1.3 kms. and the minimum fare is 60 cts. The most popular distance is between 5.2 - 7.2 kms. and this is based on average fare of 1/10.

According to the K.B.S. officials several problems face any urban bus operator among which are the problem of matatus particularly in regard to traffic congestion, the problem of the "peak", breakdown of the vehicles and lack of staff. The "peak" problem especially is very disturbing. It is caused by the large numbers of persons proceeding to work, schools, shops, business etc.

more or less at the same time of the day resulting in an artificial demand on the public transport system. It requires the provision of buildings, maintenance facilities, vehicles, accommodation and staff for a very short period of the day. The rest of the time these facilities and people are not required. Consequently the provision of peak period services is extremely expensive. The revenue collected from these services does not meet the cost of providing them. The K.D.S. authorities were of the opinion that one way of reducing this problem is by staggering hours of starting and finishing of work or school.

Kenya Bus Services (Nbi) has tried to keep pace with the growth of Nairobi City. In order to provide for the future development, the company intends to extend Eastleigh depot and build another Depot in Dandora. It recognizes the relevance of the level of passenger fares to the success of its operations by noting that the maximum use of public transport system should be encouraged by ensuring that passenger fares are at a level which the public can afford.

Kenya Bus Services receives no subsidy or tax concession of any sort from the government according to its officials. It is therefore a self-supporting venture and as such a heavy burden on the community. The more usual situation in most cities of the world is for the city bus service to be heavily subsidized by central or local government thus keeping the passenger fares low.

The services provided by K.B.S. in Nairobi are far from being adequate ⁽¹⁾. This was confirmed early this year in February (1979) when almost all matatu operations were halted by the police nationwide crackdown on matatus. Life in the city almost came to a standstill as people failed to report to work - in industries, offices, etc. due to lack of public transport services. K.B.S. could not provide enough services to all the people who needed its services and consequently there was a countrywide cry for matatu services. A Presidential directive was released immediately allowing all matatus to resume their operations bringing life back to normal.

2.2.5: Nairobi Intra-Urban Travel:

Travel within Nairobi could be looked at in terms of trip distribution by mode, trip distribution by purpose and trip distribution by time of the day. From this could be established the most common mode of travel, the most common purpose for trip making and the peak hours and non-peak hours.

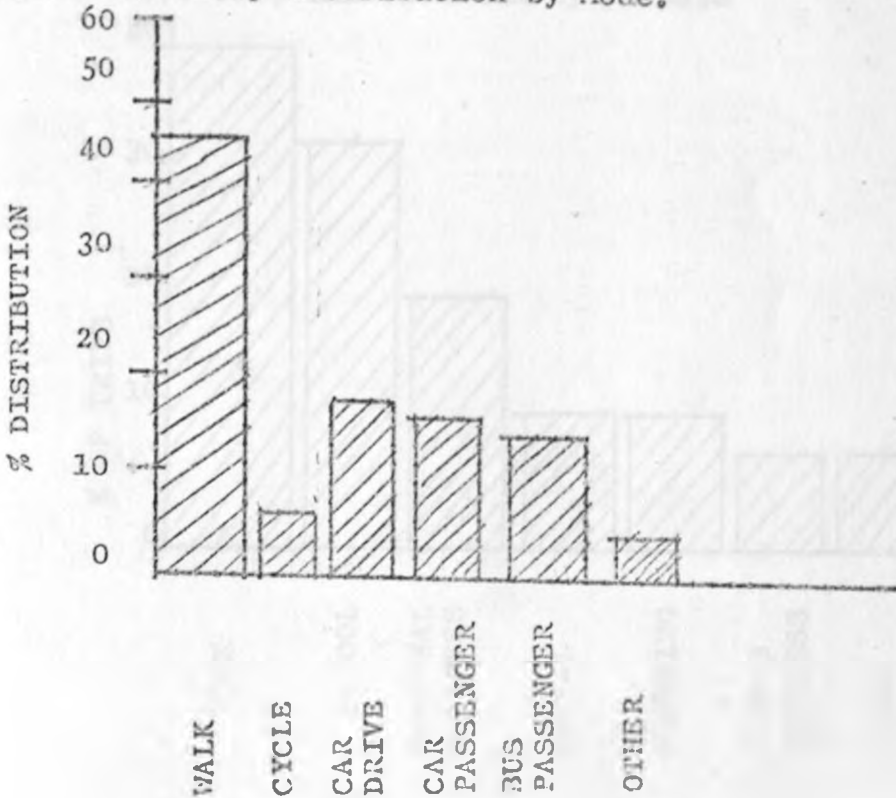
According to the Nairobi Urban Study ⁽²⁾ done in 1973, the most common mode of travel is foot (44.6%) followed by private transport (35%) - car, van, etc.

(1) A point raised by Nairobi City Engineer in the Weekly Review of May 4, 1979, PP.14, Column 2.

(2) Nairobi Metropolitan Growth Strategy - Nairobi Urban Study (1973) Vol. One.

Public transport accounts only for 14%. The chart below clearly demonstrates this:

Fig 3: 1970 Trip distribution by Mode.



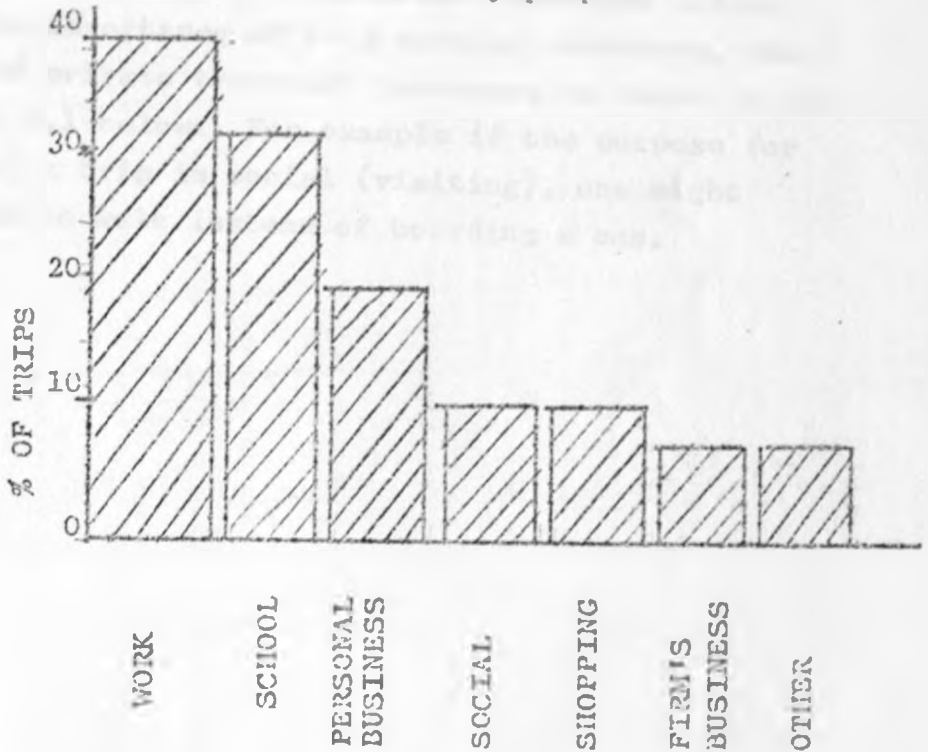
NAIROBI CITY COUNCIL:

SOURCE: NAIROBI URBAN STUDY 1973.

It is recognized that the density of residential development is a strong determinant of any transport system with higher densities, a more economical transport system normally results. Lower per capita income leads to lower rates of car-ownership. Thus lower rates of car-ownership usually results in increased use of public transport. But as has been noted above, if per capita income does not keep pace with or exceed population growth, the added population growth will not necessarily result in increased demand for public transport or mass transit services.

The underlying assumption here is that income is equitably distributed over the society.

Fig. 4: 1970 Trip distribution by purpose



CITY COUNCIL OF NAIROBI

SOURCE: NAIROBI URBAN STUDY 1973.

The above chart indicates that the majority of trips are made for essential purposes* with work, school and business trips accounting for 85% of total daily trips. The low number of non-essential trips* i.e. social and shopping, may be interpreted as an indication of low incomes of the majority of the population. The Nairobi Urban Study (1973) referred above, indicates that total daily travel per household increases with increasing incomes (see appendix 1).

* Refer to chapter one PP 12 to get the meaning of essential and non-essential trips.

There is a notable increase in non-essential trips for additional shopping and social trips. Thus, it may be concluded that people with less money tend to reserve their resources for essential trips. As the importance of trip purpose decreases, the use of private transport increases as shown in the table 2.1 below. For example if the purpose for making a trip is social (visiting), one might decide to walk instead of boarding a bus.

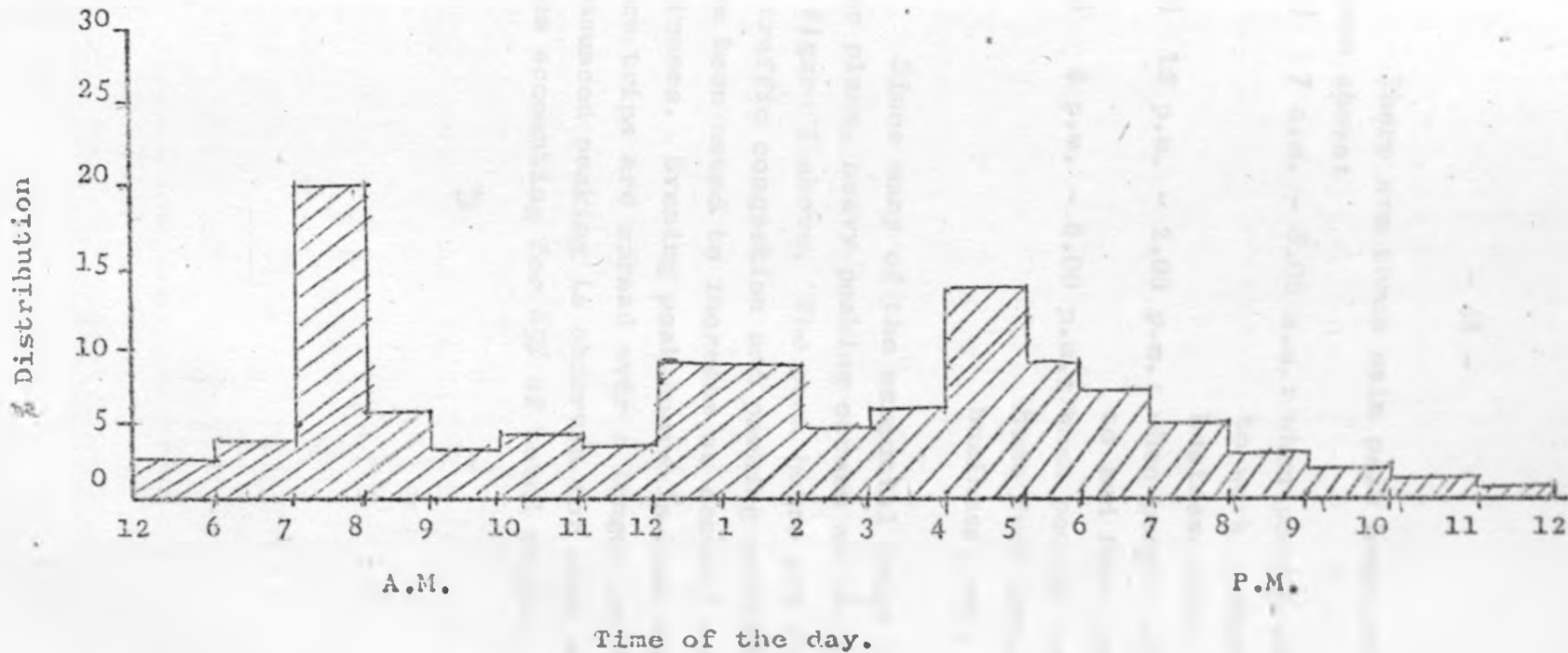
Table 2.1: Distribution of trips by travel modes:
M O D E S

Purpose	Foot	Car drivers	Passengers in Cars	Bus Passengers	Bicycles
Work and Personal Business	35%	30%	16%	15%	-
School Trips	60%	-	25%	11%	0.5%
Shopping	48%	41%	-	8%	-

NAIROBI CITY COUNCIL

Source: Nairobi Urban Study 1973.

Fig. 5: 1970 Trip distribution by time of day



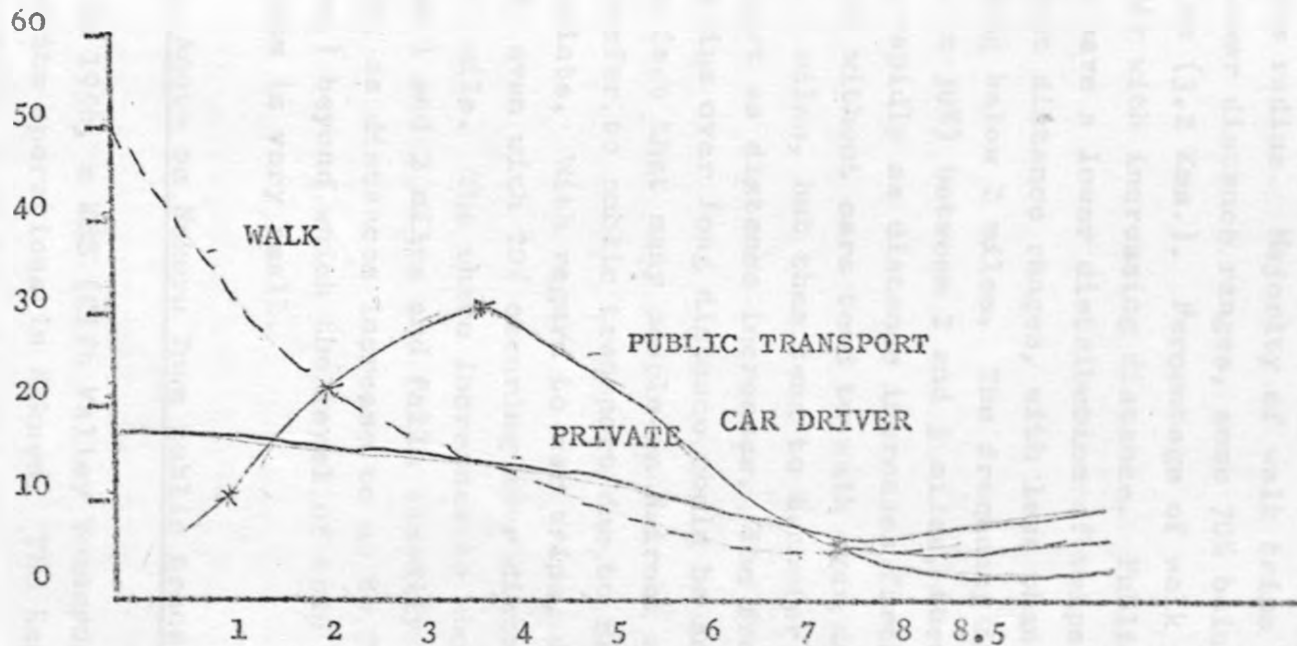
Source: Nairobi Urban Study 1973.

There are three main peak hour periods as shown above:

- (1) 7 a.m. - 8.00 a.m.: when people are travelling to work, school, personal business, etc.
- (2) 12 p.m. - 2.00 p.m.: when people are travelling to and from lunch.
- (3) 4 p.m. - 6.00 p.m.: When people are travelling home from work, school, business, etc.

Since many of the essential trips are to the same place, heavy peaking occurs at the times shown in figure 5 above. The peak hours are characterized by traffic congestion and parking problems which have been noted to increase as central area employment increases. Evening peak hours is less important since trips are spread over a longer period. Pronounced peaking is observed for work and school trips accounting for 65% of total trips.

Figure 6: 1970 trip frequency distribution by mode (walk, public transport and Private car)



Distance in Miles
NAIROBI CITY COUNCIL

SOURCE: Nairobi Urban Study 1973.

The above figure shows that the vast majority of trips fall within the range between 0 and 5 miles (8 kms.). This is explained by the fact that most of the origins and destinations are within these 5 miles radius. Majority of walk trips occur in the lower distance ranges, some 70% being below 2 miles (3.2 Kms.). Percentage of walk trips fall rapidly with increasing distance. Public transport trips have a lower distribution of trips in the shortest distance ranges, with less than 25% occurring below 2 miles. The frequency is greatest (i.e. at 30%) between 2 and 3 miles, then falls again quite rapidly as distance increases further. Persons without cars tend to walk over distances up to 2 miles, but then tend to transfer to public transport as distance increases. The frequencies of walk trips over long distance could be an indication of the fact that many people in Nairobi are unable to transfer to public transport due to financial constraints. With regard to car trips, distribution is more even with 20% occurring over distances of up to 1 mile. The share increases to about 23% between 1 and 2 miles and falls steadily but not sharply, as distances increase to up to 7 miles (11 kms.) beyond which the level of trip making by all modes is very small.

2.2.6: A note on Nakuru Town public transport system:

In 1956, a KBS (Rift Valley Transport Company) started its operations in Nakuru. The East African Road services took over in 1963 and commenced with 3 buses covering the whole town up to 1970.

The longest bus route was 8 miles (13 kms.) linking Kivumbuni with industrial area. Up to 1970, the bus services faced no competition as they operated under a franchise which protected them from other operators. The town had a population of about 47,000 people at that time.⁽¹⁾

By 1974, 8 buses were operating and enough revenue was being realized.⁽²⁾ However the Presidential decree of 1973 which allowed matatus to operate in all areas of the country including urban centres proved disadvantageous to the bus operations as they faced stiff competition from matatus henceforth. In 1976, the East African Road Services closed their operations due to lack of adequate revenue to sustain the bus services. The loss of revenue was not entirely due to competition from matatus, other factors counted also namely poor management, and lack of trained personnel leading to poor scheduling of bus operations and accounting.

As for today, matatus are the only means of intra-urban public transport in Nakuru Municipality. Although some of the residents views are that the matatus are serving people satisfactorily, the view of the majority of the people there is that the bus internal services should be re-established

(1) Bureau of Statistics 1969 population census.

(2) According to information from Traffic Manager, E.A.R.S. who was in charge of Nakuru operations at that time .

Being a public service the bus services were more reliable than the matatu services in that matatu operators can curtail services any time.

2.3: Conclusions

Among the many points arising from the above general overview of public transport systems, the following seem to be the main ones:

- (1) Intra-urban public transport service is necessary in fast growing towns in order to connect points to which people would wish to go conveniently - to work, school, hospital, shopping etc.
- (2) An efficient public transport service in a town facilitates faster mobility to and from activity areas and is particularly helpful to the majority of the people who do not own cars.
- (3) Success of public transport is dependent on many factors among which are: relatively high population, work place, residential densities, shopping, business activity, low car-ownership, income and increasing distance between activity areas and home.
- (4) With higher residential densities, a more economical transport system normally results. This is dependent on people's incomes and car-ownership. Low rates of car-ownership may result in increased use of public transport. But low incomes may result into low use of public transport service due to unaffordability of the public transport service by majority of the people.

- (5) Use of public transport services in developing countries is very low due to financial constraints. Consequently walking is the most common mode of transport accounting for as much as $\frac{2}{3}$ of trips in towns.
- (6) A knowledge of land uses in a particular town is vital in designing the necessary transportation facilities for that town.
- (7) Future land use which can be predicted on the basis of existing land use, economic activities in the town and hinterland, and anticipated future trends, can be used as a base to predict future traffic pattern. And if future traffic pattern can be determined, a suitable transport system can be designed to fit it.
- (8) 70% of walk trips are below a distance of 2 miles. Persons therefore tend to transfer from walking to public transport after a distance of 2 miles where public transport services exist. It would therefore appear rational to contend for the establishment of public transport services in towns where the length of the majority of trips made is more than 2 miles and where other factors upon which success of public transport depends (quoted above), are present.
- (9) The frequency of public transport trips is greatest between 2 and 3 miles indicating that most of the origins and destinations of trips are within this distance (in Nairobi City).

- (10) Public transport service can be provided by corporately, individually or state owned public transport enterprises. In the case of Kenya, corporate and individual undertakings - the buses and matatus respectively - seem to be the accepted operators of public transport services. They are self-supporting ventures whose services are not subsidized by the state and have to depend on the effective demand from the people. The higher the effective demand, the higher the revenue collected and the more economical the operations of public transport services are.
- (11) A franchise seems to be a necessary condition for operators who wish to establish internal bus services in towns.
- (12) It is apparent that internal matatu operations in towns are established to compete with an existing internal bus service. Therefore establishment of a bus service first seems to be the only way in which matatus could be made to provide intra - urban public transport services in towns where they do not at present, like in Thika Town.

CHAPTER THREE:

THE STUDY AREA

3.0: Introduction:

This chapter aims at giving background information of the study area. The following aspects of Thika town are covered: Historical development, location and size, physical, social and economic bases, existing infrastructural facilities, and regional development of the town. The chapter also attempts to appraise the current development plan and the existing Master Plan of the town. More emphasis is put on population, industrial base and employment pattern, social facilities, residential development and the transportation network.

3.1: Historical Development:

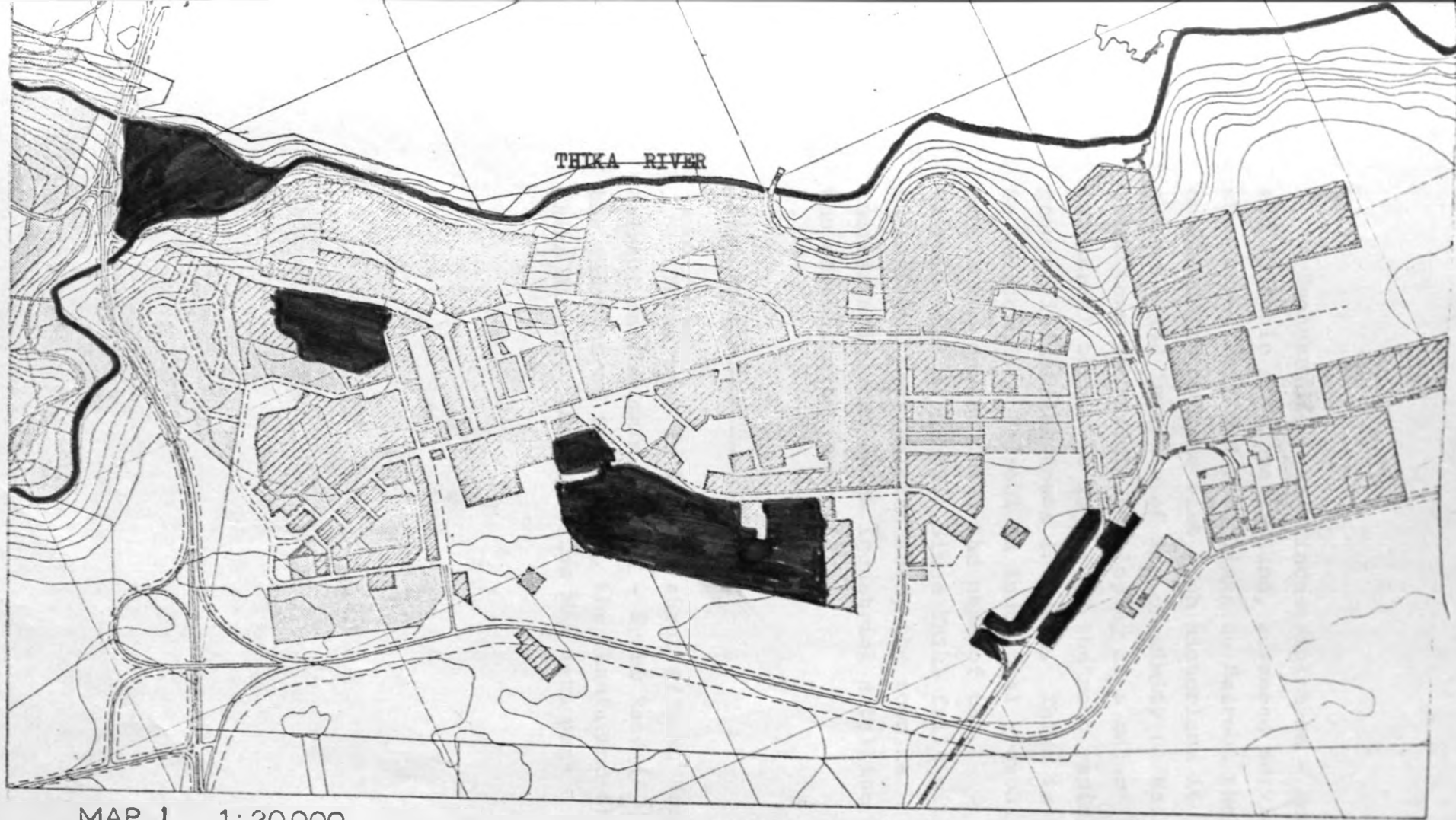
Thika started as a stop over place for the British Settlers who came at the beginning of the century shortly after 1910. The settlers established coffee and sisal plantations which are the economic mainstay of the town. A railway was constructed to bring in farm inputs and to transport farm produce to the markets. Commercial and service facilities were erected to serve the budding community.

Thika was gazetted a township in 1924 and in 1953 became the District Headquarters of the then Thika District. Following which a police station, a prison, a hospital, housing areas, a market and schools were started.

Thika town however experienced a slow development in the early years because it only functioned as a service centre for the surrounding community. By 1948, several industries including a small fruit and vegetable cannery were given plots in an extension to the township designed by the Government Town Planning Adviser. In addition to these new industrial developments, housing estates, social facilities and further extension to the industrial area was also planned. Nevertheless, the town remained relatively small. Its population was 4,500 according to the 1948 population census.

The upgrading of the Nairobi-Nyeri Road - rebuilt by prisoners - of - war - in the later part of the second world war (1939-45), gave the town a development impetus. The population grew from 4,500 in 1948 through 15,000 in 1963 to 23,749 (adjusted census) in 1969. At present, the population is estimated to be 43,000 people.

At independence in 1963 the town was granted the status of a municipality with its own elected council. Today, Thika town falls within Thika Division of Kiambu District and has its own administration machinery. This includes the District Office headed by the D.O. who acts as the government representative and the municipal council headed by the Mayor which at present has 12 elected and 4 nominated councillors whose duty is to control the development and public activities within the municipality.



THIKA RIVER

MAP 1 1:20,000

HISTORICAL DEVELOPMENT

- DEVELOPED 1910 - 29
- ▨ DEVELOPED 1930 - 49
- ▧ DEVELOPED 1950 - 69
- ▩ DEVELOPED AFTER 1970

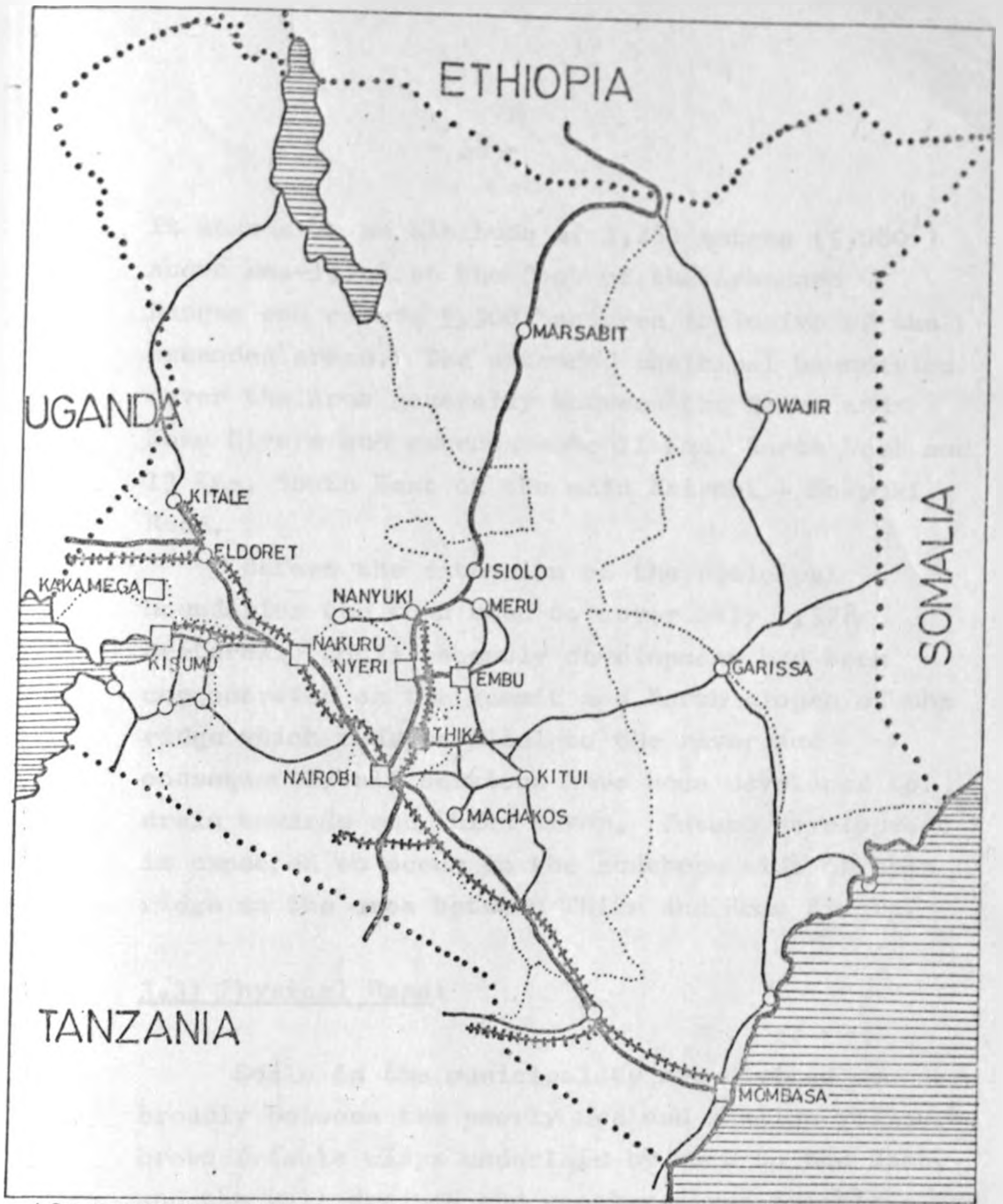
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THE DEVELOPMENT OF THE TOWN STARTED WITH THE BLUE POST HOTEL IN 1912 WHEN THE ROAD TO THE CROSSES THE CHANJA AND THIKA RIVERS THE RAILWAY AND THE STATION WERE ESTABLISHED IN 1917. THE GROWTH HAS SINCE BEEN CONFINED TO THE AREAS BETWEEN THESE TWO POLES.

Because of Thika's industrial base - ample and suitable developable land, advanced service structure, rail and road links to Nairobi the capital city and the vast rich hinterland it serves - and in spite of its proximity to Nairobi, Thika town is rapidly developing as a major industrial town. It is one of the most rapidly growing industrial towns in Kenya. Thika is believed to be second to Nairobi in industrial growth. This growth has earned Thika the name of the "Birmingham" of Kenya. Since Thika falls within the Nairobi metropolitan area, the town is increasingly seen as an industrial satellite of the capital city (Nairobi).

3.2: Location and Size;

Thika town is located about 47 kms. North of Nairobi on the main Nairobi - Nyeri Road (A₂) above the junction of two rivers, the Chania and the Thika Rivers. (See location Map next page)



LOCATION OF THIKA TOWN IN KENYA

- | | | | |
|-------|-------------------|-------|---------------------------|
| □ | PRINCIPAL TOWNS | | NATIONAL BOUNDARY |
| ■ | TOWN OF STUDY | ----- | PROVINCIAL BOUNDARY |
| ○ | OTHER TOWNS | ————— | INTERNATIONAL TRUNK ROADS |
| ————— | OTHER MAJOR ROADS | +++++ | RAILROADS |

SCALE 1:6,000,000

MAP No. 2

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DEPT OF URBAN AND REGIONAL PLANNING
M.A. THESIS 1978/79

It stands at an altitude of 1,480 metres (5,000') above sea-level at the foot of the Arbedare Ranges and covers 9,300 hectares inclusive of the extended areas. The extended municipal boundaries cover the area generally between the Thika and Komu Rivers and extends some 11 Kms. North West and 13 Kms. South East of the main Nairobi - Nanyuki Road.

Before the extension of the municipal boundaries the town used to cover only 1,578 hectares. Until recently development had been concentrated on the summit and North slopes of the ridge which runs parallel to the river and consequently all services have been developed to drain towards the Thika River. Future development is expected to occur on the southern side of this ridge in the area between Thika and Komu Rivers.

3.3: Physical Base:

Soils in the municipality are divided up broadly between the poorly drained shallow yellow - brown friable clays underlaid by rock to the East, and the well drained and weathered red friable clays and patches of Ulei soils to the West.

The Western part of the municipality consists of undulating coffee plantations which are regarded as the limit of possible urban development westwards. The Eastern part of the town where most of the urban development is taking place is not suitable for agriculture.

The main physical constraints are the flooded areas most of which lie in the Eastern side of the town and the steep slopes of the two main rivers which form the North and South municipal boundaries - Thika and Komu Rivers.

The maximum average annual temperature is 25.2 and minimum is 14.0°C. The Yatta Plateau to the East of the town renders moderate rainfall between 600 - 1000 mm westwards.

3.4.0: Social Base:

3.4.1: Population: The population growth rate of Thika town is estimated to be about 8% per annum. This high growth rate is due to the rapid industrialisation in Thika town. This has consequently attracted a lot of people into the town to seize the job opportunities created.

The population distribution of Thika area is characterized by low population density in the former scheduled European farms to the west of the town and high population density in the formerly known African residential areas such as "Majengo" where densities of more than 500 people per hectare have been recorded.

The population of Thika as recorded at the population census in 1948, 1962 and latest in 1969 show a very moderate rate of growth. This is shown in table 3.1 below.

Table 3.1: Population Growth from 1948 - 1969

	1948	1962	1969
Total Population	4,435	13,952	18,387
Annual Growth of Total Population (%)	8.5		4.0
Annual Growth of African population (%)	10.3		5.5

Source: Statistical Abstract, 1972

Table 3.2: Population by Sex in Thika Town:

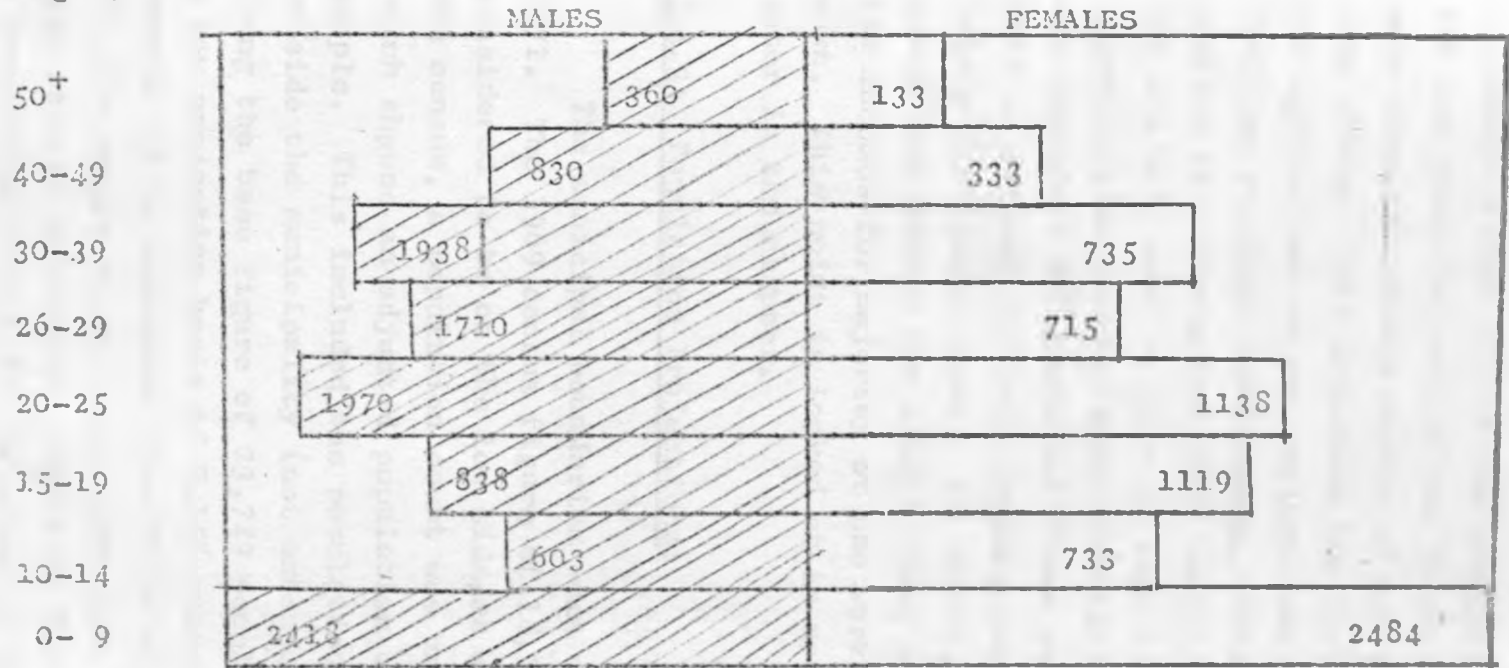
<u>Males</u>	<u>1962</u>	<u>1969</u>
Totals	8,184	10,879
Adults	5,476	7,747
Children	2,708	3,132
<u>Females</u>		
Total	5,768	7,508
Adults	3,058	4,134
Children	2,710	3,374
TOTALS	13,952	18,387

Source: National Population Census 1962, 1969.

The above table (3.2) shows that 65% of the population were adults. Most of them form the main potential working population.

3.4.2: Population by age and sex (1969)

Fig. 7



AGE - SEX POPULATION PYRAMID

Source: Thika Development Plan 1972 - 77

From the above age - sex population pyramid, it can be observed that 30% of the population are men in the age group between 20 and 50 years or there are more than the double number of men than women in the same group. This indicates the high proportion of job seeking men or men employed who leave their families at their rural homes. Other studies done confirm that the majority of residents are single men who only come to work or seek for employment opportunities leaving their families behind. They are therefore not permanent "town dwellers" and this is evident in their housing demand which is mainly for single rooms. It should however be noted that demand for single rooms could be due to low incomes for majority of the workers in Thika town. This point is looked at in more details later in the chapter.

3.4.3: Population Projections:

The municipal boundaries were extended in 1971. The 1969 census figure of 18,387 people is considered to be on the low side, as shortly after the census, a population count was made in August 1970 which showed an adjusted population of 23,749 people. This included the population immediately outside the municipality (not extended at that time). Using the base figure of 23,749 people and assuming a low projection basis of 7.15% average annual growth, it is estimated that Thika will have around 200,000 people by the year 2,000 A.D. Assuming a high rate of population growth of 8.2% per annum, a population of 245,000 is expected in the year 2,000 A.D.

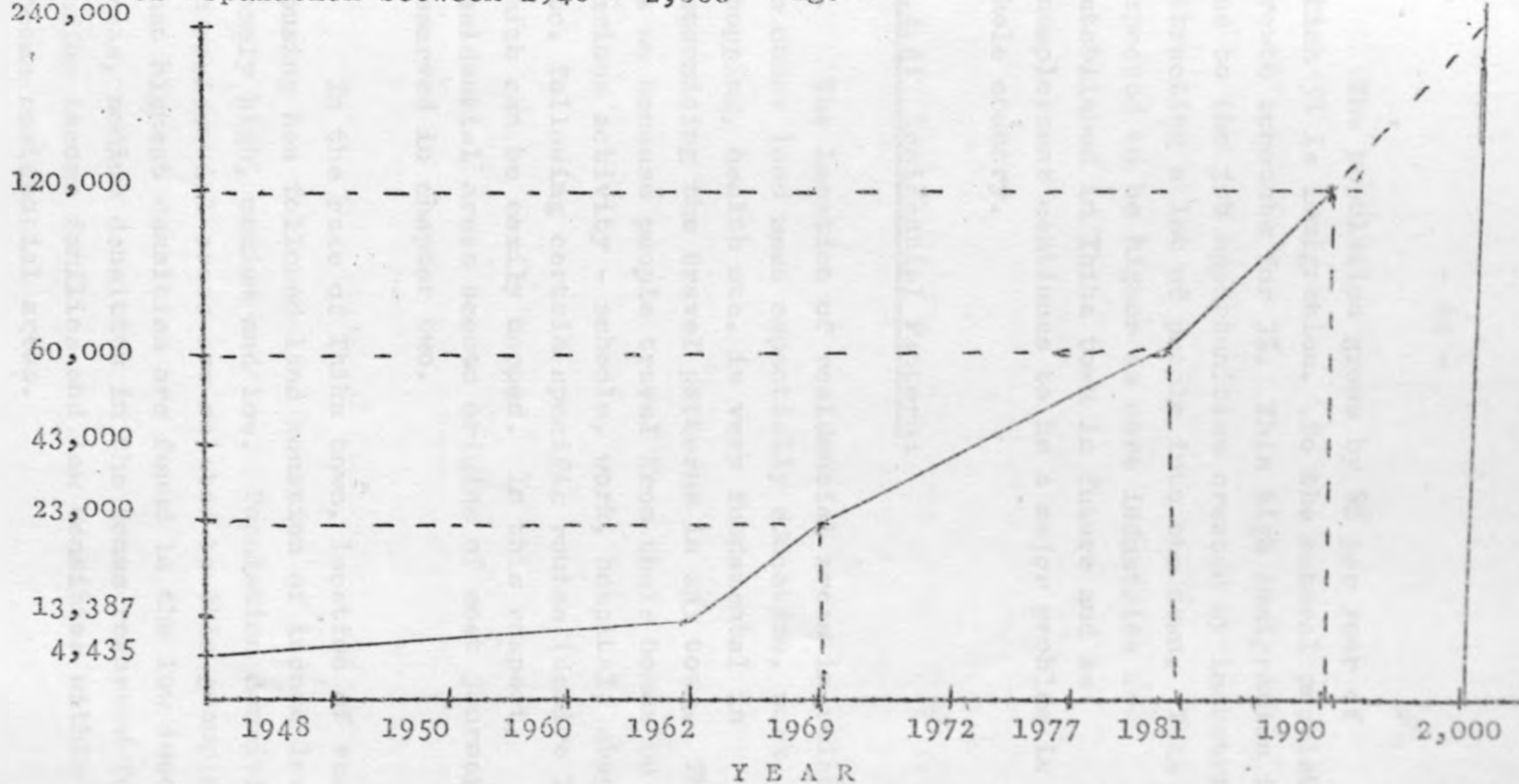
Table 3.3: Low Projection 1969 - 2,000

	1969	1973	1978	1980	1990	2,000
Population (000)						
Thika	23.4	30.8	43.5	50.0	100.00	199.4
Urban	23.4	30.8	43.5	50.0	100.00	199.4
Rural	-	-	-	-	-	-
	Growth % per annum					
	1969-80			1980-2,000		
Thika	7.15		7.15			
Urban	7.15		7.15			

Source: Ministry of Finance and Planning, Urban population Projections during 1969-2,000 within the context of Urban Development Strategy. EPD/SC 417/01.

N.B. The whole population as shown in the above table (3.3) is considered to be entirely urbanized and no distinction is made as to whether there is an urban as well as a rural population as is the case with other municipalities where boundaries were extensively extended in 1971.

Growth of Population between 1948 - 2,000 Fig. 8



Source: Thika Development Plan 1972 - 77

The population grows by 8% per year of which 5% is immigration. So the natural population growth accounts for 3%. This high immigration is due to the job opportunities created by industries attracting a lot of people into the town. This is expected to be higher as more industries are established in Thika town in future and as unemployment continues to be a major problem in the whole country.

3.4.4: Residential Pattern:

The location of residential areas in relation to other land uses especially education, work, shopping, health etc. is very fundamental in determining the travel patterns in any town. This is so because people travel from their homes to various activity - schools, work, hospital, shops, etc. following certain specific routes (desire lines) which can be easily mapped. In this respect, residential areas become origins of most journeys as observed in chapter two.

In the case of Thika town, location of residential housing has followed land zonation of income levels namely high, medium and low. Population densities in residential areas are related to this grouping so that highest densities are found in the low income areas, medium densities in the zones reserved for medium income families and low densities within high income residential areas.

The town planning section of Thika has expressed the following densities as being desirable

density for each income category. ⁽¹⁾

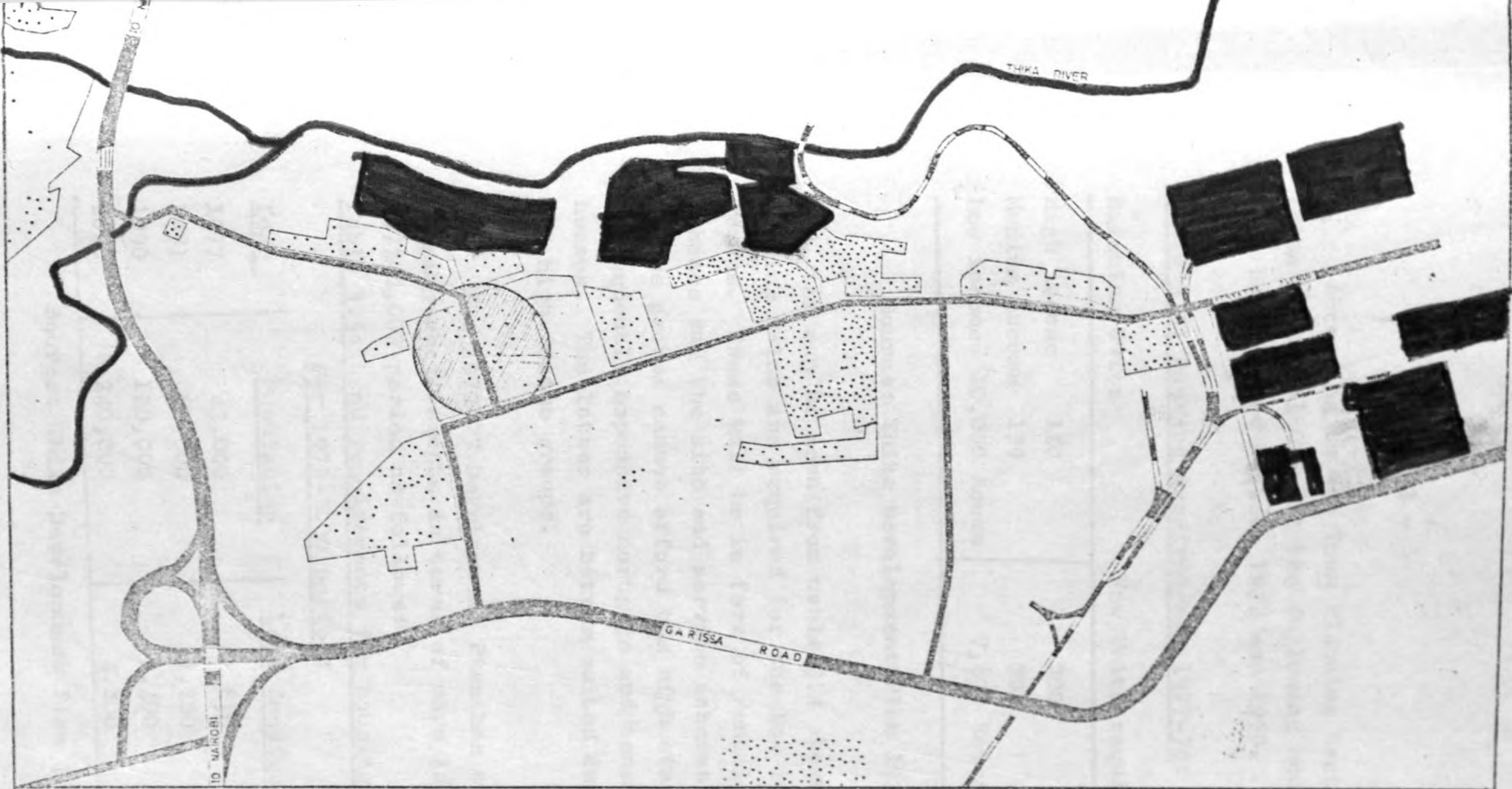
- 50 persons/hectares - High income
- 100 persons/hectares - Medium income
- 300-400 persons/hectares - Low income

The low income high density residential areas are near the industrial area. This is considered desirable in that journey to work is lessened, thus making it cheaper to travel from home to work. The high income residential areas are located to the West and North West of the existing commercial centre. The furthest being about 5 kms. from town centre (Bendor Estate). The medium income groups fill in pockets between the areas of high density and low density (shown on the map No.3).

Housing Requirements: It is noted that the present housing stock in Thika town is inadequate for the existing and anticipated population. ⁽²⁾ This is evident in the overcrowding in the high density residential areas like Majengo where population densities of more than 500 persons per hectare have been recorded. Occupancy ratio in Majengo area is well over 6 persons per room. Average occupancy ratio in Thika was 4 persons per room in 1969. The 1972-77 Development Plan aimed at reducing this occupancy ration to 2.5 persons per room. As the population increases the demand for more housing will inevitably increase.

(1) Thika Development Plan 1972-77 PP.89

(2) *Ibdi.*






RESIDENTIAL PATTERNS AND LOCATION OF INDUSTRIES IN THIKA

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 DEPARTMENT OF URBAN AND REGIONAL PLANNING
 MA THESIS 1978/79

MAP N°3

LEGEND

-  RESIDENTIAL AREAS
-  INDUSTRIES
-  TOWN CENTRE

According to the Town Planning Section of Thika Municipal Council the following housing units will be required between 1977 and 1979.

Table 3.4: Housing Requirements 1977-79:

Existing Units	New Units required (1979)
High income 120	200
Medium income 179	301
Low income 10,000 Rooms	7,800 Rooms

Source: Thika Development Plan 1972-77

As can be seen from table 3.4 above, more housing units are required for the low income groups. These will be in form of rental housing schemes and the site and service schemes as the low income groups cannot afford the high standard and consequently expensive mortgage and tenant purchase houses. The latter are better suited for medium and high income groups.

The 1972-77 Development Plan has worked out housing requirements in terms of more land for 1972-2,000 period as follows:

Table 3.5: Land requirements for housing in Thika for 1972-2000 period:

<u>Year</u>	<u>Population</u>	<u>Land Required (hectares)</u>
1977	43,000	850
1981	60,000	1,200
1990	120,000	2,400
2000	240,000	4,800

Source: Thika Development Plan 1972-77

The strategy is to locate the residential areas as near the industries as possible especially for low and medium income groups in order to minimize cost of journey - to work. But since not all activity areas can be established in one area, the residents will have to travel far to satisfy other interests outside their place of work and residence.

3.5.0: Economic Base;

3.5.1: Thika Industrial Base: Thika's industrial growth is estimated as 8% per annum. Its hinterland is potentially rich in agricultural products such as coffee, sisal and pineapples. It has therefore industries which are based on processing of agricultural produce, e.g. fruit canning at Kenya Cannery which is one of the major industries in Thika.

The rapid industrial growth of Thika town is due to suitable locational factors. These are abundant labour, water and good ample industrial land. The efficient infrastructural linkage to Nairobi by a railway and a modern dual carriageway is another contributory factor. These factors are very much favoured by foreign investors when they are looking for a place to invest.

In addition to the above factors are other factors which include shortage of ample industrial land in Nairobi, increasing price of land, traffic congestion and the ever pressing housing shortage in Nairobi. These factors seem to give Thika advantage over Nairobi. Many Nairobi based industries who seek to disperse or decentralize find Thika offering the best alternative.

Compared with other surrounding places like Machakos, Athi River or even Limuru, Thika is more favoured by good highway linkage to the Market, Water availability and even in industrial-based agricultural produce.

Presently, Thika has about 20 major industries covering fruit processing, chemicals, textiles, synthetics, pharmaceuticals, canning, can-making, animal feed, motor assembly, sisal processing, paper, etc. These industries offer about 20,000 jobs for the Kenyans. These jobs are expected to stimulate development in other sectors - housing, commercial, education, etc. - thus realizing the multiplier effect. The industries are concentrated mainly to the North of the Garissa Road and falling to the Thika River as shown on the Map No.3 in page 62.

This part of the town has been ideal for the expansion of industrial zone because of the existing railway and Garissa trunk Road. Vehicular access has therefore been readily achieved from the existing trunk Road. The site is also adequately served with water and processed effluent could be easily introduced into the adjoining river. It is apparent from the location of the industries and the development of housing schemes at Garissa that a well balanced location residential - industrial is achieved. The industries are within the walking distance from the existing housing schemes especially for the low and medium income groups who form the main labour force in the industries. But with anticipated urban development these distances

are likely to get longer and walking will no longer be the desired mode of travel.

3.5.2: Employment:

The industrial sector is the main employment sector in the town especially the manufacturing industries. According to 1969 population census, the population employees ratio was 3.32 in Thika. This means that about 33.2% of the total population are employed people. Thika Town Planning Section in its survey report for the 4th National Development Plan 1979-83⁽¹⁾, estimated that out of the employed population, 93.5% are low income people earning less than 1,200-00 per month, 4% are medium income earning between 1,200-00 - 2,700-00 and 2.5% are high income above 2,700-00 per month. It is also estimated in the same survey report that out of the estimated present population of 43,000, 15,000 people are employed leaving about 28,000 who are not employed in the formal sector. This figure (28,000) however includes the self-employed people in the informal sector and about 16,000 children. So in reality only about 12,000 adults are not employed in the formal sector. This represents a high rate of unemployment in Thika town (28% of the total population). The council proposes the establishment of more industries in the current development plan period in an attempt to absorb this unemployed population.

(1) Refer to 4th National Development Plan 1979-83 - "Socio-Economic unfastructure of Thika Municipal Council."

It aims at putting less emphasis on primary industries such as agriculture and ranching which form the immediate neighbourhood of the developed area, and expand secondary and tertiary industries.

Table 3.6 below show present registered and future employment in Thika.

Table 3.6: Present registered and future employment:

No. of employees, self-employed persons and casuals

Industry	Thika 1969		Kenya 2,000 (Towns)		Thika 2,000 A.D.	
	(Pop. 23,000)		(7,700,000)		(esti.pop. 240,000)	
Manufacturing	3,275	14%	614,400	8%	19,200	8%
Construction	201	0.9%	305,600	4%	9,500	4%
Service	1,612	7.0%	800,000	10.0%	26,000	11%
Public utilities	111	0.5%	11,200	0.2%	350	0.2%
Commerce	503	2.2%	580,000	7.5%	18,100	7.5%
Catering Services	-	-	159,800	2.0%	5,000	2.0%
Transport	178	0.8%	260,200	3.5%	8,100	3.5%
Unemployed	-	-	295,000	2.8%	9,200	3.8%
TOTALS	-	-	7,026,000	-	95,350	-

Source: Thika Development Plan 1972 - 77

Table 3.7: The major employment industries (1978)

<u>Name of Industry</u>	<u>No. of employees</u>
Kenya Cannerys	6,000
Metal Box	650
Acif Limited	1,050
United Textile Industries	816
Thika Cloth Mills	1,073
Kenya Toray Mills	673
Kenya Paper Mills	131
Bulleys Tanneries	334
B.A.T.	250
Kenya Tanning Extract	131
African Synthetic Fibre	17 + 500*

Source: A survey report prepared by Thika Town Planning Section for the 4th National Development Plan 1979-83.

From table 3.6 above is seen that manufacturing, service and commercial sectors are the main employment sectors in Thika and in Kenya as a whole. At present, manufacturing industries are playing a very major and significant role in providing employment opportunities not only for the local population but for the whole Kenya population. But it is the aim of the council and the government to develop the other sectors especially service and commercial sectors so that they could be the main employment sectors in future.

* Means when the industry is in full production in 1979.

3.5.3: Income:

Incomes of the people in a town to some extent determine the efficiency and level to which services are provided. The number of people earning certain incomes provide important information not only to the level of services and provisions required but also to the economic stability of such a town. The point the author advances here is that for certain public services such as the public transport services which are self-supporting in way of financing themselves, it is necessary to know the incomes of the people in the town. This will enable one to state what type of public transport service they can afford to sustain.

Here below is a table (3.8) showing income groups for Thika against productive industries.

Table 3.8: Income groups of Thika.

<u>Income (KShs.)</u>	<u>1970</u>	<u>%</u>	<u>1972</u>	<u>%</u>
0-99	102	2%	66	1.3%
100-149	245	4.9%	263	5.3%
150-199	918	18.6%	1177	23.7%
200-299	1747	35.4%	1492	30.0%
300-399	915	18.5%	817	16.5%
400-599	441	8.9%	408	8.2%
600-999	247	5.0%	399	8.0%
1,000-1,499	146	3.0%	154	3.1%
1,500-1,999	53	1.0%	61	1.2%
2,000 ⁺	120	2.4%	120	2.4%
	4,934	100.0%	4,957	100.0%

Source: Economic Survey 1973.

The above table shows that about 70% of workers earn between 150-00 - 400-00 per month. This is explained by the fact that most of the workers are unskilled and semi-skilled doing the manual operation in the productive industries which involve production of physical goods. That is why 93.5% of the employed population are low income earners earning less than 1,200-00 per month*.

3.6.0: INFRASTRUCTURAL FACILITIES

Industrial growth cannot be realized in isolation. It must all together be accompanied by growth in other land uses which demand provision of basic services such as water, roads, health, education, sewerage, etc. which are necessary for the growth of any town. For instance adequate land for community facilities such as schools, health centres and recreation, among others must be provided. Enough sewer, water and road services need to be extended to all land uses especially to the new industrial sites. Lack of adequate financial resources is one of the main constraints facing many municipal council authorities in their endeavour to achieve these infrastructures.

3.6.1: WATER SUPPLY:

The water system in Thika takes water from the Chania River just above its junction with the Thika River.

* Refer to page 66 to see the distribution of income levels. Self-employed people e.g. business-men and those in informal sectors are not included here.

The water is treated at a treatment plant beside the Chania Falls near the Blue Post Hotel and water power from the falls is used to pump the treated water to over-head storage tanks in the township.

Thika town has adequate water supply from this plant and has influenced the location of industries such as Kenya Cannery, Toray Mills and Nath Brothers Limited. The water plant was designed for a capacity of 3 million gallons per day to be reached by the year 1983. But due to more water consumers than anticipated e.g. new industries, this is estimated to be reached by the end of this year (1979)⁽¹⁾. 1972 water consumption was in excess of 1 million gallons per day and the consumption has been increased tremendously since then by the recent developments. It is therefore necessary to expand the existing water plant or look for alternative sources of water. One of the proposals of Thika Town Planning Section is to extend the capacity up to 6 million gallons per day.

Sir Alexander and Gibbs in their report on Thika Town have indicated 2 alternative sources of water after 1983. These are:

- (1) A second water treat plant on Chania River 500 metres up stream from Chania Falls.
- (2) From Nairobi City Councils' treatment plant at Rwegetha on Chania River via a direct aquaduct.

3.6.2: Sewage Disposal:

The existence of water borne sewage system to produce high standard of final effluent to avoid river pollution is an important location factor for industries consuming large volumes of water. The first treatment plant was designed in 1957 for a capacity of 750,000 gallons per day and for a population of 16,000 people.

In 1969, Alexander and Gibbs in their report recommended construction of more treatment works to keep pace with growing demand. Some of the treatment works recommended are already in operation on Komu River with a capacity of 1,351,000 per gallon per day dry weather flow.

3.6.3: Educational facilities:

Demand for educational facilities increases with population growth. It is important to know how these facilities are located in a given town in order to be able to establish movement patterns in that town. Journeys to schools form a big part of total number of journeys made in a particular town. This is determined by the school going population and the number of educational facilities available such as schools, institutes, colleges, etc.

In Thika town 35% of the population is school going population (those under 18 years of age). Thika has various educational facilities ranging from nursery schools to High Schools.

All these are located all over the town in close proximity to residential areas. This does not necessarily mean that all the students have shorter distances to walk. Some travel across the town from a residential area to schools located either in the CBD or in another residential area. The schools in one residential area might not be enough for school going population in that area and people from this area would therefore have to travel to other areas where schools are. Some of the school goers come from outside the town and will have to travel to where schools are. For instance it is estimated that nearly 90% of students in the secondary schools come from outside the town. Therefore journeys to schools need not be short for all school goers to walk.

At present, there are 11 nursery schools, 13 primary and 5 secondary schools with a total of about 9,000 students in Thika town. Most of these schools especially the secondary schools serve the whole region or country and not only Thika residents. The above indicated percentage clearly shows this.

In the long term Development Plan for Thika, requirement for more schools has been indicated. For example, in 1981, 20 more primary schools and 2 more secondary schools will be required to serve an estimated population of 60,000 people. In 1990, 38 more primary schools and 4 more secondary schools will be required to serve an estimated population of 120,000 people. From this could be deduced that the educational sector in Thika is expanding considerably fast due to the pressure of demand exerted by the rapid population growth and is likely to generate demand for various modes of transportation.

3.6.4: Transportation Network:

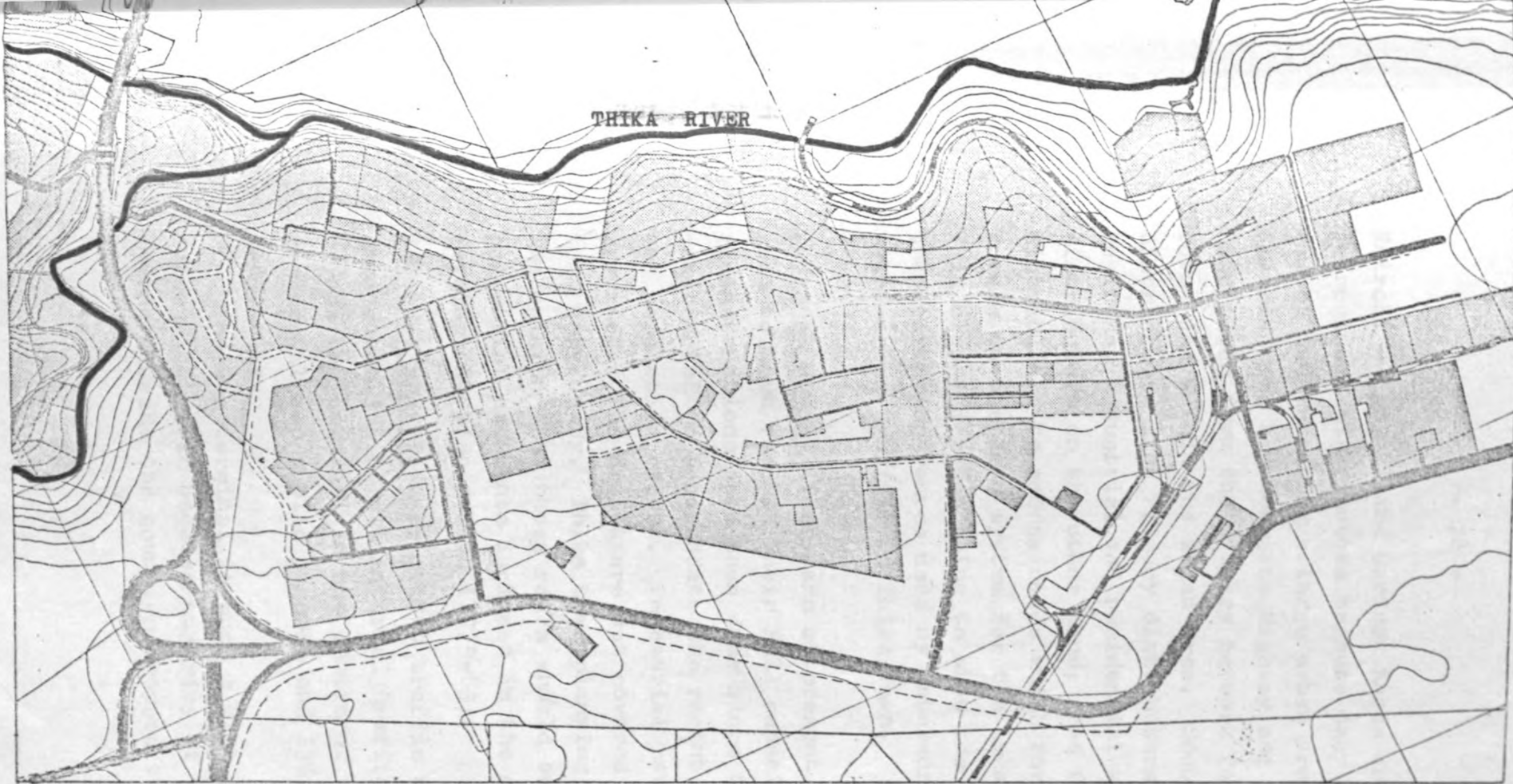
Thika is well linked to its environs by a good road network and a railway. To the south is Garissa Road (A₂) forming the southern by-pass. To the West is the Nairobi - Nanyuki trunk Road (A₂) forming the Western by-pass through Nyeri and the Northern side. There are other well tarmac^ked Roads connecting Thika town with its agriculturally rich hinterland such as the White Sisters Road (Mangu Road) to the West and Gatanga Road to the North where there is a dense population with growing economic activities.

A modern double carriage way links the town with Nairobi the capital city. The railway serves the town as it passes to the northern terminus at Nanyuki.

The traffic system of Thika is channelled through the main artery, the Kenyatta Highway and the Garissa Road (the Southern by-pass). The rest of the traffic is connected to them.





Classification of roads in Thika show a 4 level classification as shown on the Map No.4 below. Thus,

- (1) Regional distributor - Nairobi-Nyeri Road (A₂) and Garissa Road.
- (2) Primary distributor - Kenyatta Highway and Haile Selassie Road
- (3) Secondary distributor - Links between Kenyatta Highway and Garissa Road.
- (4) Local distributor - The minor access roads.



MAP k: 1:20.000

PRIMARY ROAD SYSTEM

-  REGIONAL DISTRIBUTOR
-  PRIMARY DISTRIBUTOR
-  SECONDARY DISTRIBUTOR
-  LOCAL DISTRIBUTOR

- NAIROBI-NYERI ROAD, GARISSA ROAD
- KENYATTA HIGHWAY, HAILE SELASSIE RD.
- LINKS BETWEEN KENYATTA HIGHWAY AND GARISSA ROAD

S & NJUGUNA
M.A. PLANNING II

Nairobi - Nanyuki and Garissa Roads are classified as regional distributors because they are major routes inter-secting a large urban area. Primary distributors are Kenyatta Highway and Haile Selassie Road which form the primary network for the town and form, and within the urban area. Secondary distributors link Primary distributors with the business, industrial and residential areas. Local distributors on the other hand, feed from secondary distributors to access roads which form the direct access to the Road system for the areas they serve. This classification helps to show the main transportation routes used by inter-urban and intra-urban traffic in Thika Town.

Internal Roads: These are at present congested and seem to have reached their full capacity. No major reconstructions have been done since they were constructed to accommodate the recent development and population growth. Pedestrial pavements are not provided. The drains are not covered making the town very dusty. Thika town planning section was of the opinion that these roads should be dualled and pedestrial pavements included in the current development plan period (1979-83).

Internal Traffic - From 1969 traffic survey, it was found that 55% of all internal traffic is generated by the bus terminal in the centre of the town, 32% commercial and public purpose and 13% by processing industries.

The bus terminal is such a high generator of internal traffic because majority of the workers living outside the town are dropped there in the



MAP 5: 1:20,000

INTERNAL TRAFFIC

PCU PASSANGER CAR UNITS

1mm = 600 PCU

AVERAGE DAY AUGUST 1969
 PHYSICAL PLANNING DEPARTMENT
 MINISTRY OF LANDS & SETTLEMENT

THIKA BOUND TRAFFIC IS 65% OF ALL TRAFFIC ON THE DUAL CARRIAGEWAY 90% OF TRAFFIC FROM WHITE SISTERS ROAD AND 50% OF TRAFFIC FROM GARISSA ROAD THE MAP SHOWS THE DISTRIBUTION OF EXTERNAL TRAFFIC AT THE GATEWAYS INTO THIKA INTERNAL TRAFFIC IS EXCLUDED MOST TRIPS ARE GENERATED BY BUS TERMINAL AND TRANSPORT 55% COMMERCIAL AND PUBLIC PURPOSE 32% PROCESSING INDUSTRIES 13%

morning by buses and matatus coming from the countryside and Nairobi and have to travel to their places of work. Most of the traffic on the internal roads especially Kenyatta Highway are buses and matatus. The town Planning Section of Thika expressed need for an internal transport system during the current plan period (1979-83).

External Traffic: - This shows the catchment areas of the traffic which has Thika as its destination. 1969 traffic surveys showed that 25% of all trips are generated in Nairobi, 35% by surrounding Rural locations close to Thika, 12% by the Eastern Province and the rest 28% by places like Ruiru, Limuru and Kiambu not so close to Thika but are dependent on Thika for employment and commercial purposes among others.

65% of all traffic on the main road from Nairobi has Thika as destination. This includes traffic generated from places along the Nairobi - Nyeri Road such as Ruiru and Kalimoni. It should be noted here that the traffic includes both public and private transportation systems. 90% of all traffic from White Sisters' Road has Thika as destination.

Nairobi traffic is mainly cars and matatus whereas the rural traffic is mainly buses. The implication here is that traffic from Nairobi is mainly private transport and matatus are the only means of public transport linking Nairobi and Thika.

3.6.5: Other Infrastructural Services:

Thika has a wide range of other infrastructural services namely health, electricity, telephone and post office. With good and efficient telephone and postal services, Thika is able to communicate easily with the rest of the country and the world and at the same time attract investors. These services however need to be increased to cope up with the growing population. Health services for instance need to be increased to cope up with the ever increasing demand from the rapidly growing population and from the surrounding districts - Kiambu, Murang'a and Machakos - which depend on Thika for such services. It is unlikely that the present District Hospital is able to serve adequately the town residents totaling over 43,000 people and the surrounding districts with a population of over 500,000 people. According to the Development Plan for Kenya (1974/78), a health centre is required for every 20,000 people.

3.7.0: Land Availability:

Land for industrial development is readily and cheaply available in Thika. Out of the total municipal area of 9,300 hectares, 2,240 hectares (24%) of the total land is reserved for industrial development. It is estimated that about 500 hectares of industrial land area is still available at a 99 year lease for new industrial development.

3.7.1: Existing and planned land use pattern:

The table below summarises the zoned land use according to the 1973 prepared by the Physical Planning Department of Ministry of Lands and Settlement.

Area	Existing Land Use	Planned Land Use
Area 1	Residential	Commercial
Area 2	Industrial	Industrial
Area 3	Public	Public
Area 4	Green	Green
Area 5	Water	Water

Table 3.9: Thika Zoned Land Use (1973)

<u>Category</u>	<u>Developed (hectares)</u>	<u>Undeveloped (Hectares)</u>	<u>Total Hectares)</u>
Residential	100	265.1	365.9
Industrial	126.7	111.8	238.5
Education	64	27.8	92.8
Recreational	11.7	299.3	311.0
Public Purpose	78.7	51.9	130.6
Commercial	18.6	18.1	36.7
Public Utilities	36.3	47.7	84.0
Transportation	-	7.1	7.1
Deferred		149.8	149.8
TOTAL	430.8	978.6	1,417.4

Source: Thika Development Plan 1972 - 77

The above figures show that of the existing land use as at 1973, the industrial use claimed the most land at 126.7 hectares followed by residential which claimed 100 hectares. It was found in another report ⁽¹⁾ prepared by Physical Planning Department and appearing in the Town Planning Handbook (1971) that residential land use in Thika is 13.9% as compared to the 41.5% average for other towns referred to in Appendix 2. Industrial land use in Thika claims 38.7% as compared to the average of 7.8% for all the towns referred to. This confirms the dominance of industrial land use development in Thika.

3.8.0: Regional Development of Thika:

Its proximity to Nairobi puts it in the Nairobi metropolitan area and favours it for partial decentralisation especially of industries.

As the development in the recent years shows, the areas which are first affected by the growth in the metropolitan region are areas which use an existing Development as nucleus. The area close to Nairobi the capital city will therefore receive the main part of extra population in the region. This is evident in the peri-urban areas and those outside Nairobi City boundary such as Kahawa, Kikuyu, Dagoretti, etc. Kiuru, Thika and perhaps Kalimoni will be secondary growth centres.

N.B. Total planned area as at 1973 is 2,833.8 hectares.

The development of Thika as an industrial town is going to affect the development of its hinterland - Muranga, Machakos and Kiambu - from which raw materials are got for its industries, and on which this hinterland depends for services and employment

3.9.0: Thika in the Context of Kenya's Urban development:

Kenya has adopted an urban development strategy which aims at the development of both service centres and growth centres.

The growth centre strategy aims at developing infrastructure in a number of selected towns so as to attract commerce and industry into them. Thika is one of the 13 growth centres usually known as principal towns selected for Kenya. The others include: Nyeri, Nanyuki, Kakamega, Eldoret, Embu, Nakuru, Meru, Malindi and Kericho. Some of these principal towns are administrative - commercial oriented like Nyeri and Embu while others like Nakuru and Thika are industrial - commercial oriented with these two activities very much pronounced.

Thika is one of the 10 largest centres in Kenya as shown in table 3.10 below and has also a sizeable share of wage employment as shown in table 3.11. It has a locational advantage over other centres as observed earlier that ensures its future growth. Being close to Nairobi enables it to benefit from the latter's agglomeration economies and it is therefore the obvious decentralization alternative for industrialists. The recent industrial development in Thika confirms this observation.

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Table 3.10: Population of 10 largest centres 1962 and 1969: Compiled from population census 1962/69:

Town	Census	Popu. 1979	Annual Growth of Urban popu. %	% of total Urban popu. 1962	% of total Urban popu. 1969
Nairobi	266,974 (347,431)	509,286 (509,286)	9.7 (5.6)	39.8 51.8	47
Mombasa	179,575	247,073	4.7	26.8	22.8
Nakuru	38,181	47,151	3.1	5.7	4.4
Kisumu	23,526	32,431	4.7	3.7	3.5
Thika	13,952	18,387	4.0	2.1	1.7
Eldoret	19,605	18,196	-1.1	2.9	1.7
Nanyuki	10,448	11,624	1.5	1.6	1.1
Kitale	9,342	11,574	3.1	1.4	1.1
Malindi	5,818	10,757	9.2	0.9	1.0
Kericho	7,692	10,144	4.0	1.0	0.9
TOTAL	574,933	916,623		85.7	84.7
OTHER TOWNS	96,017	165,814		14.3	15.3
TOTAL URBAN POPU.	679,500	1,081,437	7.1	100.00	100.00

Source: Central Bureau of Statistics, population census 1962-69

Table 3.11: % Distribution of total wage employment in main towns in Kenya:

<u>Total</u>	<u>1963</u>	<u>1974</u>
Nairobi	53.9	58.9
Mombasa	18.6	17.9
Nakuru	3.9	3.6
Thika	1.9	2.4
Kisumu	4.3	3.1
Eldoret	3.3	1.9
Other	14.1	12.2

Source: Bureau of Statistics; Statistical Abstract, 1976, Ministry of Finance and Planning, Kenya.

3.10: Conclusion:

Arising from the above brief but comprehensive overview of Thika Town, it could be deduced that Thika is one of the fast growing towns in Kenya. Its growth is mainly due to its industrial base which is at present expanding very rapidly and offering a lot of job opportunities for Kenyans, consequently inducing population influx into the town. Lack of adequate infrastructural services such as housing, transportation facilities, educational, health, etc. is one of the major problems facing the town. It is quite difficult to provide these services at a rate which will keep up with the high growth rate being experienced by the town at present.

However, in order for the town to grow in an efficient, healthy and orderly fashion and be able to sustain its growth potential, it must be able to face the anticipated problems of rapid industrialization such as those related to the provision of community amenities - hospitals, schools, transportation, housing etc.

Associated with industrialization is the movement of raw materials and finished products, and movement of workers to and from work. Transportation network in an industrial town like Thika is therefore an important input into the development of such a town. It should be able to ensure efficiency, convenience, safety, reliability and comfortability to the town dwellers. A thorough appraisal of it is therefore very essential.

CHAPTER FOUR:

ESTABLISHING THE NEED FOR PUBLIC

TRANSPORT SERVICE IN THIKA

4.0: Introduction:

In this chapter, primary and secondary data are analyzed in order to get the knowledge of the type of transportation system existing in Thika Town. It is on the basis of the existing transportation system and future needs that any attempt to establish the need for public transport system can be rationalized.

The previous chapters especially Chapter two have explicitly spelt out conditions which are necessary for the establishment of public transport system. The most important ones are: a relatively high population which is steadily increasing and concentrated on densely developed urban areas, a high level of business activity and employment, low car-ownership, income and increasing distance between work place and home. This chapter therefore endeavours to review the prevailing conditions in Thika in order to establish whether need for public transport service exists in Thika Municipality.

4.1: Trip generation and distribution:

Most of the trips made in Thika have their origins in the residential areas and destinations in the work places (industries, offices, etc.), institutions(schools), market and hospital.







ORIGINS AND DESTINATIONS OF INTERNAL TRIPS

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 M. A. THESIS 1978 / 79.

MAP No 6
 SCHOOLS INDUSTRIES AND TOWN CENTRE ARE
 THE MAIN DESTINATIONS.
 RESIDENTIAL AREAS AND HINTERLAND ARE
 THE MAIN ORIGINS.

LEGEND

-  TOWN CENTRE
-  SCHOOLS
-  INDUSTRIES
-  RESIDENTIAL

From the study, it was found that 113, 233 internal person trips by all modes of travel were made on a typical weekday. Out of these, work trips accounted for 44.7%, school 17.5%, market 18.0%, visiting 8.9%, recreation 5.6%, other purposes like going to church 4.3% and hospital 1.0%. Table 4.1 below clearly shows this.

Table 4.1: Daily trip distribution by purpose for all modes:

<u>Purpose</u>	<u>No. of trips</u>	<u>%</u>
Work	50,597	44.7
School	19,780	17.5
Market/business	20,496	18.0
Hospital	1,147	1.0
Recreation	6,307	5.6
Visiting	10,033	8.9
Others	4,873	4.3
	<hr/> 113,233	<hr/> 100.0

Source: Field Survey.

The above table clearly shows that the majority of trips are made for essential purposes with work, school and business trips accounting for 80.2% of total daily trips. This appears to compare well with what was found in Nairobi city (see chapter two page 37) where the same trip purposes accounted for 85% of total daily trips. However, school trips do not seem to account for a very big share

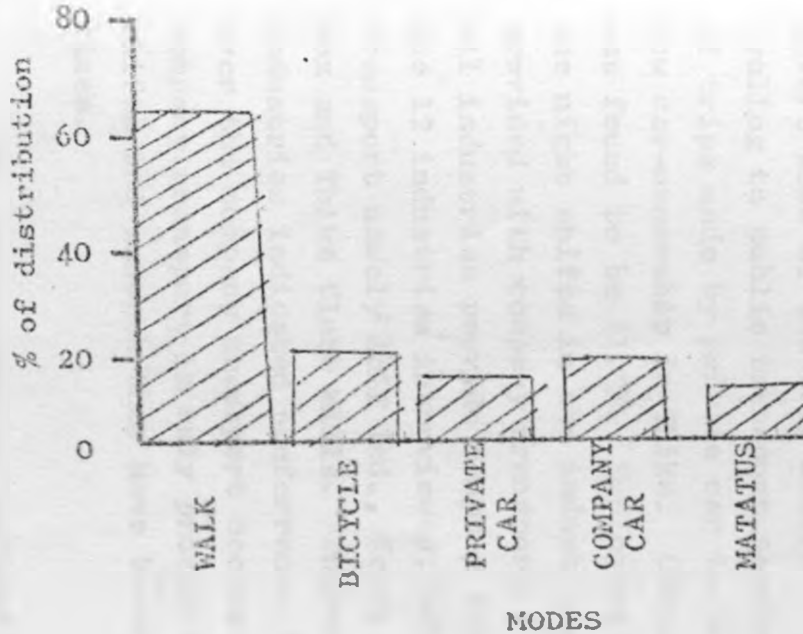
of total daily trips as is the case of Nairobi. This could be explained in terms of there being fewer educational facilities in Thika than in Nairobi and hence fewer trips for school purpose. On the other hand, market and business trips seem to account for a very significant share of total daily trips. This could be due to Thika town being a very active business and market centre for its hinterland and hence generating a lot of business/market trips.

4.2: Modes of Transport:

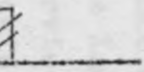
There are five modes of transport identified in Thika namely bicycle, foot, private car, company vehicle and matatus*. According to the author's surveys foot was found to be the most common mode of travel accounting for 65% of the total daily trips. Figure 9 below clearly shows this.

* N.B.: These matatus do not provide intra-urban public transport services. They are the transport vehicles commuting from the surrounding areas to Thika Town. They pick the town dwellers living in the outskirts of the town i.e. in site and service scheme 5 kilometres from the town centre. They normally charge Shs.2/50 for this distance.

Figure 9: Trip distribution by modes:



SOURCE: FIELD SURVEY:

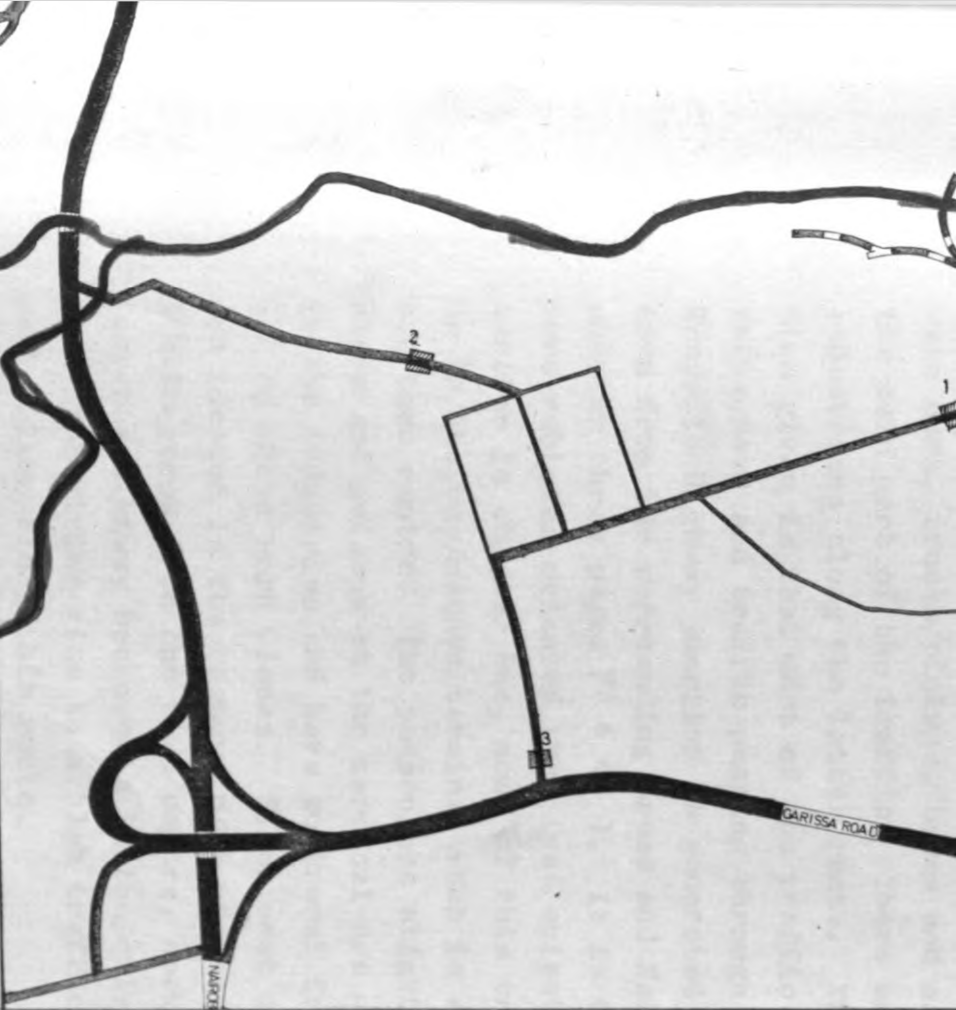


As can be seen in the above figure, the majority of trips are made by walking and cycling.

These two modes of transport account for about 82% of the total daily trips in Thika whereas in Nairobi, they account for about 50% of the total daily trips (see chapter two page 36).

The predominance of walking and cycling can be attributed to the lack of organized intra-urban public transport service which could, if established, divert some of the trip makers from walking and cycling to public transport service. The low number of trips made by private car is an indication of low car-ownership in Thika. Car-ownership in Thika was found to be 11.3%. Employees who work during the night shifts in the industries are the only ones provided with company transport. Here again, not all industries provide company transport. Out of the 12 industries interviewed, only 4 offer company transport namely Acif Ltd., Kenya Cannery, Metal Box and Thika Cloth Mills. The workers in these industries indicated preference for public transport over the company transport because they argued that company transport is only provided during the night shifts and as such they have to walk during other times.

The predominance of walking and riding the bicycle was also indicated in the traffic counts carried along the major transportation routes shown on the map below.



MAIN INTERNAL TRANSPORTATION ROUTES

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DEPARTMENT OF URBAN AND REGIONAL PLANNING

MA THESIS 1978/79



**TOWN
LEGEND**

--- RAILWAY LINE

ROADS

TRAFFIC COUNT POINTS

1 ALONG KENYA/TA HIGHWAY

2 ALONG BATANGA - THIKA ROAD

3 ALONG KENYA/TA HIGHWAY/GARISSA ROAD JUNCTION

The traffic counts were carried out during the peak hours and low-peak hours at 3 different points along Kenyatta Highway and Gatanga-Thika Road. They showed that traffic along the selected routes is highest during three periods of the day: from 7 a.m. - 8.30 a.m, 12.00 noon - 2.00 p.m. and 4.00 p.m. - 6.00 p.m. These peak periods seem to correspond with the Nairobi peak periods. (see chapter two page 40).

It was however noted that each route had traffic of its own characteristics. For instance traffic along Kenyatta Highway at point 1 (shown on the map) showed that pedestrians formed the main traffic whereas those carried at the junction of Kenyatta Highway and Garissa Road showed that private cars, trucks/pickups, buses and matatus formed the main part of the traffic. There are very few pedestrians along the latter route. The explanation given is that most of the traffic along Gatanga-Thika Road and traffic passing through Garissa Road-Kenyatta Highway junction is generated outside Thika town from the surrounding areas and Nairobi (see chapter three pages 78 & 80). It is therefore much more vehicles oriented than foot oriented. As noted earlier in chapter one, most of this traffic ends up in the bus/matatu terminal which is situated in the town centre. The passengers alighting from the buses and matatus at the terminal are mostly workers in the industries and have to travel from the terminal to their work places. Since most of the industries are located in the eastern part of the town, about 5 kilometres from the town centre, workers walk along Kenyatta Highway because it is the only access to that side giving rise to a high traffic in form of pedestrians along this route.

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Another reason why pedestrians form the main part of traffic along Kenyatta Highway is that this is the major road passing through the centre of the town. It connects the industrial and residential areas in the eastern part of the town with the main commercial centre, market, administrative offices, the hospital, schools and residential areas to the western part of the town. People travelling to these places walk unless they can afford to drive. Hence the main part of the traffic is in form of pedestrians.

Table 4.2: Traffic distribution by time of the day along major transportation routes:

POINT	TIME	PEAK HOURS					Trucks/ pickups
		TYPE OF TRAFFIC					
KENYATTA HIGHWAY (AT THIKA HIGH SCHOOL GATE)		Pedes- trians	cars	matatus	Buses	byci- cles	
	7-8.30a.m.	2,500	350	100	20	800	200
	12-2.00pm.	2,200	340	60	10	750	150
	4-6.00p.m.	3,000	430	115	36	836	230
GATANGA-THIKA AS(AT BLIND'S SCHOOL GATE)	7-8.30a.m.	900	150	200	0	70	100
	12-2.00pm.	800	100	120	0	50	90
	4-6.00p.m.	1,000	220	210	-	80	130

POINT	PEAK HOURS						
	<u>TIME</u>	<u>TYPE OF TRAFFIC:</u>					
AT THE JUNCTION OF KENYATTA HIGH- WAY/GARISSA ROAD		Pedes- trians	Cars	Matatus	Buses	Byci- cles	Trucks/ Pickups
	7-8.30a.m.	50	250	180	37	32	140
	12-2.00pm.	35	236	174	31	20	122
	4-6.00p.m.	80	350	210	40	50	18

POINT	NON-PEAK HOURS						
	<u>TIME:</u>	<u>TYPE OF TRAFFIC:</u>					
KENYATTA HIGHWAY (AT THIKA HIGH SCHOOL GATE)		Pedes- trians	Cars	Matatus	Buses	Bicy- cles	Trucks/ Pickups
	9 a.m.--12n.	1,300	200	60	12	200	170
	2p.m.--4pm.	1,600	215	60	13	185	155
GATANGA-THIKA RD(AT BLIND'S SCHOOL GATE)	9 a.m.--12n.	400	78	98	-	50	60
	2p.m.--4pm.	300	80	112	-	38	65
AT THE JUNCTION OF KENYATTA HIGHWAY/ GARISSA ROAD	9 a.m.--12n.	36	160	140	24	13	100
	2p.m.--4pm.	30	180	130	18	27	115

4.3: Mode Preference:

72% of the people interviewed indicated that they preferred public transport for travelling: 8% preferred foot, 5% bicycle, 12% private car and 3% company transport. The majority of those who preferred public transport also happened to be those who walked more than 5 kilometres to work, school or market. Those who preferred foot were either those who felt that they could not afford public transport if it was established due to financial constraints or those who walked shorter distances to work, school or market. Most of the people who owned cars preferred using their cars for travelling.

Need for establishing internal public transport in Thika town was also expressed by the managers and heads of industries and institutions interviewed. Majority of these industries and institutions as stated above do not offer transport to their employees. The managers and heads of the institutions interviewed felt that public transport would help the majority of the people who travel long distances to work or school. One industry (Kenya Cannery) indicated that majority of its workers live outside the town boundary and travel by matatus and buses from the rural areas daily. These people are dropped at the bus/matatu terminal in the town centre and have to walk to work about 10 kilometres from the terminal. Out of 6,000 workers employed in Kenya Cannery, 3,500 (58.3%) live outside the municipality boundary. Some schools like Chania High

school indicated that out of 800 students in the school, 650 come from outside the municipality boundary and their predominant mode of travel is foot or matatus. The Headmaster felt that such people would benefit a great deal from the establishment of an internal public transport service.

Some managers of industries explained lateness to work for majority of the workers as being due to transportation problems in the majority of the cases. They quoted various travel problems encountered by workers especially during the rainy seasons. They noted that it was difficult for the workers to walk to work during the heavy rains. Consequently, high rates of lateness were recorded in most industries. Almost all the managers interviewed favoured the establishment of internal public transport service in Thika. Indeed, all of them considered the establishment of internal public transport service to be the most important thing that ever happened to Thika.

4.4: Travel Distance:

The distance travelled by majority of the people ranged from less than 1 kilometre to more than 5 kilometres. Out of the people interviewed 15.8% travelled less than 1 kilometre, 15.4% less than 2 kilometres, 25.3% less than 3 Kms. 3.3% less than 4 kilometres, 9.5% less than 5 Kms. and 30.7% more than 5 Kms. as shown in the table 4.3 below. However, it should be noted that the distances shown are for single journeys (trips) not for return journeys.

Table 4.3: Distance travelled for all purposes and by all modes:

Distance	Less Than 1 Km.	Less Than 2 Kms.	Less Than 3 Kms.	Less Than 4 Kms.	Less Than 5 Kms.	More Than 5 Kms.	TOTAL
% of Distribution	15.8	15.4	25.3	3.3	9.5	30.7	100

Source: Field Survey

Table 4.3 above shows that the vast majority of trips fall within the range 0 kilometres and 5 kilometres accounting for 69.3% of travel distance distribution.

However, a good number of trips fall within the distance over 5 kilometres (30.7%). Taking 3.2 kilometres to be the distance people would start transferring from walking to public transport (see chapter two pp.39), we would then have over 44% of trips falling within the distance range which would require public transport service. Not forgetting that even within the shortest distance ranges, 25% of public transport trips occur below 3.2 kilometres. ⁽¹⁾

Further analysis of the data showed that majority of essential trips such as work trips school trips and business/market trips fall within the distance of over 3 kilometres. For instance, 60% of work trips and 57% of business trips were within this distance. Nevertheless, non-essential trips such as visiting and recreation also showed that majority of them fell within the same distance. Recreation accounted for 68% and visiting 39%. This could be attributed to the fact that most people tend to travel long distances for visiting and recreation especially during weekends. Recreational facilities in Thika are minimal and the few recreational facilities there are, are not located in close proximity to the residential areas hence

(1) See chapter two page 43.

people have to travel long distance.

The furthest located industry i.e. Kenya Cannery* is located about 10 kilometres from the town centre and 5 kilometres from the site and service scheme where some of its workers reside. It is the largest industry in Thika employing 6,000 people with 58.3% of them living outside the municipality boundary as we have noted above.

The furthest located residential areas are the Benor Estate and site and service housing scheme which are located about 5 kilometres from the town centres. Bendor estate is located about 15 Kms. from the furthest located industry (i.e. Kenya Cannery). It is however an estate of high income group people and the majority of them own cars. Site and service housing scheme is for low and medium income groups and is as such high density residential area with lower rate of car-ownership. So the majority of people in this estate use foot as their main mode of travel.

There are however other areas within Thika Municipality boundary which are located about 9 miles (14.4 Kms.) from the town centre. A lot of traffic with Thika as destination emanate from these areas. For instance it was noted in Chapter Three that 90% of all traffic from White Sisters' Road (coming from Gatukuyu side, 9 miles from the town centre) has Thika as destination (1). Most of this traffic is in form of matatus and is comprised of workers, students and business persons who travel to Thika daily.

* Refer to Map No. 6 on page 90.

(1) See Chapter Three page 78

Establishment of public transport service would have to consider extending services to these areas.

4.5: Travel Time:

There seemed to be a correlation between travel time and travel distance. Thus, travel time increased with increasing travel distance. 55.3% of trips made had travel time of more than 20 minutes. 48.7% had travel time of less than 20 minutes. Further analysis showed that 20.4 of trips had travel time of more than one hour. This seemed to correspond with the high percentage (30.7%) of distance travelled. The high percentage of longer travel times is due to the fact that car-ownership in Thika is very low (11.3%) and hence walking is the most common mode of travel since no public transport services exist. Majority of the people therefore use foot to travel from one activity area to another within the town boundary. As distance between activity areas or between home and activity areas increases, travel time increases and upon this, the need for establishing public transport will arise. Since the majority of Thika residents cannot afford to own cars as explained in the previous chapter, establishment of public transport would help them a lot to solve their travel problems within the town.

Table 4.4: Travel time for all purposes and by all modes:

Travel Time	Less Than 10 Mins.	Less Than 20 Mins.	Less Than 30 Mins.	Less Than 1 Hr.	More Than 1 Hr.
% of distribution	21.3%	22.4%	13.5%	30.5%	30.4

Source: Field Survey

It was observed in Chapter Three that Thika has adopted the strategy of developing residential areas alongside industrial development. The aim is to keep travel distances and travel times as short as possible and also enable walking to be the main mode of travel to work. Consequently, costs of journey - to work would be kept to the minimum. This explains why we have such a high percentage of travel time of less than 20 minutes (44.7%) and travel distances of less than 2 kilometres (31.2%). This strategy seemed to be fine as far as work trips were concerned. But other trip purposes like schooling, market/business, etc. which are not located within the same residential area, demand more travel time. It was also found that not all people in a particular residential area worked nearby. Some worked far away in other industries or offices. Housing is a major problem in Thika town and as such one resided where one got a room or house regardless of where one worked. Furthermore, as Thika town grows and there are indications it will grow, distances between home and work place will increase.

4.6: Income of Various trip makers:

Out of the people interviewed 68.3% were employed. This included self-employed persons. The other 31.2% were mainly children, housewives and jobseekers. This latter group was not included in any of the income groups analysis as they would have raised the number of people in that income group giving a false picture of the real situation.

The income groups indicated in Table 4.6 below therefore refers to those people who actually earned incomes from formal employment or private business.

Table 4.5 : Incomes of various trip makers:

Income (Kshs.)	No. of People	%
0 - 99	8	3.8
100-199	10	4.9
200-399	30	14.6
400-599	54	26.2*
600-999	52	25.2*
1,000-1999	30	14.6
2,000+	22	10.7
	206	100.00

74.7% of the people interviewed indicated that they earned less than 1,000-00 per month. These people fall within the low income groups category according to Thika Planning Section. ⁽¹⁾ Majority of the people however seemed to have a monthly income of between 400-00 and 599-00 per month (26.2%). Only 23.3% of the people earned less than 400-00 per month.

(1) See Chapter Three pp. 65.

* Most Common Income Levels.

In general, incomes in Thika are low considering that the vast majority of workers earn less 1,000-00 per month (74.7%) and are therefore in the low income group. Nevertheless, incomes seem to have improved quite a lot compared with 1973 figures where 77% of the workers earned between 150-00 and 400-00 per month. This is due to salary and wage reviews which have been effected over the past years.

Table 4.6: Car-ownership by income group.

<u>Income</u>	<u>Car-ownership</u>
0-99	-
100-199	-
200-399	-
400-599	-
600-999	2
1,000-1999	5
2,000 ⁺	27
<hr/>	
	34
<hr/>	

Source: Field Survey.

The majority of car-owners were within income group of over 2,000-00 per month. These people account only for about 10.7% of the working population in Thika. Low car-ownership was attributed to low incomes of majority of the people as shown in table 4.5. Lower rates of car-ownership where travel demand is high like in Thika was recognized (in Chapter Two) as a necessary condition for establishing public transport service.

4.7: Justification for establishing need for public transport service in Thika Town

Need for establishing public transport service in Thika town has been expressed in interviews by many people living in Thika town. What the general public feel about the need for public transport is indicated by a letter to the editor of Daily Nation of 4th March 1979 (page 7).

However, justification for establishing need for public transport service in Thika cannot only be based on this general demand for public transport. Other factors which were found to be necessary for establishing public transport services in other areas are more central to the justification for establishing need for public transport services in Thika.

From the analysis of the existing situation in Thika, Thika was found to have a high level of business and employment activity resulting into high rate of trip generation. This had been found in Chapter Two to be one of the conditions necessary for establishing public transport. Further analysis showed that more than 44% of the trip made fell within the distance range which require public transport service i.e. a distance of over 3.2 kilometres.

We need a cinema

THIKA, popularly called the Birmingham of Kenya, is a rapidly growing industrial town. Soon this magnificent town may assume the status of a city.

Unfortunately, despite its bustling population, the town lacks many essential social amenities. Even for those whom money is not a problem, there are not enough luxurious services that a man can crave for.

Would the Municipal Council consider the possibility of providing bus services to its residents particularly from the town centre to the industrial area and residential locations?

A cinema and drama theatre would also be very welcome to cater for the entertainment needs of Thika workers.

Githinji wa Chaga,
Nairobi

*Njiru -
we don't
go by
same
road
connect
the*

This provided an answer to the argument advanced by some, people that travel distances in Thika might be too short to require public transport services. Furthermore, it was noted that residents from the residential areas far away from the town centre such as site and service were ready to board matatus travelling between Thika town and the rural areas and pay Shs.2/50 for a distance of only 5 kilometres. This further indicated need for an organized public transport service.

Long travel times due to dependence on walking as the main mode of travel was another indication that need for public transport existed in Thika. 55.3% of trips made had travel time of more than 20 minutes. Public transport then is needed to reduce travel time and increase efficiency in the town.

Another factor which justifies the need for establishing public transport service is the low level of car-ownership in Thika. The vast majority of people in Thika cannot afford to own private cars. They need an alternative mode of travel to walking. As distance increases between home and activity areas and especially between home and work, school and business areas which form essential trip purposes, the need for public transport becomes more acute.

Out of the 113,233 trips made in a typical week day in Thika, 80.2% accounted for essential trips. It was noted in Chapter One that essential trips are production oriented and as such cost

attached to them are likely to be insignificant in relation to the anticipated regards. Therefore demand derived from them will not be very sensitive to changes in travel costs. Since they are more definite in the sense that they must occur, they are the best indicators of the need for public transport. The fact that they are the majority in Thika further justifies the need for public transport.

Thika's steadily increasing population is another factor justifying need for public transport. Population projections for Thika Town in Chapter Three clearly indicate that Thika is growing rapidly and as such it requires well planned infrastructures to fit its anticipated growth. A well organized public transport system would therefore solve the current travel problems and also cater for the anticipated future growth.

4.8: An economic perspective to justify establishing need for public transport service in Thika:

The operation of public transport service in any town should be conceived as a function of income. For any public transport operator to accept to provide public transport services, he must first be convinced that enough income accrues from the operations of the public transport services in that town. The economic justification of operating public transport services should be seen as the likely daily trips which would use public transport service and the likely cost for each trip giving the likely total daily earnings.

on the basis of all this, it should be possible to know the size and nature of public transport services responsible for the carrying of urban transport services.

In the case of London, it has been estimated that 111,711 individual person trips are made of various lengths. Out of these trips, 25 per cent are short indicating a high percentage of the population using transport trips. Further analysis shows that 41% of total daily trips fall within the distance range which would require public transport services 61% of the total daily trips which fall within the distance range which require public transport services should therefore be based on the maximum possible trips which would be made by public transport if it was available. This shows encouragement of the likely benefits of utilizing all trips which would not be the public transport services and also of the fact that most of the short distance trips would use public transport services available. In the studies carried out elsewhere, up to 25% of public transport trips were found to occur within distance ranges of less than 2.5 kilometers (1.5 miles) but not all.

Thus,

$$\frac{49,721}{111,711} = 44.5\% \text{ trips}$$

49,721 trips are the total other 25% within the distance range which would require public transport.

$$\frac{65 \times 49,823}{100} = 32,385 \text{ trips}$$

32,385 trips are the minimum trips which would be made by public transport service.

Taking 2.6* trips to be the average daily trips per person per day, 32,385 trips represents 12,456 persons who would require public transport service everyday.

From table 4.3 above showing distribution of travel distance, average travel distance was found to fall between 3 and 5 kilometres. For any travel distance between these two distance ranges, the bus fare is 1/00 according to the Kenya Bus Services standard fare - scale. For 32,385 trips made in Thika, likely daily earnings would be:

$$32,385 \times 1/00 = 32,385-00$$

$$\begin{aligned} \text{Yearly revenue} &= 32,385 \times 365 \\ &= \underline{\underline{11,820,525/00}} \end{aligned}$$

In order to establish whether it is economical to operate an internal bus service in Thika, the following factors are considered:

$$\begin{array}{l} * \text{ Total daily trips} \\ \hline \text{Total population} \end{array} = \frac{113,233}{43,000} = 2.6 \text{ trips.}$$

- (i) Operating costs e.g. petrol, oil, wear tyres, etc = 20 cts per Km. per pcu*
- (ii) Average person trip length = 4 Kms./day
- (iii) Average bus occupancy = 100 passengers*
- (iv) Average travel distance per bus per year = 20,000 Kms.*
- (v) Average bus life = 10 years
- (vi) Average bus value = 300,000/00*
- (vii) Terminal costs, storage workshops, Bus stops/stages = 9,000,000/00*
- (viii) Recurrent expenditure = at 10% total capital costs*
- (ix) Depreciation = 9% total capital costs*

From the above information the following can be established;

$$\begin{aligned} \text{- Total distance travelled} &= 32,825 \times 4 \times 365 \\ \text{in a year} &\quad \quad \quad \underline{2.6 \quad 1 \quad 1} \\ &= \underline{18,432,500 \text{ Kms.}} \end{aligned}$$

$$\begin{aligned} \text{- Therefore No. of buses} &= \frac{18,432,500}{20,000 \times 100} \\ &= \underline{\underline{9.2 \text{ buses}}} \end{aligned}$$

$$\begin{aligned} \text{- Therefore Rolling Stock} &= 9 \times 300,000 \\ &= \underline{2,700,000/00} \end{aligned}$$

* From Kenya Bus Services officials.

$$\begin{aligned}\text{Operational Cost} &= 2 \times 18,432,500 \text{ Kms.} \\ &= 3,686,500/00\end{aligned}$$

$$\begin{aligned}\text{Therefore for 10 years} \\ &= 36,865,000/00\end{aligned}$$

Therefore Total costs;

(i) Fixed costs (Terminal costs, storage, workshops etc.) + Rolling Stock

$$= 9,000,000/00$$

$$2,700,000/00$$

$$11,700,000/00$$

(ii) Total operational costs

$$= 36,000,000/00$$

(iii) Depreciation for 10 years

$$= \frac{9\% \times 11,700,000 \times 10}{100}$$

$$100$$

$$= 10,530,000/00$$

(iv) Recurrent Expenditure

$$= \frac{10\% \times 11,700,000 \times 10}{100}$$

$$100$$

$$= 11,700,000/00$$

Thus,

Total Costs		Total Revenue
1. Fixed Capital = 11,700,000/-		Annual Revenue = 11,820,525/00
2. Total Operational costs 36,000,000/-		Therefore expected Revenue for 10 years =118,205,250/00
3. Depreciation = 10,830,000/-		
4. Recurrent Expenditure = 11,700,000/-		
<hr/> TOTAL COSTS = 70,230,000/-		118,205,250/00

Therefore costs per annum $\frac{70,230,000}{10} = 7,023,000/00$

Revenue per annum = 11,820,525/00

Therefore Annual Profit/Saving = Revenue - Costs
= 11,820,525/00 - 7,023,000/00
= 4,797,525/00

CONCLUSION:

From an economic point of view, operation of an internal bus service in Thika town is to be viable. This further helps to justify the need for establishing an internal public transport service in Thika Town.

However the underlying assumptions in the above analysis are firstly, that all the trips which were previously made on foot and requiring public transport service (i.e. with travel distance of more than 3.2 kilometres) would use the public transport service established. Secondly, that all the people making these trips would afford to pay the fares of the established public transport service.

CHAPTER FIVE:

CONCLUSIONS AND RECOMMENDATIONS:

5.0: Major Conclusions:

Arising from the analysis of data, review of the literature and background information of the study area, many conclusions regarding the establishment of need for public transport in Thika have emerged.

The study has shown that conditions which have led to the establishment of public transport services in other parts of the world prevail in Thika. Among them are the increasing population densities in the town due to high level of business and employment activities, low level of car-ownership and increasing distances from home to activity areas.

Due to lack of organized internal public transport services in Thika town, movement within and about the town was found to be problematic. Travel times were found to be long and walking which was found to be the main mode of travel was found to be costly in terms of time and inconveniences experienced by the trip makers. Inconvenience in walking was found to be more pronounced during the rainy seasons when high rates of lateness and absenteeism were recorded in many work places. On the basis of time costs and inconvenience, walking could not be said to be the best mode of travel for the vast majority of Thika residents. The best mode of travel as noted in Chapter One is the one which tries to minimize both the costs incurred and time spent during travel and which ensures convenience.

The establishment of public transport services in Thika town was found to be particularly necessary in view of the increasing distances between activity areas due to the towns growth. It was found that public transport services are required for distance ranges of more than 3.2 kilometres. 44% of all the trips made in Thika fall within this range. As the town grows, trips made within this distance range are going to increase and demand for public transport services can be expected to arise.

The future growth of the town is ensured by the expanding industrial base of the town itself and the continued dependence of its economically rich hinterland/economic activities such as business for and employment. The increased industrial investment in Thika is due to the decentralisation of industries from Nairobi to Thika.

With the future growth of the town thus ensured, population of Thika is expected to grow, employment facilities to expand, residential densities and commercial activities to increase and consequently the distance between activity areas and homes to increase. These factors which were found to be the main determinants of the success of public transport services in any town were found in Thika town. They therefore help to justify the need for establishing public transport services in Thika town.

Central to the establishment of public transport services is the knowledge of existing land use, economic activities in the town and hinterland and anticipated future trends

On the basis of this knowledge, a good public transport service can be designed which would take into consideration the likely future land uses and travel demand.

Thika's need for intra-urban public transport service was found to be very much a consequence of land uses i.e. high level of business and employment activities and school attendance and not very much due to very high local population. Its local population is relatively small compared with Nairobi's when Nairobi first got its public transport services. However economic activities within the town itself and between the town and its hinterland generate a lot of traffic in the town. As regards the activities between the town and its hinterland, a lot of traffic with Thika as destination was recorded. This traffic as was found in the analysis has its destinations in the work places, schools and market. 70% of it was found to have destination in the industries which are located more than 5 kilometres from the bus/matatu terminal in the town centre. It was concluded therefore that the establishment of internal public transport service in Thika would be a great help to the majority of people living within and also outside the town boundary who at present depend on walking for their travel.

Public transport companies in many countries are self-supporting ventures and as such cannot operate where they are likely to incur losses. Their operations are largely controlled by market forces. Their success very much depends on the affordability by the majority of the people in the town where they are operating to pay the tariffs set.

An economic justification stipulating the major constraints and likely profits which could accrue from the public transport service operations is therefore necessary.

In Kenya, public transport services are provided either by individually owned or corporately owned ventures who charge a government controlled tariff. In either of the two cases, no government subsidy is provided and as such they have to operate where they are assured of at least making marginal profits. They are therefore more attracted where they make high profits i.e. where high residential densities, low level of car-ownership and long travel distances prevail. We have seen that such conditions exist in Thika. Thus justifying the operation of an internal public transport service.

Matatu services only seem to be established in towns where internal bus services exist. They are established in order to supplement the existing bus services. Nevertheless, they appear to be competing with the existing internal bus services in most cases. The experience in Nakuru however showed that this competition can lead to the deterioration and eventual extinction of the internal bus services. On the other hand, experience in Nairobi and Mombasa where matatus operate in competition with buses, no deterioration of bus services is reported such as diminishing revenue for the bus operators as was the case in Nakuru. The conclusion derived from this is that at a certain population size demand for public transport is so high that buses alone cannot afford to provide adequate services.

Matatu services are therefore needed. They are not seen as posing a bad competition but as providing the town dwellers with necessary and indispensable services. The Nakuru experience where the established internal bus services collapsed is an indication that this apparent population threshold which require both bus and matatu services had not been reached. This means that the internal bus services needed protection from any competition if they had to operate at a profit or break-even.

The Nakuru experience also showed that success of public transport bus services depends also on proper training of the personnel for good Management and Administration.

5.1: RECOMMENDATIONS:

The following recommendations are derived from the conclusions noted above:-

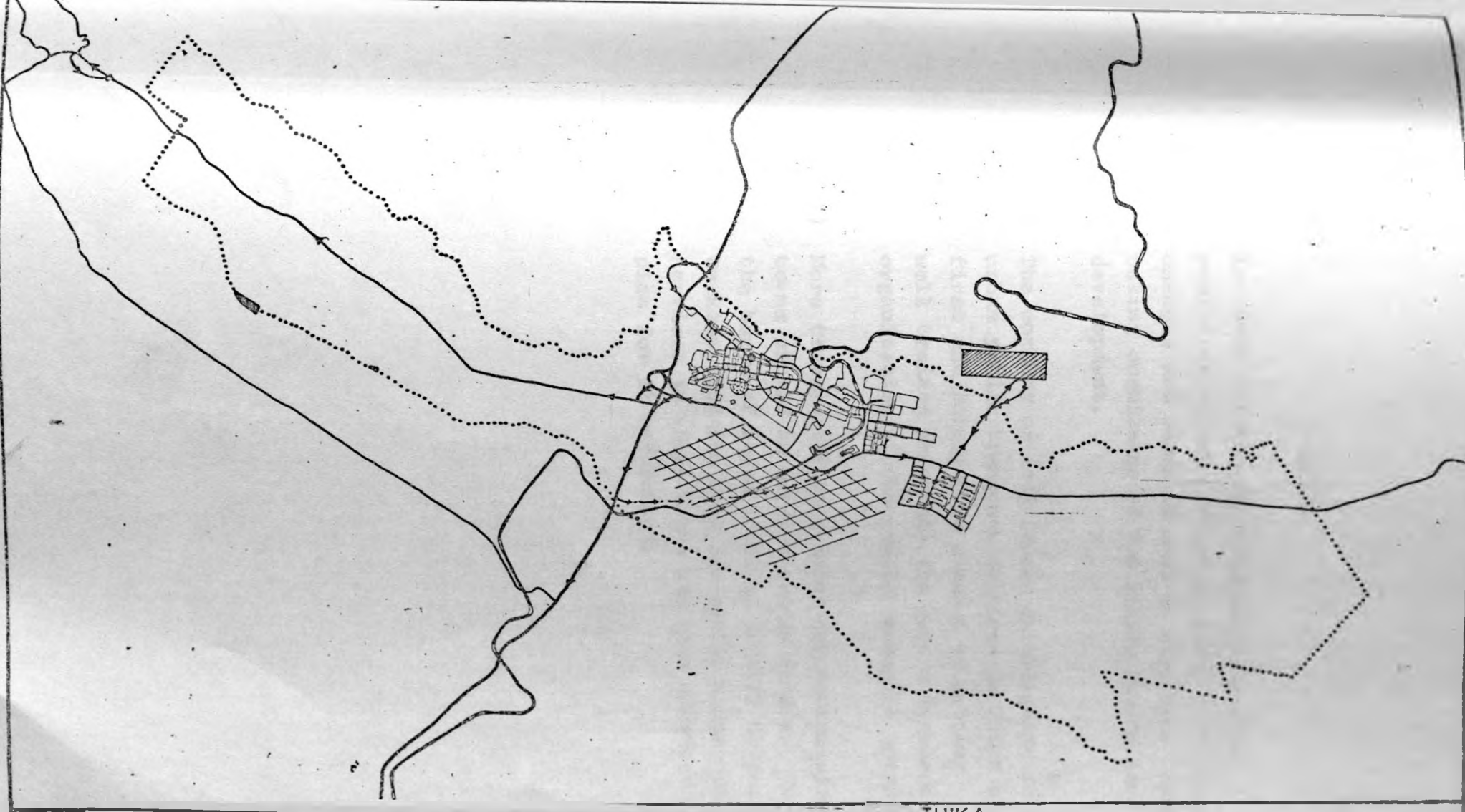
- (1) Thika local authority should make arrangements to establish internal public transport services in Thika Municipality. In case the local authority cannot be able to establish its own public transport services, it could either request a public transport operator to do so or form a joint venture with a public transport operator.
- (2) Thika local authority should grant a franchise to the operator who would establish public transport services in the town. The franchise should stipulate the tariffs to be charged the people using the public transport services established and also protect the operator from any other competitors.

- (3) The bus company establishing internal public transport services should first commence the operations with about 6 buses on 4 routes (shown on the Map No. 8) and increase the number of both the buses and routes as demand arises.









In view of the relatively small size of Thika town (as compared with Nairobi and Mombasa) and consequently short travel distances, small public transport vehicles i.e. Mini buses are recommended for the operation of public transport services in Thika. For short distances, smaller vehicles were found to be more economical to operate than the big vehicles (refer to Chapter Two).

- (4) Thika Municipal Council should look for a site to construct a Bus park, a Bus depot and other associated facilities in order to cater for the garaging, repair and maintenance of the vehicles. The cost of these facilities is reflected in the economic analysis of establishing public transport services in Chapter Four.

The Bus park should preferably be built next to the Bus/Matatu terminal. This would enable people travelling by buses and matatus from the hinterland and Nairobi to board the town buses for industries or other destinations within the town, from nearby. Thus ensuring a smooth link between the inter-urban and intra-urban travel which is lacking at present increasing travel problems in the town.



THIKA

- | | | | |
|---|--------------------------------------|---|--|
|  | KENYA CANNERS FACTORY |  | THIS ROUTE TO BE ESTABLISHED WHEN DEVELOPMENT IN THIS AREA HAS BEEN ATTAINED |
|  | DEVELOPED AREA |  | MUNICIPAL BOUNDARY |
|  | BUS ROUTES |  | EXISTING BUS TERMINAL |
|  | DIRECTION OF FUTURE TOWN DEVELOPMENT |  | PROPOSED B.L.E. - P.L.B. |

- (5) In order for the established intra-urban public transport service to cater for future changes and needs it must be flexible. Thus taking cognizance of the likely future land use development.
- (6) The company or individuals establishing intra-urban public transport services in Thika should first and foremost be assured of getting well trained personnel for good management and organisation of the public transport operations.
- (7) More transportation studies for medium size towns should be carried out in future. On the basis of these studies, it will be possible to know when the need for public transport services in these towns has been attained and plan for it beforehand.

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A P P E N D I X 1

NAIROBI TRIP RATES:

(24 Hour-day Trips/Household)
I N C O M E

Purpose	Car per H/hold	£0	£97	£205	£301	£600	£901	£1201	£2401	£3601	TOTAL
		-96	-204	-300	-600	-900	-1200	-2400	-3600	+	
Home-based Shops and School	0	0.80	1.05	1.76	2.34	2.14	3.45	3.54	5.18	5.84	1.86
	1	1.00	1.49	3.54	2.57	4.50	3.91	3.78	3.05	3.70	3.60
	2+	4.00	5.40	4.00	2.92	8.00	6.02	3.84	4.09	3.24	4.13
	TOTAL	0.90	1.07	1.82	2.38	2.83	3.90	3.72	3.60	3.65	2.37
Home-based Work and Other, and non-home based	0	1.32	2.47	3.23	4.19	5.02	5.23	5.77	7.00	8.44	3.49
	1	3.70	3.73	4.50	4.17	4.65	5.96	6.91	7.77	8.15	6.35
	2+	7.00	7.10	7.20	7.04	7.72	7.28	8.79	7.73	11.54	9.40
	TOTAL	1.52	2.52	3.38	3.90	5.00	5.75	6.90	7.22	9.86	4.48

...../

A P P E N D I X 1 (Contd.)

NAIROBI TRIP RATES:
(24 Hour-day Trips/Household)
I N C O M E

All Trips	0	2.12	3.52	4.98	6.53	7.16	8.68	9.29	12.18	14.28	5.34
	1	4.70	5.22	8.04	6.74	9.15	9.87	10.69	10.82	11.85	9.95
	2+	11.00	12.50	11.20	9.95	15.71	13.30	12.62	11.82	14.79	15.53
	TOTAL	2.43	3.58	5.19	6.28	7.83	9.65	10.62	10.81	13.52	6.85

41% - Private Transport

8% - Buses

N.B. As importance of trip purpose decreases, the use of private transport increases. People with less money restrict their resources to essential trip making.

A P P E N D I X 2:

LAND USE AND POPULATION SCHEDULE:

		NAKURU	KISUMU	ELDORET	THIKA BY ZONE	NANYUKI EXCLUDE GOLF ARMY	NYERI	KITALE	ISILOLO	T. FALLS EXCLUDE GOLF	NAIVASHA BY ZONE EXCLUDE PRISON	AVERAGE
A. LAND USE BY ZONE AS % OF TOTAL LAND USE 0 - 6	RESIDENTIAL 0	50.2%	45.9%	44.5	13.9	47.9	45.8	34.6	63.3	28.1	41.2	41.5
	INDUSTRIAL 1	5.6%	6.5	2.7	38.7	5.5	2.5	5.1	1.2	5.9	4.4	7.8
	EDUCATIONAL 2	13.4%	8.1	14.2	18.0	12.9	17.3	19.6	6.7	27.4	18.7	15.0
	RECREATIONAL 3	17.4%	15.9	18.0	6.6	19.5	12.3	26.3	2.5	7.3	6.0	13.0
	PUBLIC PURPOSES 4	9.1%	16.1	13.0	14.0	8.1	16.5	10.5	19.3	21.4	21.9	15.0
	COMMERCIALS 5	1.6%	3.8	5.0	4.4	2.4	4.6	2.5	3.6	4.9	6.3	3.9
	PUBLIC UTILITIES 6	2.7%	3.6	2.7	4.4	3.4	1.0	7.4	3.9	5.0	1.5	3.0
B. TOTAL ACREAGE (ZONES 0 - 6)		20650	1195	1480	789	601	635	894	184	447	227	-
C. POPULATION 1968		53,000	33,500	29,500	20,000	15,600	12,500	10,500	8,400	8,100	6,400	-
D. LOW DENSITY POPU. 1968, TOTAL 0 - 6		25,800	26.4	19.9	26.0	25.9	19.5	11.2	45.4	21.4	25.1	25,300
E. GROWTH RATE PER ANNUM		5.7%	5.6	6.2	5.5	6.9	7.9	2.8	7.4	7.2	6.2	6.2
F. POPULATION INCREASE 1968-73		25,000	10,500	10,500	11,000	6,200	5,700	1,500	3,600	3,300	2,500	
G. GROWTH RATE % 1968-73		23%	31	35	45	40	46	14	43	41	36	36%

SOURCE: PHYSICAL PLANNING DEPARTMENT

A P P E N D I X 3:

Questionnaires Used in the Interviews:

UNIVERSITY OF NAIROBI 1978/79
DEPARTMENT OF URBAN AND M.A. PLANNING
REGIONAL PLANNING 2ND YEAR

QUESTIONNAIRE FOR ASSESSING " THE NEED FOR
ESTABLISHING PUBLIC TRANSPORT SERVICE IN THIKA TOWN "

A HOUSEHOLD/INDIVIDUAL SURVEY QUESTIONNAIRE:

1. Zone Number
2. Household Number
3. Number of Persons in the Household
4. Relationship to the Head of Household
-
5. Purposes for making trips:
 - A: For work
 - B: For school
 - C: For Market/Shopping/Business
 - D: For visiting
 - E: For recreation
 - G: Others (specify)
6. Number of trips made by a person for each purpose:
 - A: Work (per day/per week)
 - B: Market/Shopping/Business (per day/per week)
.....
 - C: Hospital (per day/per week)
 - D: Recreation/sports (per day/per week) ...
 - E: Visiting (per day/per week)
 - F: School (per day/per week)
 - G: Others (state) - (per day/per week)

*Specify the days if not daily.

7. TIME TAKEN IN EACH TRIP:

Purpose	Less Than 10 Mins.	Less Than 20 Mins.	Less Than 30 Mins.	Less Than 1 Hr.	More Than 1 Hr.
Work					
Market/Shopping/ Business					
Hospital					
Recreation					
Visiting					
School					
Others					

8. DISTANCE TRAVELLED

Purpose	Less Than 1 Km.	Less Than 2Kms.	Less Than 3Kms.	Less Than 4Kms.	Less Than 5Kms.	More Than 5Kms.
Work						
Market/Shopping/ Business						
Hospital						
Recreation						
Visiting						
School						
Others						

9. Mode of Transport:

- A: Foot
- B: Bicycle
- C: Private Car
- D: Company Vehicle
- E: Public Means (Bus/Matatus)
- F: Others (specify)

10. How much do you pay for each journey?

11. MODE PREFERENCE BY TRIP PURPOSE

Purpose	Foot	Bi cycle	Private Car	Company Car	Public Means	Others
Work						
School						
Hospital						
Visiting						
Market/Shopping/ Business						
Recreation						
Others						

12. Which route do you follow for the following purposes?

- A: Going to work
- B: Going to Hospital
- C: Going to school
- D: Going to Market/Shopping/Business
- E: Going to Visiting
- F: Going to Recreation/Sports

13. Monthly Income
From Employment Kshs.
From Business Kshs.
From Other Sources (state)
..... Kshs.
14. How many personal cars/vehicles do you own?
.....
15. Do you Travel to Nairobi?
Yes/No.
16. How many times a day/week?
17. What problems do you encounter with the
present transportation system?
1.
2.
3.
18. Would you like any changes introduced?
Yes/No.
19. Which changes would you like introduced
(if any)?
1.
2.
3.

UNIVERSITY OF NAIROBI
DEPARTMENT OF URBAN AND
REGIONAL PLANNING

1978/79
M.A. PLANNING
2ND YEAR

A QUESTIONNAIRE FOR INSTITUTIONS AND BUSINESS

ESTABLISHMENTS:

1. Zone Number
2. Location of Establishment
3. Types of Establishment:
 - A: Industry
 - B: Market
 - C: School
 - D: Hospital
 - E: Bank
 - F: Others (state)
4. Number of Employees
- Number living outside Municipality Boundary
- Number living within Municipality Boundary
5. What is the predominant mode of travel for outsiders?
6. Do you offer Company Transport for your employees? Yes/No.
7. If yes,
 - (a) How many trips a day does it make?
 - (b) How many persons are carried per trip?
 - (c) How much does each person per trip?
8. Punctuality of the workers: Is it:
Good?
- Moderate?
- Bad?

9. What reasons do your employees give for reporting to work late?
 1.
 2.
 3.
 4.
10. A. Rate of Absenteism:
 - High
 - Moderate
 - Low
 - Non-ExistentB. Reasons for Absenteism:
 1.
 2.
 3.
11. What are your views about establishing Public Transport Service in Thika Town?
.....
.....
.....
.....
12. If School, How many of the students come from:
 - A. Within Municipality Boundary?
 - B. Outside Municipality Boundary?
13. What is their predominant mode of travelling to School?
14. If Hospital, how many outpatients report per day?
15. How many come from:
 - A. Within Municipality Boundary?
 - B. Outside Municipality Boundary?
16. What is their predominant mode of travel?
.....
17. Any other Institutions (to be stated)

LIST OF PLATES:



Plate 1: Cycling back to work (in the background are the industries).

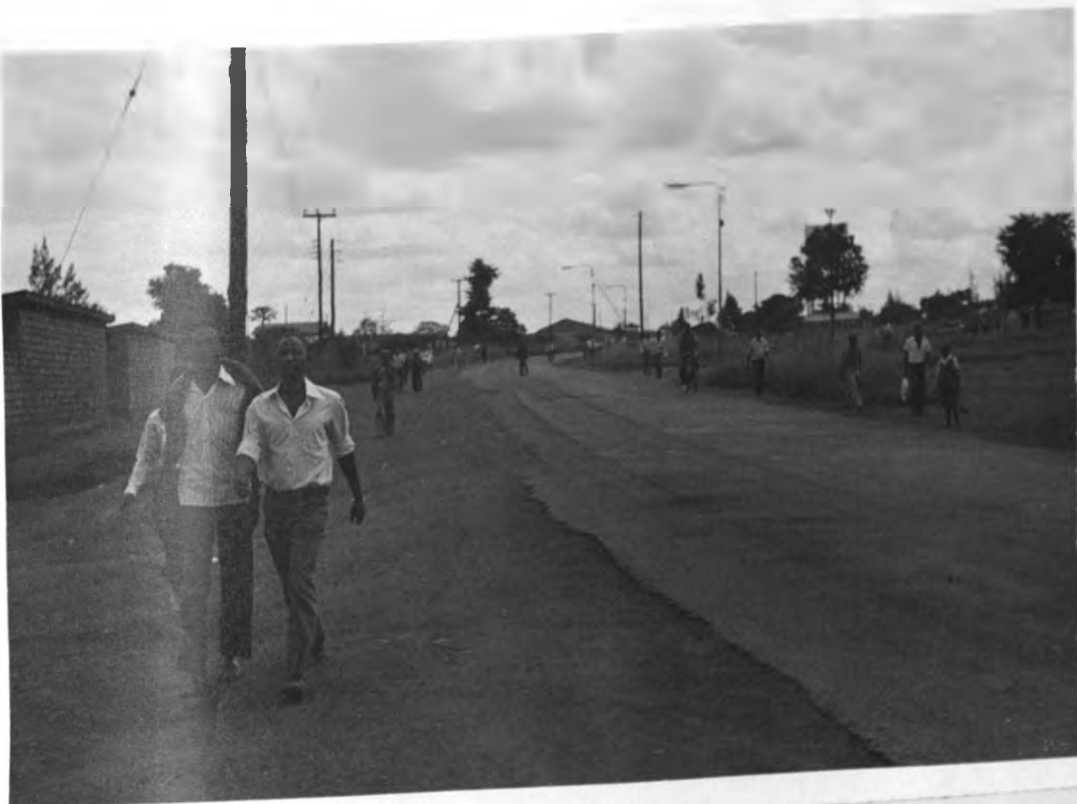


Plate 2: Walking is the most common mode of travel in Thika.



Plate 3: Traffic along Kenyatta Highway, the main spine road passing through the centre of the town.



Plate 4: Cycling in Thika is for all. It is the second most common mode of travel.



Plate 5: Bus terminal for up-country Buses.



Plate 6: Uncontrolled parking for matatus (from the hinterland).



7: Matatus commuting to Thika from the hinterland a very common sight along Kenyatta Highway.



8: Site and service housing scheme located more than 5 Kms. from the town centre.



Plate 7: Matatus commuting to Thika from the hinterland a very common sight along Kenyatta Highway.



Plate 8: Site and service housing scheme located more than 5 Kms. from the town centre.