

**INDUSTRIAL LOCATION: A COMPARATIVE STUDY OF NAIROBI - THIKA
CORRIDOR AND ATHI RIVER-NAIROBI CORRIDOR**

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DECLARATION

I. JANE W. WANJOHI, hereby declare that this thesis is my original work and has not been presented for a degree in any other university.

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ABSTRACT

This study examines the factors that have made industries move more towards Nairobi-Athi River Corridor than towards Nairobi-Thika Corridor which is a deviation from the expected growth of Nairobi as recommended by the Nairobi Urban Studies Group which predicted concentrated growth on the South-west of the city towards Thika in the North-east.

The study attempts to find out the main reasons why development of industries has deviated from the general expected development of Nairobi, that is, concentrated development between Thika and Nairobi. From the literature reviewed, it is apparent that factors that affect industrial location include land and its attributes, capital: finance and equipment, sources of raw materials, market and price of products: sources and costs of labour, Transportation and freight, housing for workers, public policy, agglomeration, linkage and external economies.

To solve the problem, the number of industries on each Corridor were counted and an observation was made of the upcoming ones. The main reasons, in order of importance, that have made each industry be located where it is were obtained from the owners of the industries or managers. The problems encountered were enumerated in each area.

From the field survey it was found out that more industries are

come up on the Athi River-Nairobi Corridor than on the Thika Nairobi Corridor and the main reasons given for this phenomenon was availability of land that does not have competitive uses, availability of services (water, sewers, power, roads, railway, Airport etc), agglomeration, expansion of the Central Industrial Area and the public policy of starting Export Processing Zones on this corridor.

There are two parts to this study. The first part comprises the introductory chapters which include among others the study objectives, research methodology and hypothesis. A short geographical setting of the area is given plus a brief history. The Literature review the main factors that affect industrial location generally and those that affect industrial location in Nairobi in Particular. This was done in order to find out if these are the same factors that have made industries be attracted more to the Nairobi-Athi River Corridor than to the Thika Nairobi Corridor. The second part comprises the data analysis, the main findings, conclusions and recommendations.

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Although I have received much guidance and encouragement from the above-named persons, the narrative, opinions, conclusions and mistakes in this study are my own responsibility.

DEDICATION

This thesis is dedicated to my family - My husband Dr. JOSEPH MWANGI and our children MARTIN MACHARIA and NAOMI NYAMBURA for their love and understanding.

CHAPTER ONE

INTRODUCTION

This is an introductory Chapter which mainly examines the study problem, it outlines the objectives of the study and hypothesis and explains the methodology of the research. It also gives the scope and the limitations of the study.

Introduction to the Problem

According to the United Nations Industrial Development Organisation (UNIDO), industrialisation in developing countries necessarily exposes their economies to the ups and downs of their external environment. Few developing countries have enough resources and domestic markets large enough to establish and service a reasonably balanced industrial structure although, according to Chapman (1991)¹ manufacturing has been central to many of the great developments affecting society over 200 years. The continuing tight international credit situation and the sedentary pace of economic growth pursued by developed countries result in stagnating world trade and pose serious threats to industrialisation efforts in developing countries. Nevertheless, manufacturing is important in all modern economies as a growth generating sector having a profound influence on jobs and incomes not only in the actual manufacture of goods but also in other branches of economic activity which provide manufacturers with material and other suppliers with services. The location of manufacturing industry thus becomes quite a critical element in the planning of economic development at all geographical levels. The overall growth record of industries in developing countries

improved in 1986 and should have continued in 1987 and 1988, only because developing countries have learnt². Kenya, being one of the developing countries was no exception.

The location of the individual firm is very important as it has been proved that the profitability and/or productivity of a plant is dependent on its geographical location. For instance the wage differences within Sweden can reach 20% according to a study by Jobin (1973) and according to another piece of empirical research, the regional differences in productivity when comparing sites in Stockholm area and some other regions were up to 20%³.

Therefore, the entrepreneur's choice of location for his firm is probably one of the most important decisions he will ever make. It fixes the location from which he is henceforth obliged to purchase his raw materials, his semi-finished products and his energy. It establishes the size and the quality of the workforce available to him and, in some cases it defines the markets in which he can sell his products. What is more, once the decision is implemented, there can be no turning back. The financial implications of moving a second time will almost in all cases force him to stay where he is. Therefore knowledge about location processes would be useful to individual firms⁴.

In Kenya, industries are concentrated in the major urban areas like Nairobi, Mombasa, Kisumu, Nakuru, Thika etc. but the biggest concentration is in Nairobi's Central Industrial Area⁵. The Nairobi industrial area has grown in importance as a manufacturing area to be a major industrial centre in Kenya and

in Nairobi since its establishment in 1947-1948 in the 1948 Master Plan⁶.

The existing Nairobi industrial area has a large area that is undeveloped and an efficient railway and road network but congestion of traffic forces planners to look for alternative industrial areas. The higher costs of land in Nairobi Central Industrial Area than in other industrial areas; its being unavailable in large blocks; the high labour costs which are approximately 2% higher than in the rest of Kenya (except for Mombasa); the expensive provision of services such as social, health recreational and housing facilities have made entrepreneurs and planners look for alternative sites outside the Central Industrial Area. Moreover, adequate water supply is a problem with some firms in the Central Industrial Area of Nairobi. Related to this are problems of sewage disposal. Some companies in the periphery of the Central Industrial Area are not connected to the sewerage system and thus have to dispose of their wastes⁷.

To avoid traffic congestion, it has become an important part of policy that the existing industrial area not be expanded beyond the area designated in the 1947 Master Plan for Nairobi comprising an area of about 690 ha.

According to the Nairobi Urban Study Group, additional development should be limited to industries that are capital intensive and with consequent low levels of employment, and to those directly related to the central area functions. Firms

which need new sites should be encouraged to look for new sites in new industrial areas created elsewhere in the city⁸

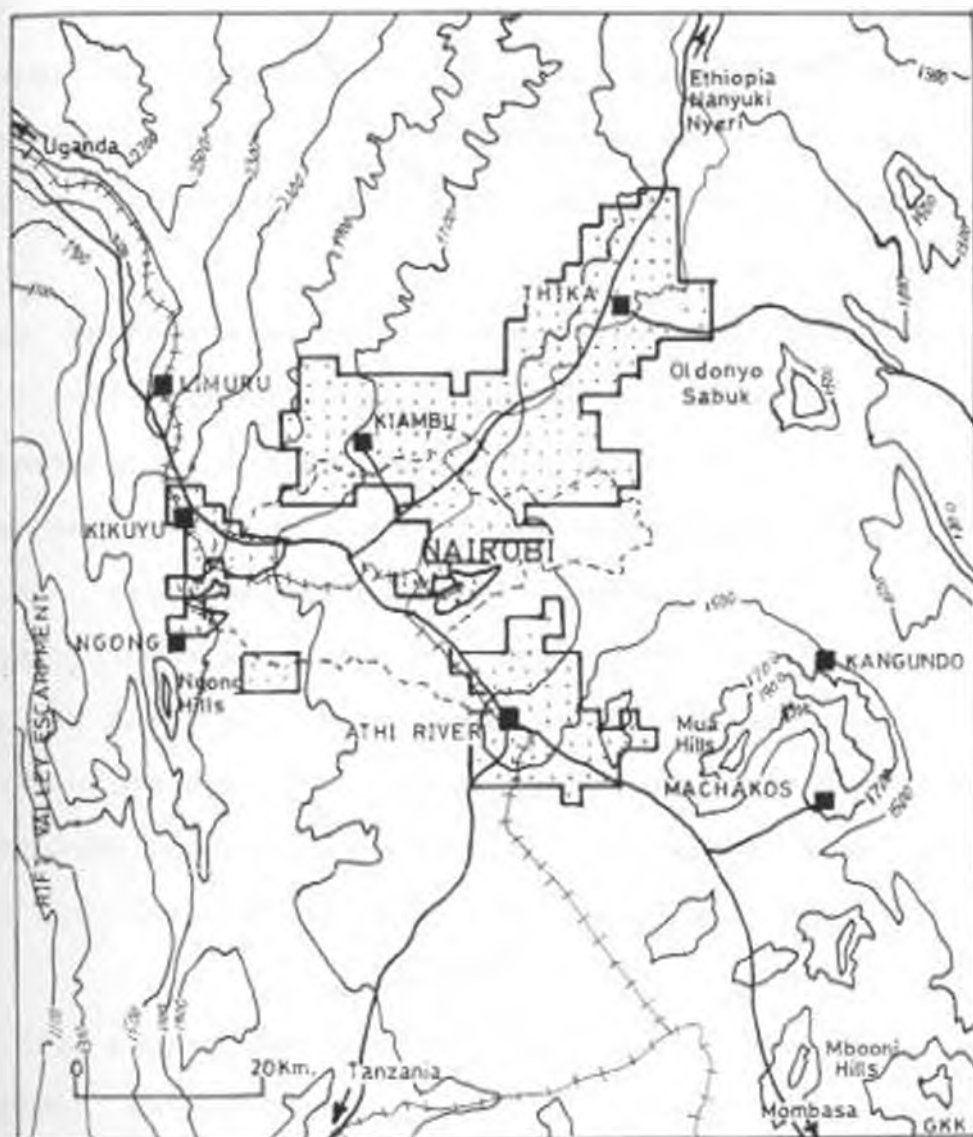
The idea of looking for new locations of industries was incorporated in the 1973 Nairobi Metropolitan Growth Strategy which had a wide range of alternative strategies for urban growth in the Nairobi region.

The process of formulation and evaluation of alternative strategies for Nairobi's urban growth followed three cycles during which refinements were made progressively to the data and criteria employed in the process. Some requirements included changes in the assessment of the suitability of different areas for urban growth in the standards adopted for land uses, in land requirements and in the evaluation criteria. The principal refinement made to the process was to influence the phasing of development in four periods: 1971-75; 1976-80; 1981-85 and 1986-2000. The evaluation criteria in this cycle was land availability, population and employment; and standards and land requirements.

Though absolute conclusions could not be drawn, the process of evaluation was sufficiently thorough to suggest certain firm courses of action. It emerged clearly that only limited development seems advisable at Limuru, Machakos and directly to the east and west of Nairobi. Primarily this derives from anticipated problems of attracting industrial investment and hence jobs, to these areas and secondarily, because of the immense investments required for outlying infrastructure

particularly the large quantities of water that would be needed to encourage development in any meaningful way. In the areas to the east, where at first sight the flat land appears to offer lower land and residential building costs, high servicing costs, the need for more roads, greater prevalence of black cotton soil and drainage problems reduce these advantages. In addition, there is no doubt that these conditions on this flat terrain would be much less amenable to urban living than those predominating in the more attractive rolling areas to the north-east. It also emerged clearly that there are considerable advantages to be gained in developing in a linear manner between Nairobi and Thika and less advantages in expanding Nairobi to the East and in the possible development of satellites at Thika and Athi River (See Figure 1.0). These development conditions for Nairobi were the strategies considered up to the mid of the century.

Thus, it can be concluded that the strategy favoured concentrated development between Nairobi and Thika as the first alternative strategy to urban growth and then a second alternative strategy was a new city at Thika, eastern extensions to Nairobi and development at Athi River¹⁰



TITLE. NAIROBI AND ENVIRONS

 AREAS OF GREATEST POTENTIAL FOR DEVELOPMENT

SOURCE : urban study group (nairobi) metropolitan growth strategy

A casual field observation of these growth strategies show that the growth of industries has deviated from this expected growth strategy. What has been observed is that there is concentrated industrial development between Nairobi and Athi River. Between Nairobi and Thika there is concentrated development but industrial development is only in specific areas like Ruaraka, Kahawa, Ruiru and Thika itself. It is not continuous industrial growth like on the Athi River-Nairobi corridor. The number of existing and up-coming industries is more on the Nairobi-Athi River corridor than on the Thika-Nairobi Corridor.¹¹

As at the time of the field collection of data, 70 industries were counted on the Athi River-Nairobi corridor and 10 were counted on the Nairobi-Thika corridor. The difference in the number of industries operational as at the time of the field survey may not be significant but what is significant is the difference in the number of industries that were under construction on the Athi-River corridor. 70 industries were under construction on Athi-River corridor while 10 industries were under construction on the Nairobi-Thika corridor. This is a clear indication that industries are moving more towards Athi River than towards Thika.

According to the Nairobi Urban studies Group, in the long term, growth should be arranged in a corridor of development of changing width reaching from the south-west towards Thika in the north-east (See Figure 1) but the growth of industries is towards

the south-east. Thus this study hopes to come up with the reasons which have caused this phenomena.

It was calculated that by the year 2000 there would be approximately 119,000 people working on industrial estates in Nairobi which is about 18% of total employment in the same area, not including local industrial sites in residential areas. This is quite a high percentage and an indication of the importance of industries as a source of employment and income.

The evaluation criteria for industrial development was direct access to road and rail networks, provision of water and power supplies and reasonable land and building costs. From the point of view of promoting industry a few very large sites, of the size of the existing industrial area, would appear at first sight to be the most effective way of providing for industrial growth with economies of infrastructure, easy movement between industries and so on. However, such concentrations would hinder attempts to obtain a reasonable distribution of traffic and would proportionately decrease the level of accessibility to the labour force by enforcing longer work journeys necessitating more extensive use of mass transit than might otherwise ensue.

Another fundamental criterion for location of industrial areas was land availability.

Industry requires relatively flat sites and access to utilities such as drainage, power and water. Topography north and west of Nairobi offers a relatively limited amount of land of this nature. To the North-east and east of the city, land is flat.

and as a result most of the selected industrial sites are on this side e.g. Ruiru, Kasarani, Ruaraka, and Dandora. This points out to the fact that industries should also have grown on the Nairobi-Thika corridor more than the Athi-River-Nairobi corridor where the only selected industrial areas were Firestone and Langata apart from the Central Industrial area. Hence there must be reasons why this has not been happening and the study hopes to come up with them and suggest the best land usage on the two corridors.

According to Opendo (1969), Thika and Athi River are among the 13 significant industrial towns in Kenya which share among themselves 60% of Kenya's manufacturing and service operatives according to the 1969 statistics. Thika had a share of 2.7% of the manufacturing and service operatives while Athi River had a share of 1.0%¹. Hence the two towns could be said to be industrial magnets for industries trying to move out of the Nairobi Central Industrial Area or for new industries that cannot get space in the Central Industrial Area. Hence the developments along the two corridors.

In summary, it can be stated from observations made that the growth of industries in Nairobi have not conformed to the expected strategies for the growth of Nairobi which favoured concentrated development between Nairobi and Thika as the first strategy to urban growth. Instead, there is concentrated development of industries between Nairobi and Athi River.

Objectives

The study looks at the reasons why industries seem to be moving more towards Nairobi-Athi River corridor than towards Thika-Nairobi corridor despite the recommendations of the Nairobi, Urban Studies Group of 1973 in which they recommended a linear form of growth linking Nairobi to Thika, that is, concentrated development between Nairobi and Thika as a first alternative strategy.

The research hoped to find out the reasons and causes of this phenomenon and to suggest what can be done to achieve rational industrial location and rational land use along Nairobi-Thika corridor and Nairobi-Athi River corridor.

The main objective of the study was hence to compare the factors that affect the location of industries in the two corridors. The number of industries operational as at the time of the study were counted and an observation was made of those under construction.

Hypothesis

Athi River - Nairobi Corridor has proved a stronger industrial location magnet than the Nairobi - Thika corridor owing to the availability of larger tracts of land for industries, higher level of infrastructural services and better proximity to the Central Industrial area of Nairobi for raw material supplies.

Importance of the study

Manufacturing is very important in all modern economies as a growth generating sector having a profound influence on jobs and

incomes not only in the actual manufacture of goods but also in other branches of economic activity which provide manufacturers with materials and other supplies and with services¹⁴. At one extreme the entrepreneur who aims at maximising his personal income will be concerned to find the location that offers the largest possible returns. At the other extreme the entrepreneur who places high value on personal satisfactions of non-monetary kind would be content with returns just sufficient for his purpose. To him the search for an "optimum" location would be a superfluous endeavour.

Most entrepreneurs fall somewhere between the two extremes of maximising and mere survival but the range of possible aims and attitude is still very wide and likely to affect location decisions in differing ways.

Nonetheless all aim at finding a satisfactory location, and "satisfactory" means at minimum location which enables the business to survive. So the choice of location is normally a rational decision made after some assessment of the prospects for the particular business in that particular location.

The enormous sums of money annually allocated and vital interests committed, to expansion of existing plant or the establishment of new branch enterprises are not allocated without regard to the varying levels of prospective profitability at different locations. For new enterprise too, location must be important in that it is one of the most difficult to reverse if the choice should prove to be unwise.

The issue of location can be summarised by stating that, in a given industry in given sets of economic, social and technical conditions one or more optimum locations will exist (even though they may not be easily found). There will also exist a series of locations, all of them viable, but all of them varying in conditions and degree of profitability. Below a certain level, however, the location would not be viable and no plant could survive in competitive conditions. In the absence of special circumstances (such as government subsidies) productive enterprise will exist within these "spatial margins of profitability", where a surplus of revenue over expenditure enables activity to continue. In the real world, we have a range of near-optimal and sub-optimal decisions out of which these broad patterns of manufacturing have emerged.

According to the Nairobi, metropolitan Growth Strategy of 1973, it was reasonable to anticipate that given a continuation of growth, Nairobi and Thika may eventually fall within the same metropolitan area and it was necessary to formulate a strategy which could accommodate such an eventuality.

Expansion of the city along a corridor of development does give flexibility to react to changing growth rates and other pressures and ensures a measure of adaptability which is not inherent in a more concentric form of development. As far as industrial growth is concerned, Nairobi and Athi River seem to be falling within the same metropolitan due to the continued growth of industries along the Athi River-Nairobi Corridor. It was therefore

important to study the factors that have contributed to the location of industries along this corridor and to look for constraints to the development of industries along Nairobi-Thika corridor, in order to be able to influence future trends.

Research Methodology

The research objectives were achieved in two ways: A review was made on the existing related literature. The review included the factors that influence industrial location and the models that have been put forward during the development of industrial location theories. A review was also made on the factors that affect industrial location in Kenya.

The second way of achieving the objectives was through a field survey of the factors that influence industrial location along the Nairobi-Athi River corridor and the Nairobi-Thika corridor. Each factor of location was treated separately and a comparison made between the two corridors. All industries that were operational as at the time of the field survey were counted along the two corridors.

Two sets of questionnaires were administered. One was administered to the local authorities in whose jurisdiction the industries fall. These were Athi River Urban Council, Ruiri Urban Council and Nairobi City Commission. The other set of questionnaires was administered to all industrial entrepreneurs who were willing to be interviewed.

Out of a number of 67 industries along Nairobi-Athi River corridor, 57 industrial entrepreneurs (owners, managers, or

directors) were interviewed. 42 industrial entrepreneurs were interviewed out of a total of 85 industries along the Nairobi-Thika corridor. The rest were not interviewed because some were unwilling to be interviewed and others gave appointments that could not be accommodated within the time limit.

The locational factors that were looked for through the questionnaire and observations were:

1. Land and its attributes
 - size and cost
 - Access to water
 - Topography
 - Services such as sewers, gas, electricity connections.
2. Capital, finance and equipment
3. Sources of raw materials
4. Market and price of finished products
5. Sources and Costs of labour
6. Transportation and freight
7. Housing for workers
8. Public Policy
9. Agglomeration, linkage and External economies.

All these variables were compared for both the Athi River corridor and Thika corridor with a view to seeing which corridor offers the greatest industrial investment and expansion opportunities.

Data Analysis

The data collected from the field is both qualitative and

quantitative and has been analyzed in various ways so as to get reasonable results. Each factor that influences industrial location was analyzed separately for the two corridors and a conclusion was reached as to which corridor is better than the other. Assessment tables and chi-square were used to make information clearer and to emphasize the differences in the two corridors.

Scope of the study

The study concentrated on manufacturing industries and excluded retail and warehouse.

One set of the questionnaires was administered to all industrial entrepreneurs who were willing to be interviewed in the two corridors. The other set of questionnaires was administered to local authority town clerks within the jurisdiction who either answered the questions themselves or delegated the duty to their members of staff.

The physical boundaries of the corridors are the old city of Nairobi boundaries. Thus, the Nairobi-Thika Corridor starts at River Gitathuru (between Muthaiga Police Station and Utalii College) and goes all the way to Juja. Between Juja and Thika there are no manufacturing industries and so the area is left out. As for the width, all industries along Baba Dogo Road in Ruaraka were considered and all those in Kasarani, Kahawa, Ruiru and Juja were included. Industries in Dandora were excluded because they are not directly influenced by Thika Road.

The importance of the Nairobi - Thika highway and Nairobi

Mombasa highway to the development of industries cannot be ignored. This is in line with axial development hypothesis which states that an urban area could have its development take place fastest along transportation routes. Industrial development is no different. Other researchers, Gathungu Kariuki (1977) and King Oriah (1987) have in their studies defined the Thika - Nairobi corridor as that area that is served by the Nairobi - Thika highway. This study has taken a similar definition for the two corridors that were studied. However, it has gone further and defined the width of the corridor which is the area within a distance of 2.5 km on either side of the road. This width was decided upon after a field survey whereby it was found out that all industries that are served by the Nairobi - Thika highway and Nairobi - Mombasa highway are within this range.

The Nairobi-Athi River corridor starts at Ngong River and goes all the way to the junction of Namanga Road and Mombasa Road. All industries between Mombasa Road and Ngong River were examined (Villa Franca, Firestone, Embakasi). All the industries on the right side of Nairobi-Mombasa road were considered to be within the study area. The issue of delimiting the width did not arise on this side of the road because all the industries are built along the road.

Along Nairobi-Thika corridor, 85 industries operational at the time of the field survey were physically counted. Of these, 42 entrepreneurs were interviewed. The rest could not be interviewed either because they were unwilling or gave

appointments that could not be fulfilled because of time limit. Of those that were interviewed 30 are in Ruaraka, 8 in Ruiru, one along Kamiti Road, one in Kasarani and 2 in Juja.

Along Nairobi-Athi River corridor, 87 industries operational as at the time of the field survey were counted. It was also observed that more industries than the existing ones were under construction. Of these 87 industries, 40 were interviewed while the others refused or gave too far-off appointments such that they could not be accommodated within the time limit. All the industries interviewed are in Embakasi area which includes Villa Franca, Internal Container Depot and Firestone. It is only 3 industries at the border of Nairobi and Athi-River that were interviewed outside the Embakasi area.

Definitions of important terms

The phrase "manufacturing industries" as applied in this thesis refers to both the agricultural and non-agricultural industries. The word "manufacturing" may be defined broadly for the purposes of this thesis as the conversion of primary or secondary raw materials of either organic or inorganic origin into forms more useful to man. "Manufacturing" includes both processing and fabrication.

The earlier stages of the conversion of the primary raw materials (as they emerge from the purely extractive stage) are here regarded as primary processing or simply as "processing". As the processed products (such as cloth, leather etc.) may be subjected to further manufacturing processes (such as the conversion of

fabrication of cloth into clothes or the fabrication of leather into shoes etc). This second and allied stages are here termed secondary processing or simply "fabrication".

This thesis holds the view that both processing and fabrication constitute the activity termed "manufacturing".

An industrial "establishment" is assumed in this thesis to be identical with a "factory", while the term "location factors" is applied to any phenomenon which influences the decision governing the areal distribution pattern or spatial location of industries.

A manufacturing operative is a person directly concerned or closely involved in the manufacturing processes on the assembly line in a factory.

For the purposes of this study, "growth" and "development" are presumed to have the same meaning, that is, realization of potentialities of land especially by converting it for residential or industrial purpose.

The term "corridor" is hereby taken to mean the area that is served by the Thika-Nairobi highway and the area served by the Nairobi-Mombasa highway.

Outline of the Thesis

The thesis has been subdivided into six chapters with the first chapter comprising the study objectives, research methodology, hypothesis, data analysis, scope of the study and definitions of important terms used in the study.

Chapter 2 discusses the geographical setting of the Nairobi Region in which the study area is located and among the aspects that are discussed are the physiography, soils, vegetation, climate and infrastructure. A brief background of the area is also given.

Chapter 3 discusses the development of industrial location, theories, factors that influence industrial location as developed from the theories. The factors that influence industrial location in Kenya are highlighted and finally a brief summary of the chapter is given.

Chapter 4 gives a general overview of the industries around Nairobi.

In Chapter 5, data collected from the field is analysed factor by factor. Problems faced by industrial entrepreneurs are enumerated and possible solutions are given.

Chapter 6 which gives a summary of the main findings and also identifies areas of further research.

REFERENCES

1. Keith Chaoman & David F. Walker, Industrial Location Principles and Policies, 2nd Edition, (U.K., Basil Blackwell Ltd. 1991), 17.
2. United Nations Industrial Development Organisation (UNIDO), Industry and Development, (Global Report 1987), 9.
3. Sten Soderman, Industrial Location Planning (Stockholm-Sweden, Almqvist & Wiksell International, 1975), 5
4. Soderman, 4
5. R.E. Opendo, "Industrial Role of the Main Kenyan Towns". University Social Sciences Council Conference, (University College, Nairobi, Dec. 1969), 836.
6. P.K. Thuo, The Nairobi Industrial Area: An Economic Analysis, (Nairobi City Council, 1972), 3.
7. J.W. Mwangi, "Planning Standards for Future Urban Industries, Based on the Performance of the present Nairobi Industrial Area", (M.A. Thesis, Department of Urban and Regional Planning, University of Nairobi, 1975), 37.
8. Nairobi Urban Studies Group, Nairobi Metropolitan Growth Strategy, Vol. 1, City Council of Nairobi, 1977. Paragraph 60.
9. Nairobi Urban Studies Group, Vol. II, Appendix 3.17.
10. Nairobi Urban Studies Group, Vol. II, Appendix 3.26.1
11. Field Survey: This was revealed during the field survey when an observation was made of the number of industries coming up on both corridors and those already in existence.
12. Nairobi Urban Studies Group, Vol. II Appendix 3.39.
13. R.E. Opendo, "Industrial Role of the Main Kenyan Towns." 836.

14. R.C. Estall and R.B. Olive, Industrial Activity and Economic Geography: A Study of the Forces Behind the Geographic Location of Productive Activity in Manufacturing Industry, (London, Hutchinson & Co.Ltd. 1973. 18.

CHAPTER 2

GEOGRAPHICAL SETTING

Introduction

The geographical setting will include Nairobi City and region. The term "region" is best used for an area forming an essential unity but here it will be used for convenience to indicate the area defined by the boundaries of the map in Figure 2.1. The study area, Nairobi-Thika corridor and Nairobi-Athi River corridor, is conveniently included in the Nairobi region.

Kenya's population of about 24 million people is concentrated in three major regions:

- 1) Around Lake Victoria on the Western flanks of the Rift Valley in the Kenya Highlands,
- 2) On the Eastern flanks of the Rift Valley - the Eastern slopes of the Aberdare Range, around Mt. Kenya and Nyanbena Range. This area of concentration also includes the Nairobi Region, which lies on the southern tip of the concentration.
- 3) Another concentration area lies along the coastal belt¹.

Nairobi region is located about mid-population "core" areas which are joined together by the railway-highway backbone that extends from the coast to Lake Victoria.

The remainder of the country is arid and relatively unproductive. Nairobi has grown as a major service centre of both up-country highland agricultural areas and as a national headquarters of the country. The city's historical background

and development has led to the importance of Nairobi region as the commercial and industrial centre of East Africa²

Nairobi Region is well served by communication routes namely:

- 1) Railway and Road from Mombasa via Nairobi to Kisumu:
- 2) Route along the Eastern flanks of the Aberdare Range, to the rich agricultural districts of Meru, Embu and Nyeri around Mount Kenya; and then onwards to Addis-Ababa Ethiopia via Marsabit and Wajir.
- 3) The other route branches southwards at Athi River township into Moshi and Arusha (Tanzania) via Namanga. It then continues to Zambia and South Africa³

The Nairobi Region

This is the region utilized by the Nairobi Urban Studies Group in their "Metropolitan Growth Strategy" on which this study is based. The area is going to be used repeatedly in this study. As stated earlier, the area within the scope of this study includes Nairobi City, Nairobi-Thika Corridor, and Nairobi-Athi River Corridor.

Physiography and Soils

1) Physiography

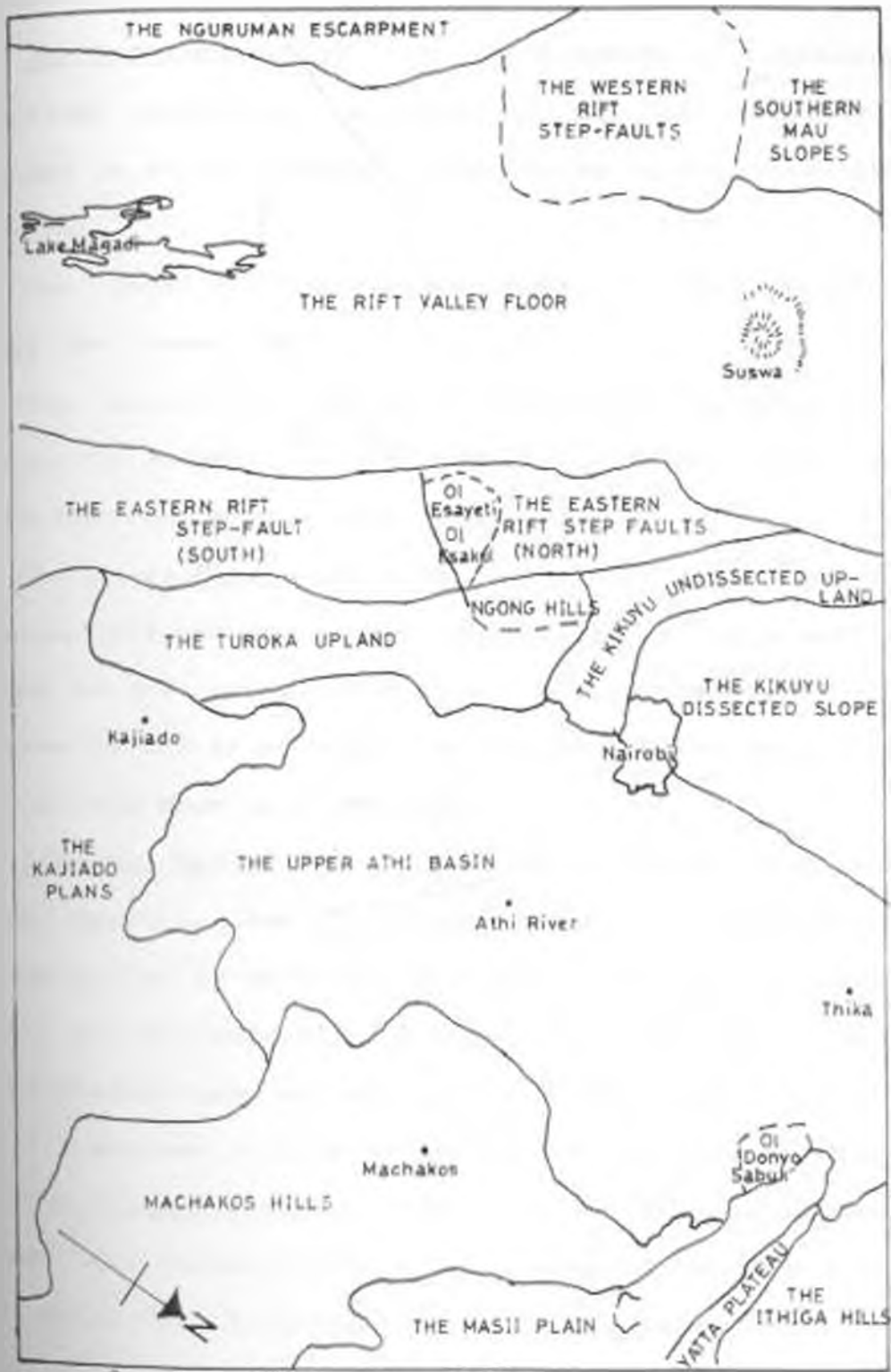
According to Morgan, W.T.W., the Nairobi region may be divided into three zones each of which land-forms have been derived from very different conditions:

In the east and south, land forms are the result of long

continued erosion upon contorted ancient crystalline metamorphic and igneous rocks. In the centre, they derive from superimposition of layers of lava and ash into which erosion has only partly begun its work.

The western part of the area comprises a portion of the Rift Valley where the horizontal volcanic rocks have been much faulted and tilted. young central volcanics have been formed and the whole landscape is so recently created that there has been little time for modification by erosion⁴. One factor may be regarded as dominant in each zone: erosion; structure; tectonic forces. The position of the area is also relevant: it lies across the south eastern portion of the uplifted Kenyan dome.

There has been uplift toward the north and west culminating in the Aberdares on the eastern side of the Rift Valley with the Mau forming the equivalent high point on the west (See Figure 2.0).



SCALE: 0 1 2 3 4 5 miles

TITLE PHYSIOGRAPHIC DIVISIONS OF NAIROBI REGION

SOURCE Morgans W.I.W. Nairobi City and Region

The physiographic divisions include:

a) The Machakos Hills: They are composed of metamorphosed and granitized sediments, a portion of the basement series⁵. Drainage is shared between tributaries of the upper Athi to the north and west and those draining to the east into what might be locally termed the "lower" Athi.

The margins of the hill masses are bordered by outliers imperfectly reduced by the advancing erosion level and examples of the pediment may be seen at all stages⁶.

b) The Masii Plain: It lies to the east and at the foot of the Machakos hill masses. Near the hills it is a well developed portion of the sub-miocene level but further east it is being attacked by the tributaries of the Athi River which are cutting deep valleys down to a new level⁷.

c) Ithanga Hills: Only a portion of these hills lie in the Nairobi Region. The landscape is at a mature stage of its erosion cycle in which there are no accordant summits remaining to give any evidence of the former "end-cretaceous" surface, but no extensive lower surface has yet developed. Local relief is near its maximum with ragged residuals with pediments between⁸.

d) The Rajiado Plains: These are well drained southward by the Rajiado and Selengei Rivers. In some places the boundary with the Kapiti Phonolite flow to the north is marked by a bluff and in following the road from Nairobi South towards Namanoh, the change from the level grassland of the lava surface to the more

undulating erosion level covered with thorn trees and bush is most obvious⁹.

e) Yatta Plateau: Although it is only a small part of the Yatta Plateau which is visible in the Map its south-eastward extent is for a distance of 280km. The plateau is between 1 and 2 miles wide at the top, and is thought to have been formed by a lava flow that ran down the ancient Athi River Valley in pre-tertiary times¹⁰.

f) The Upper Athi Basin: It consists of the area drained by the Athi River above Fourteen falls excluding the higher margins of the Kikuyu slope and Turoka upland. Differential erosion of hard lava layers and bands of varying resistance in the Athi series has resulted in flat plains bounded by bluffs with waterfalls and entrenched streams below them e.g. the Nairobi falls on the Nairobi River or the Makoyeta Gorge in Nairobi Game Park. A few inselbergs rise from buried sub-miocene surface to emerge above the plains. These include Poma Rock and Matuu and the much larger and higher ridge of Lukemba. Most of the area of study lies in this region.

g) The Kikuyu Dissected Slope: To the north west of the Athi basin the land rises in response to the uplift towards the shoulder of the Rift Valley and the superimposition of more recent volcanic series including the Nairobi Trachyte, the Kericho valley series and the Kiambu and Limuru Trachytes. The area receives high rainfall which has given rise to a large number of parallel streams flowing in the easterly and south

easterly direction Morgan argues that,

..... because of the strongly layered volcanic series and the considerable gradient of the streams, the valleys are deep, narrow and steep sided, separated by flat topped ridges which impart a strong 'grain' to the country¹¹.

The area is covered by the Nairobi trachyte and the Kirichwa Valley Tuffs. In the higher elevations - above Kiambu, it is covered by pleistocene and recent volcanic lava.

n) The Kikuyu Undissected upland: This area is above the Likuvu dissected slope bordering on the Rift Valley. It is an open country mostly grassland of the low hills and ridges. Some of these are the result of faulting, parallel to the Rift Valley, but the faults are not pronounced as one moves further west. It is most striking how the railway makes use of this easily traversed country, skirting the heads of the valleys to the east. Northwards the land is rising towards the Kirirangou plateau and the Aberdare Ranges¹².

11) The Turoka uplands: The Turoka uplands to the south of the Ngong Hills is even less dissected because of the small amount of rainfall that characterised this area. Geologically the area is covered by Mbagathi phonolites in the north and Olorgesalie volcanic series to the south. Small streams with youthful valleys drain eastwards following the gentle slope from west to east and

from the headwaters of the Athi River¹³. At the northern end of this upland are the Ngong hills. It is in this area that the

Kiserian River has captured several east flowing streams.

The Noong Hills were formed out of the eastern portion of a volcano that subsequently had its western half collapse into the Rift Valley floor when faulting occurred. They are adjacent to the Rift Valley escarpment, which is comprised of closely spaced North-South parallel faults with raised horsts and sunken grabens between them (the Rift Valley floor). Their north-south tendency has been interrupted behind the Noong Hills by the Ol' Dseyetti and Ol' Esakut Volcanic piles.

Some permanent swamps exist like the Undiri Swamp west of Kikuyu town. Former lakes in the grabens have left behind deposits of diatomite and other lake sediments¹⁴.

The area which is the subject of this study can be divided into three geomorphic regions:

- a) The Upper Athi basin
- b) The Kikuyu undissected slope and
- c) The Kikuyu dissected slope.

The topography of the study area is therefore a dissected slope in the south-west and a relatively flat but very gently sloping plain in the east extending up to the flanks of the Mau Hills.

Soils

The spatial distribution of soils are related to the rainfall of the Nairobi region: which averages about 950mm per annum and mean temperature of about 26°C.¹⁵ Most of the upper Athi Basin is flat and low-lying, covered with rocks of volcanic

origin as the soil parent material. In some areas, the sediments are derived from the tertiary lake beds. Near the Kikuyu plateau eroded volcanic material is also an important factor influencing soil formation. However, the most important factor influencing the nature of soils over the Athi Plains is their flat, or near flat topography. A clay soil locally known as "black cotton soil" has formed and its boundary roughly coincides with that of the upper Athi River Basin within the Nairobi City boundaries. Thomson, B.W. observes that:

The Athi plains phonolites have weathered into black cotton soil This soil is easily detected by the grass vegetation and stunted thorn trees which it carries. It may have many adverse physical properties for it is sticky, waterlogged and dries up hard in dry weather, making deep cracks below the surface.

Most of the area in Nairobi region has that kind of natural vegetation e.g. Jomo Kenyatta International Airport, Eastleigh Airport, Nairobi National Park etc.

According to Scott, conditions of impeded drainage persisting for a long time over volcanic rock parent material is the main causal factor of black cotton soil formation¹⁷.

On the "bluff" forming the boundary between Athi Plains and the Kikuyu Plateau an immature kind of soil occurs, described by Thomson White as:

..... a wedge of pisolitic iron stone (Murrum). It is the result of well drained and eroded low scarps formed on the edges of Nairobi Trachyte layer. The soil is red to yellow in colour and yields gradually to another

soil type locally known as "Red Coffee Soils" as the slope and elevation of the plateau increases.

R.M. Scott observes:

When the topography is broken, the upper areas are generally well drained and so leached soils develop giving rise to red, deep acid soils of good structure formed in situ.¹⁸

On both types of the Kikuyu plateau, the soils are mainly "red coffee" except in the localised areas of impeded drainage—former swamps etc. This is because of the dissected nature of the plateau that has resulted in the area staying well drained during a long period.

On the undissected part of the plateau however, soil conditions are mixed owing to the gentle undulating topography. This causes the two major soil types to occur intermittently and in irregular distribution depending on how well each piece of land is drained.

Climate

The Nairobi area as defined for this survey is an area of some 18,394 sq.km. of diverse topography situated within that part of East Africa influenced by the Monsoonal systems of Asia and Indian Ocean¹⁸. The major features of its climate are controlled by the large-scale pressure systems of the western Indian ocean and the adjoining continents, and its day-to-day weather is related to the very considerable day to day variation in detail of these pressure systems. In addition the effect of topography

leads to a diversity of climates due to the tendency for greater cloudiness or precipitation at higher altitudes and on windward slopes, and the lower temperatures with increase in altitude. From the climatological point of view, aridity is the key restricting factor, thus rainfall - in all its aspects - is the meteorological element of greatest economic significance and must be emphasized in any study of the environment and natural resources.

The climate of Nairobi area can readily be sub-divided on the basis of predominant wind and general characteristics into four well-marked seasons. Their precise beginning and ending cannot be exactly defined since there is always a period of transition of variable-duration from season to season. Inevitable also, there is variation of weather type with each season. The following gives a reasonable approximation to the duration of the seasons and the main characteristics of their weather (Table 2.1).

Table 2.0 Duration of the seasons and the Main characteristics of their weather.

Season	Approx. duration	main characteristics
N.E.	Dec-Mar.	Persistent north-easterly winds Monsoon and sunny; warm or hot day good visibility, occasional showery periods of several days more commonly in December and January.
Rainy Season	Late March	winds light and variable all season to May light easterly, usually north-easterly at first and south easterly later. Periods

of rain and shower may occur interspersed with dry periods; usually warm; becoming cloudier towards the end of the period.

South-
East
Monsoon

June to
October

Persistent south-easterly winds; usually cloudy or overcast and cool even cold at higher altitudes where mist or fog and drizzle are common; little rain in first half of season, but increasing amounts during later half.

Rainy
season

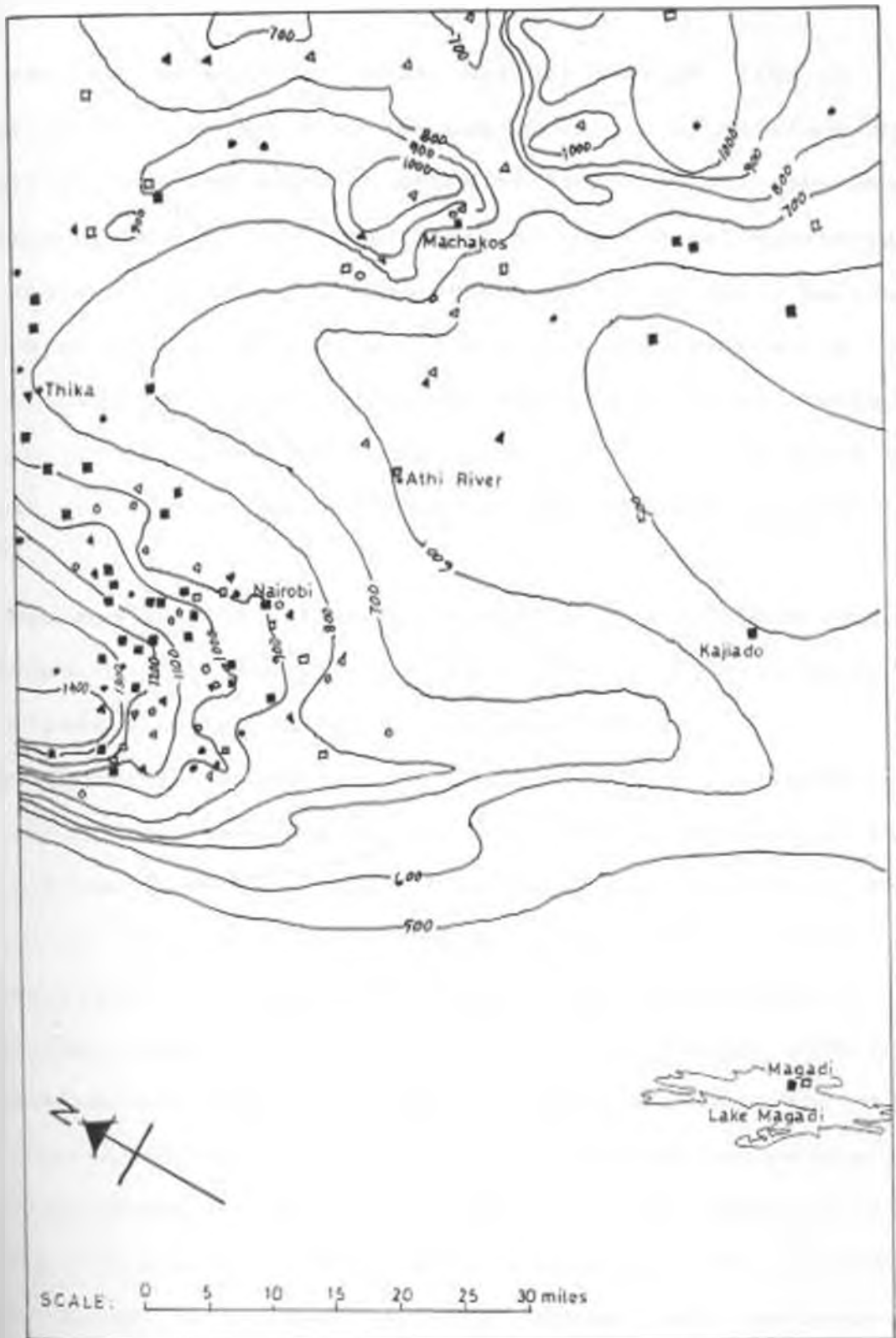
November.

winds light easterly changing from south-easterly to north easterly throughout the month usually warm, sunny and showery.

Source: Morgan & Nairobi. City and Region.

Figure 2.1 shows the distribution of the average annual rainfall in Nairobi area. The broad pattern of rainfall distribution is seen to be directly related to topography²⁰.

The area of maximum rainfall is clearly the Kikuyu uplands to the North of Nairobi. The Uolands in the south-east form a second region of high rainfall though the annual total is less than in the Kikuyu Uolands. The two regions of high rainfall are separated by the drier region—approximately 500-700mm of rain per annum comprising the head waters of River Athi between Kajiado and Ol Donyo Sabul. The remaining rainfall region is the Rift Valley where at least in the south, the annual rainfall is probably less than 400mm. In the north of this portion of the Rift Valley the volcanic cone of Suswa and the highlands to its west probably receive more than 400mm, but in the absence of rainfall records no precise isohyets can be drawn²¹.



KEY:

- | | | |
|---|---|---|
| ● 30. as at 31/12/1962 | ○ 20. as at 31/12/1962 | ▲ 10. as at 31/12/1962 |
| ○ 30. as at 31/12/1962 including some stations which closed prior to 1960 | ○ 20. as at 31/12/1962 including some stations which closed prior to 1960 | ○ 10. as at 31/12/1962 including some stations which closed prior to 1960 |

TITLE MEAN ANNUAL RAINFALL: SOYETS ARE IN MILLIMETRES AND THE NUMBER OF YEARS RECORDED AT EACH STATION IS INDICATED. INFORMATION IS INADEQUATE TO PERMIT THE MAP TO BE COMPLETED FOR THE RIFT VALLEY AREA (MAGADI 384mm)

SOURCE: Morgan WTW Nairobi: City and region

It can be generalized that Nairobi region lies in an equatorial climatic regime that has been modified by altitude and has a small diurnal and annual ranges of temperatures. The mean annual temperature is lower than that of the normal equatorial climatic regime. In Nairobi, the hottest Month has daily maximum temperature of 28°C at mid-day and a mean minimum temperature of 14° after midnight. The coldest month has daily maximum temperature of 12°C at these times of the day. This is about $5-8^{\circ}\text{C}$ cooler than the temperatures found in true equatorial climates²³.

Whereas the generalization holds true as far as temperatures are concerned, most authorities on East African Climate concede that the climatic regime in Nairobi is more complex.

It is monsoonal in character and caused by the influence of Asiatic and African land masses on the pressure systems of the African-continent²⁴. The meso-climatic regions within the Nairobi region are, therefore, differentiated by means of annual rainfall statistics, and their relative wetness and dryness.

In Nairobi, there are two rainy seasons coinciding with the intermediate periods shown in Table 2.1 from mid-March to Mid-May, and from Mid-October to Mid-December. The typical weather characterizing these two periods consists of a few days of rain alternating with similar periods of dry weather. The rainfall during the March to mid-May is more intense with occasional thunderstorms over Nairobi especially in April. This is locally

called the "long-rains" season. The mid-October to mid-December season is the "short-rains" season because it is shorter in duration and the amount of precipitation is relatively lighter compared to the other season.

Nairobi region mainly receives orographic rainfall, hence altitude is of considerable significance in determining the regional differences in the annual amounts of precipitation. The mean annual rainfall increases with altitude. This is why within the region the lower areas of the Athi Plains coincide with drier areas while the Upper Nairobi areas on the Likuyu Plateau are wetter.

The Upper Nairobi is wetter and cooler than the lower Nairobi²⁵. Moreover, the climate of upper Nairobi can support more luxuriant vegetation than that of the Athi Plains. This area is therefore more pleasant to live in than on the lower Nairobi. The soils are also more suitable for agriculture.

Vegetation

Since the Nairobi region has a great diversity of ecological conditions, there are many different types of volcanic rock, soils, topography, altitude and rainfall. These different combinations of ecological elements result in a variety of local ecosystems with a great diversity of flora and fauna over the region. Morgan (1967) has demonstrated the effect of these factors on vegetation types in the entire Nairobi region, and provides an in-depth study of Nairobi's ecological conditions²⁶. But within the city area, with the exception of the Athi Plains

section. very few stretches of natural vegetation are visible because most of it has been cleared to give way to urban and agricultural activities. On the Athi Plains, in the neighbourhood of the Nairobi National Park and Jomo Kenyatta International Airport, to the North and to the west as far as the border line of Kikuyu Plateau the natural vegetation is mainly acacia savanna. This is comprised of a mixture of trees and shrubs scattered on a plain of tall perennial grass. The trees and shrubs do not form a canopy about the grass. Trump observes:

.....included among the original acacia savanna vegetation types of the Nairobi areas are the acacia sayal, acacia drepanolobium (whistling thorn) savannas which occupy large parts of the Athi and Kapiti black clay plains.....²⁷

On the eastern edge of the Kikuyu dissected plateau, running roughly on both sides of the Nairobi-Thika railway line from the neighbourhood of Eastleigh Airport through Karicho, Ruaraka to Kahawa (up to Thika via Kuitu) a savanna type classified by Trump as "combretum" savanna grows²⁸. This is characterised by various medium height broad leaved "combretum" species,

..... which give it an orchid appearance

This is an indication of slightly higher rainfall in this area than on the plains. It is also an indication of shallow murram soils on the edge of the dissected Kikuyu Plateau. Similar conditions also support a wedge of evergreen bush lands south-

most of the city centre on the edge of the Kikuyu undissected plateau (parts of upper Nairobi National Park and Langata). This comprises of:

..... a mantle of small trees of bush habit i.e. branching or forking from the bases, together with lesser

bushes and shrubs. Some vegetation of this class is evergreen or partially so, but the most extensive bush lands are deciduous and often thorny.....

With increasing altitude and rainfall these two types of savanna give rise to:

..... a dry semi-deciduous forest of 'Nairobi' type. This type is found in all the upper parts of the city including Karen, Ngong road forest, Dagoretti and Karura forest.

The map below summarises the types of vegetation found in Nairobi region.

Infrastructure

a) Roads: The entire Nairobi region is served by good tarmac roads on which runs an efficient bus/matatu service. The study area (Thika-Nairobi-Athi River) is well served by roads. There is the Nairobi-Thika highway which is dual-carriageway and the Roebasa-Nairobi road along which Athi River town is situated. The city of Nairobi is well served with good road network with efficient Bus service, serving over 100,000 passengers and a private car population of over 50,000 cars everyday.

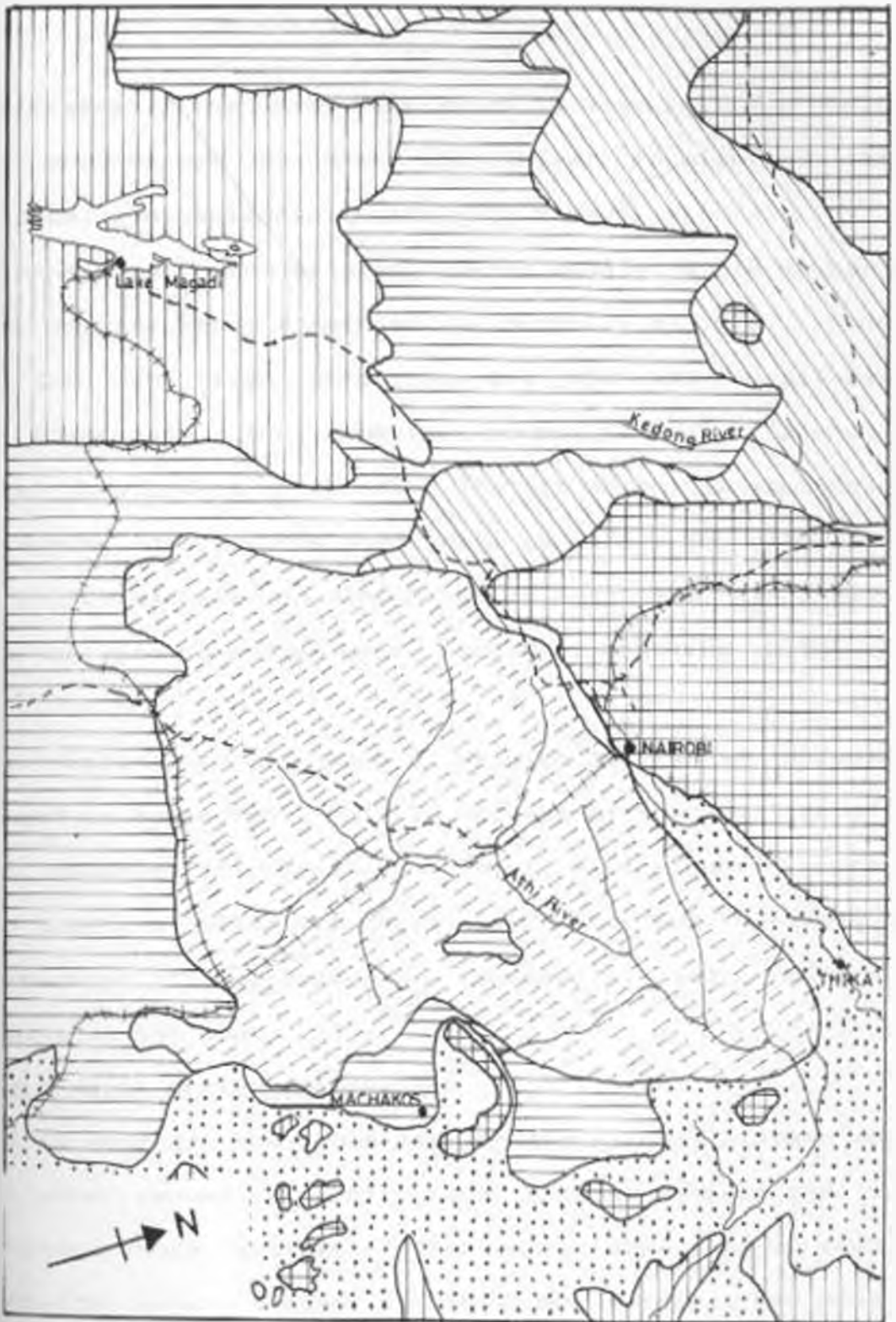
b) Railways: Although the building of the railway in Kenya has played a significant role in the history of Nairobi, no passenger

transit system is in operation within the city. It operates to a small extent outside the city to Thika and to Athi River. The trunk rail-road running through the city from the coast to the north-eastern and western Kenya is mainly used for hauling heavy goods from the coast to the country's highland region, Uganda and eastern Zaire. The construction of modern road system north of Nairobi and around Mount Kenya since the mid 1950s has made passenger travel by road more popular. On the whole, even the goods trade is being taken from the railway by large trucks running on the new and efficient highways which have been constructed throughout the country since the early 1960s³³.

In the Nairobi region economy, the railway is significant within the industrial area. The individual factory sites benefit from the railway sidings serving them for hauling the bulky raw materials required in the process of manufacture and for hauling bulky finished products off their production systems to the markets on the highlands and at the coast.

⊖ Electricity: The city has had electricity since 1908. The environs are also well served with electricity particularly the urban areas like Thika, Athi River, Ruiru among Nairobi's satellite towns³⁴.

⊖ Water supply: Nairobi's water supply has been obtained from various sources since the city was founded. These include the Ondiri Swamp (Kikuyu), the Nairobi Dam: A dam on Ruiru River near Githunguri (Kiambu), the Sasumua Dam on Chania River aloft the



0 5 10 15 20 miles

TITLE VEGETATION

KFY



Former Forest Areas



Evergreen Bushland



Combretum Savanna



Acacia Savanna



Mixed Acacia Bushland



Grassland

SOURCE

Kinengop Plateau. The City Commission is also in the process of building another dam at Ndaka-ini (Thika) to alleviate water shortages being experienced in the City today¹⁵.

In Athi River, the existing water supply is in a parlous condition despite being augmented as recently as 1976. Sources include the Athi River boreholes, but the water available is totally inadequate for domestic purposes leave alone for industrial development purposes. The situation is particularly acutest during dry periods when there is hardly any river flow¹⁶. Another source of water in Athi River is boreholes. In 1982, about 30 private boreholes were used by industries within Athi River.

In Thika, water has not been a problem as far as industrial development is concerned. This is because of the position of the town in relation to Chania and Ihika Rivers which guarantee adequate supply of water the whole year. This has therefore been an attraction to industrial, commercial and residential development in the town.

Storm water drains and sewages

Before 1948 most of the properties on the kikuyu plateau (upper Nairobi) were served by septic tank systems because the soils could support these systems. The central area was a combined storm and foul water system; and the lower Nairobi had separate storm and foul water systems¹⁷.

The master plan of 1948 recommended a continuation of the sewerage design that separates the foul water from the storm

water system for engineering reasons. Since then, the industrial area and all the subsequent development of lower Nairobi has been serviced that way. Currently, most of the properties in upper Nairobi remain on the septic tank systems and all the properties in lower Nairobi are on a sewer system.

In Thika storm water is excluded from the sewage system. It has a separate drainage system which does not find its way to the treatment plant.

Along Thika-Nairobi corridor, all the areas between Ruaraka and Thika use septic tanks to get rid of foul water. Open drains have been constructed in most places to take care of storm water. The same case applies to the area on the Athi River-Nairobi corridor excluding the areas along Enterprise road in Embakasi.

f) Other services: The study area could be said to be well served by telephone communication, Radio and television and also tele networks.

Local Government Efforts on Industrial Attraction:

There are various local authorities that are involved in the development of industries in the study area. Though they are not the investors, they play a vital role of attracting investors by providing land and infrastructural facilities. These local authorities include the Nairobi City Commission, Ruiru Town Council in Kiambu and Athi River Urban Council.

Nairobi City Commission: The Government's policy on Nairobi's central industrial area is to decentralise the

industries because of the existing problems of congestion, traffic jams, high land values and lack of big plots at the present Central Industrial Area. As a result land for industrial development has been zoned in other areas such as Firestone (100 ha.), Dagoretti (120ha.), Langata (20ha.), Dandora (280ha.), Ruaraka (110 ha), Kasarani (230ha.), Ruiru I (180 ha.), Ruiru II (100 ha.)¹⁹.

Ruiru: The town council of Ruiru encourages industrial growth by setting land aside for development of industries and providing infrastructure. Rates of unimproved site value are lower in Ruiru than in Nairobi. There is also a reduction of import duty for imported industrial machinery. The industrial land in Ruiru covers 21% (64 ha.) of the total land area in the town²⁰.

Athi River: The Council encourages industrial development by allowing for change of user from agricultural land to industrial land. This has been done in areas around Galasheet industry at the border of Nairobi and Athi River. The Council also provides infrastructure whenever possible.

Background of the Study Area

This will cover Nairobi, Nairobi-Thika corridor and Athi River-Nairobi Corridor.

Nairobi:

The city of Nairobi lies at the border between two different types of ecological regions in Central Kenya. To the South there stretches the lowly populated plains of the Athi and Kapiti and

to the north are highly populated highlands of central Kenya. Both are bounded to the west by the Rift Valley.

Nairobi was founded in June 1899 as a railway encampment. The opening of the railway from Mombasa to Nairobi in August 1899 precipitated the transfer of both the railway headquarters from Mombasa and Government administration from Machakos to Nairobi by 1905. By the end of the same year, Nairobi was assuming the function that it had to perform as the future capital city. From then on, a part of the railway station and administrative activities and other related commercial and residential functions had already started to emerge at the turn of the century.

On the 16th of April 1900, Nairobi Municipality was established through the publication of its regulations, the setting out of the first arbitrary boundary within a radius of 2.4km from the offices of the Protectorate Government at the time⁴¹. By 1906 the town had sorted itself out into seven distinct areas which were:

- 1) Railway centre (including station marshalling yards, sheds and offices).
- 2) The Indian Bazaar (a commercial zone with two Indian Centres).
- 3) The European Business and Administration Centre.
- 4) Railway quarters (Residential houses for the railway subordinate staff).
- 5) Dhobi quarters (which included houses for the Government subordinate staff)

- 6) European Residential Area
- 7) Asian Residential area

In 1907, Nairobi was made the capital of Kenya. By 1909, much of the central area of the city as we know it today was established⁴². Official concern for the development of the Nairobi industrial area was given expression by the colonial Government in 1947. It became obvious that the Nairobi urban area had achieved dominance as the administrative, commercial and industrial centre of the Eastern Africa.

The planning group in their 1948 report recommended that a well defined area for exclusive industrial activities be demarcated to the south-west of the Nairobi Railway station. This area is adjacent to the railway marshalling yards and was therefore an extension of the service industries area of the East African Railway⁴³.

Since 1948, the Nairobi Industrial area has been growing. The Kenya Industrial Estate (KIE) was established in 1969 as a subsidiary of the I.C.D.C., with the purpose of encouraging indigenous entrepreneurs to invest their skills and capital in the manufacturing sector of the economy. KIE has constructed many units for manufacturing purposes. Here, the policy of the Government was to protect infant industries as established. Since then, the Nairobi industrial area has been expanding so fast so that it has caused transportation problems due to congestion and housing problems for industrial workers. The plot sizes have also become small such that any industry intending to

expand has to look for alternative sites. This points to a policy of decentralization as an ideal solution. The congestion of the Nairobi industries has made entrepreneurs to move to other locations within the city such as Dagoretti, Dandora, Kasarani, Ruaraka and to locations outside the city boundaries in the satellite towns such as Thika, Ruiru, Athi River, Kikuyu, Limuru etc.

The Nairobi-Thika Corridor:

Thika is a medium sized fast growing industrial town of about 150,000 people living about 41.7 km from Nairobi City Centre by road. The most important link between Nairobi and Thika is the dual carriage motorway which was completed in 1969/70 and which carries the bulk of traffic between these two urban areas.

This has not always been the case. The oldest link between Nairobi and Thika is the railway which was built to serve White British and South African Settlers in the Nairobi-Thika Region in 1906. Thika town was founded in 1910 at the point where an earth road track that followed the general direction of the railway line crossed the Chania River. The railway was commissioned in 1913 ushering a great influx of white farmers who settled on both sides of the railway and the earth road to grow coffee (on the upper flanks of the Aberdare escarpment), visal and later pineapples (on the flatter plains) around Thika. From that time on, the road came to be more intensely used as development of the motor car took place. It was bitumenized during the early 1950s to facilitate rapid military movements towards the Mau Mau

infected areas of Nyandarua, Murang'a, Nyeri, Embu and Meru. At this time, the road was a single carriage-way⁴⁴.

The construction of a dual carriageway increased accessibility between Nairobi and Thika by shortening travel time (in view of the great volume of traffic between the two urban areas that had been reached by 1970). This road/railway corridor was viewed as the main "backbone" by the planners, along which Nairobi's expansion to the year 2000 was expected.

In addition, the road on both sides of the "backbone" was in large farms; fifty hectares or more, and it was envisaged that large land owners would be negotiated with if such land is to be acquired for urban housing and infrastructural development. The land on both sides of this backbone is almost flat; with only a few flattish hills that would be no major handicap to development.

It must be pointed out that one of the main recommendations of the Metropolitan Growth Strategy, was "land banking" in anticipation of future development. This anticipated availability of funds to purchase all these farms compulsorily⁴⁵.

With these assumptions in mind then, the 1973 "Metropolitan Growth Strategy" recommended that most of low and medium income housing would be developed in this area that includes Dandora, Kariobangi, Ruaraka, Kasarani and Kahawa. They further recommended the extension of the two industrial nuclei of Dandora and Kasarani due to their proximity to transportation axis and other infrastructural amenities. Another industrial nucleus

would be established at Ruaraka and Ruiru by the year 2000⁴⁶ a factor that is slowly but surely being realised.

When the strategy was formulated land acquisition was expected to be easier in this direction because it was owned by large scale former ranchers and sisal farmers. Now this condition has been overtaken by events such that most of this land is now owned by numerous small scale low income developers who are members of various co-operative societies that acquired the large farms. There is therefore a fast growing development constraint along this corridor such that land use planning is no longer easy. The result of these realities is that land has become very expensive and difficult to acquire. As a result the growth of Nairobi is taking place in an informal unplanned manner in all directions⁴⁷.

Nairobi-Athi River Corridor

Athi River is linked to Nairobi by the main A109 Nairobi-Mombasa road and by the Uganda Railway line which facilitated the development of Athi River.

The land on this corridor used to be Maasai ranches and was hardly used for anything else. However some land in Athi River belonged to Co-operative Societies as agricultural land but it has recently (after 1988) been subdivided into 5 acre plots to the shareholders. The land near the old Nairobi boundary has been developed into residential housing. Further on, it has been used for industrial development. The land beyond Firestone Factory (around villa Franca) belonged to European expatriates and

was acquired compulsorily by the Government and has been given out for industrial development and Airport related activities. As a result of congestion in the Central Industrial Area, industries have been overspilled onto this corridor and this has resulted in land being very expensive due to the increased demand for industrial plots.

Summary of the Chapter

Physiographically, the study area (Thika-Nairobi Corridor and Athi River-Nairobi Corridor) lies in "The Upper Athi Basin" which is characterised by flat plains bounded by bluffs with waterfalls and entrenched streams below them; a few inselbergs rising above the plains and black cotton soils.

The average rainfall is about 950mm per annum and it decreases from Thika towards Athi River, and a mean temperature of about 26°C. There are two rainy seasons, that is, late March to May - normally referred to as the "long rains" and "short rains" from mid-October to mid-December. The vegetation of the study area is mostly grasslands except in the area near Thika town where the vegetation is combretum savanna.

The study area is well served with infrastructure, that is, roads, railway, electricity and telecommunication. Water is the only one that presents a bit of a problem especially in areas far from the City like Ruiru, Juja and Athi River.

The piped water is not enough and boreholes have been sunk in

order to try and alleviate the problems. The sewage system is also not there in these same areas and people have to rely on septic tanks.

The local authorities always try to encourage industrial development by providing infrastructure where they can, reducing rates in rural towns and reduction on import duty for imported machinery in these rural towns. Moreover, it was observed that land use is more diverse on the Nairobi-Thika Corridor than on the Athi River-Nairobi Corridor. Land use on Thika Corridor includes residential, industrial and commercial developments, agricultural development and ranching. On the Athi River Corridor, residential development is only near the old Nairobi boundary. The rest of the area is generally industrial development, airport related activities and ranching.

REFERENCES

1. G.K. Kingoriah, "Policy Impacts on Urban Land Use Patterns in Nairobi, Kenya 1899-1979", Ph.D. Dissertation, Indiana State University, 1980, p. 35.
2. Kingoriah, 35.
3. Kingoriah, 37
4. W.W.W. Morgan, Nairobi: City and Region. (Oxford University Press, 1967), 14.
5. Morgan, 14
6. Morgan, 14
7. Morgan, 16
8. Morgan, 16
9. Morgan, 16
10. G.K. Kingoriah, "Policy Impacts", p. 44
11. G. K. Kingoriah, " Policy Impacts, " 44.
12. King oriah, 45
13. King oriah, 45
14. King oriah, 46
15. B.W. Thomson and H.W. Samsom, "Climate" in Morgan's Nairobi: City and Region, 46
16. R.M. Scott, "Soils" in Morgan = East Africa, 95-105.
17. Scott, 97
18. Scott, 99
19. B.W. Thomson and H.W. Samsom, "Climate", 20.
20. Thomson and Samsom, 28.

21. Thomson and Samson, 29
22. Thomson and Samson, 33
23. Thomson and Samson, 33
24. G.I. Kingorish, "Policy Impacts", p.54
25. G.K. Kingorish, "Policy Impacts", p.55
26. E.C. Trump, "vegetation" in Morgan a Nairobi: City and Region, p. 37-39.
27. Trump, 45
28. Trump, 40
29. Trump, 43
30. Trump, 42
31. Trump, 41
32. G.K. Kingorish, "Policy Impacts", 66
33. G.K. Kingorish, "Policy Impacts", 66
34. R.B. Ooendo, Industrial Geography of Kenya. (Nairobi: East African Publishing House, 1972).110.
35. G.K. Kingorish, "Policy Impacts", 67
36. P.K. Kvalo, "The Impact of Industrial Development on Environmental Quality with Special Reference to Kenya Meat Commission and East African Portland Cement Factory in Athi River Town". (M.A. Thesis in Planning and Environmental Studies, University of Nairobi, 1983). 36.
37. G.K. Kingorish, "Policy Impacts", 71.
38. B.M. C .Sibanda, "Planning for Basic Infrastructural Services in Thika with specific reference to Water Provision, Sewerage and Solid Waste". (M.A. Thesis in Planning, University of Nairobi, 1980), 47.
- Nairobi Urban Studies Group, Metropolitan Growth Strategy Vol.II. (City Council of Nairobi 1973) paragraph
- P.M. Sibanda, "Notes on Kuiru Town", Report and Proceedings Workshop on Housing. (Nairobi, Jan. 18th - 31st, 1987).

41. C. P. Ndwigah, "Urban Land Policy and Urban Land Values: A Case Study of Land Zoning". (M.A. Thesis, Department of Land Development, University of Nairobi, 1988, 74.

42. Ndwigah, 74

43. J.W. Mwangi, "Planning Standards for future Urban Industries. Based on the Performance of the Present Nairobi's Industrial Area". (M.A. Thesis, Department of Urban and Regional Planning, University of Nairobi, 1975.), 35

44. G.K. Kingoriah, "The Nairobi-Thika Axis as an overflow Corridor for Nairobi's Metropolitan Development". Report and Proceedings: Workshop on Housing. (Human Settlements, University of Leuven Jan. 18th - 31st, 1987, 390.

45. Nairobi, Urban Studies Group, Nairobi Metropolitan Growth Strategy Vol 1 . (City Council of Nairobi, 1973), Chapter 3, Sections 103-108.

46. G.K. Kingoriah, "The Nairobi - Thika axis as an overflow Corridor for Nairobi's Metropolitan Development". 391.

CHAPTER 3

DEVELOPMENT OF THEORIES OF INDUSTRIAL LOCATION AND FACTORS OF INDUSTRIAL LOCATION

Development of Theories of Industrial location

Industrial location theory has its origins from the work of Von Thunen (1826). Although Von Thunen concentrated on the determination of least cost locations for agricultural activities, he provided the theoretical framework for later industrial location theory through his use of two cardinal variables in his analysis: land rent and transportation costs. Since his time, geographers and economists have pursued vigorously the goal of looking for the best location of industrial and other economic activities over space¹.

The first positive development of industrial location was undertaken by a German economist William Launhard in 1889 and 1895. He explained that the spatial distribution of industries was determined by variations in cost and demand factors at alternative locations. He analysed the location of industries using a simple model - the location triangle. He also became the initiator of the concept of ton-mileage as it applies to raw materials and finished products transportation through his emphasis on transportation costs in industrial location theory. According to him, the manufacturer would locate at the point of least transportation costs².

The next significant step in the development of industrial

location theory was by Alfred Weber³. He formulated an industrial location triangle and arrived at a conclusion that transportation costs were the primary determinants of industrial location; and that they are a direct function of the distance between the place where the industry would be located, sources of raw materials and the market for the finished product. Through this analysis he developed the concept of "isodapanes" whereby he concluded that the costs of any production firm would vary spatially from the minimum costs prevailing at the "least cost location" in which case any industry would face an increasing space costs function the further away the entrepreneurs decide to locate it from least costs location. An industry would be oriented to cheap labour until savings in labour diminish to equal transport cost.

Weber also introduced the concept of orientations whereby an industry could be market oriented or raw material oriented; where an industry would be attracted to the factor input that is most dominant in transportation costs. He also revealed labour and transportation orientations. In analysing orientation using the Weberian model, the closeness of isodapanes would determine the direction of the highest transportation costs. In similar fashion, Weber introduced the concept of agglomeration where industries tend to cluster together to benefit from external economies - linkages with one another; and from savings in transportation costs⁴.

Weber's analysis forms the backbone of the modern industrial

location theory. His analysis has been upheld by location theorists, and has been broadened to fit the general equilibrium analysis by people like Walter Isard, and later theorists.

Tord Palander brought forth the concept of threshold areas to describe the extent of market areas of the manufactured goods from an industry located in a hypothetical least cost location within the Weberian analysis⁵. His major concern was with the effect of transport costs on isodapanes. Although his approach was clearly Weberian, he criticized Weber's concept of agglomeration on the grounds that no firm would leave the least cost location to a position of potential agglomeration, unless it was sure that other positively linked firms would do the same.

Smith identified Walter Christaller's work as the first major geographical contribution to location theory. Christaller laid down a conceptual model with a definite set of assumptions through which manufacturers would understand better their spatial margins of production in case they made a decision to locate on any point over any physical space⁶.

August Losch was interested in giving an orderly general descriptive model of spatial interaction of economic activities following his deep belief that there must be order and reason underlying the apparent spatial chaos in the world. In a simplified model of spatial equilibrium, he arrived at an ideal distribution of homogenous producers best fitting over a homogeneous unitropic space. He rejected the Weberian least cost approach in his profit maximizing axioms and concentrated on the

demand side so much so that he neglected the supply side.

Melvin Greenhut (1956) examined how both the cost and demand factors influence plant location. He identified major locational factors and subsequently singled out the costs of transport as the major locational determinant. He also considered the externality and agglomeration economies as important causes of industrial location. He added a new dimension in industrial location theory hitherto accorded insignificant attention-namely-personal considerations of the entrepreneurs in industrial location decisions⁷.

Walter Isard's work (1956, 1960) is a great synthesis of all location theorists preceding him like Von Thunen, Ricardo, Launhardt, Weber, Palander/Hoover, Christaller/Losch and other general equilibrium theorists. His work forms the "meat" of the skeleton of modern neo-classical industrial location theory that was constructed by Weber. Isard used the principle of factor substitution (isocost/isoquant analysis) as what he deemed to be the missing link between industrial location theory and other branches of economic theory⁸.

Since Walter Isard the number of location theorists has increased tenfold. New techniques of analysis in all aspects of location theory have been developed by aid of electronic computer and new statistical techniques. E.W. Rawston (1958, 1969) was interested in finding out to what extent the choice of industrial location is restricted by various factors in its adjustment towards economic optimality; and how such restriction comes

about. He identified three location constraints as physical restriction, economic restriction and technical restriction. Physical restriction to viability would define the extent to which natural resources are available; economic restriction - the spatial margins of profitability, technical restriction would encompass the need for specialized factor combination - the machinery, labour, etc., how such need has been satisfied, and constraints in the way of such satisfaction⁹

Allen Pred (1967, 1969) used his new concept of Behavioral Matrix to explain the causes of sub-optimal industrial location decisions in the real world, which cannot be explained by theoretical deterministic models. Variations of the amounts of information available to the entrepreneur and each entrepreneur's ability to utilize such information (which also varies between entrepreneurs) would determine how each entrepreneur believes in his choice of what he thinks is the optimum location for his industry. This - coupled with Greenhut's personal considerations concept gives a more comprehensive view of the sub-optimality in industrial location that is prevalent in real world situations of market economies at the moment¹⁰.

David Smith (1971) synthesized all the earlier work in his authoritative text Industrial Location and developed the concept of space cost curve based on Weber's isodapanes and Palanderan threshold area analysis. He incorporated this in his variable cost model of industrial location and theorized on the effect of production costs as affected by variables like entrepreneurial

skill, locational subsidy, external economies, substitution between inputs, scale of production and personal considerations.

In the work edited by F.E. Hamilton called Spatial Perspectives on Industrial Organization¹¹, is a sample of the current research into industrial location theory. Some of the major concerns of the modern regional scientist and industrial location analyst are highlighted throughout the 1970s decade. The scientists of the latter half of the twentieth century are concerned that hitherto industrial location theory has concentrated on the analysis of uni-product firms, which are unconstrained in their financial resources, and could choose to locate anywhere in an idealized homogeneous unitropic space. The multi-products multinational firm has not been sufficiently analysed. In the scientists' opinion, locational determinants for these, and their relationship to the developing and developed economies, needs greater treatment in industrial location theory. The authors manage to demonstrate that uni-product firm, constrained by both spatial and financial parameters, would behave differently from the classical/neo-classical profit maximizing firm by having no alternative regarding the space of operation and the financial constraints. This kind of firm would focus its attention on what to produce, given the constrained locational consideration rather than where to produce that particular product. This is the case with the embryonic industries in 20th century developing countries and in the 17th, 18th and 19th century industries in the Industrial revolution

Western Europe and North America. In the other extreme end the multinational would be so diversified in products that the individual location of one operation in any country may carry very little weight as long as it does not violate the overall business policy of the multinational concern. The country of location and the financial risks in them would be of greater relevance to the multi-product and multinational corporation. Tendency towards monopolistic concentration would affect the locational considerations and the scale of operations.

In general neo-classical industrial location analysis is an area where active research is now progressing. Current research has greatly been aided by electronic computers in multi-variate analysis of the numerous factors that influence industrial location.

The Industrial Location Factors

The issue of land and its attributes is of initial concern for any industrialist. The land occupied by the physical plant is of course very important and its size is determined by the kind of industrial activities taking place. Land is also needed for such purposes as storage of materials and finished products, parking of cars and trucks, internal circulation and room to expand. Access to water for use in industrial processes and proximity to a river, canal or lake into which effluence can be deposited, is a major consideration for many firms. Level land may be important for industries with extensive areas of plant,

and some need bedrock near the surface to support special equipment. Services such as sewers, gas electricity connections, and good road access can also be regarded as desirable attributes to land. The cost of land also varies from place to place. However, although the cost of land is often a major item in initial expenditure, it is insignificant in most industries over a long period or when rent is expressed as a proportion of total production costs. A firm with average land needs will not be particularly sensitive to quite substantial variations in the cost of comparable sites, especially if the higher-cost locations have advantages with respect to access to more important inputs, but some sites that are otherwise desirable may have to be eliminated because of the prohibitively high cost of land. This is generally true of city center locations, where the manufacturer is unable to outbid commercial users. So, even if the cost of land is not particularly influential as a determinant of plant location in general, there are places where the price that others are prepared to pay will effectively exclude manufacturing¹²

Capital: finance and equipment is another factor that influences location. Finance capital is needed before land or any other inputs can be acquired. Obtaining capital is generally no problem for the large modern industrial corporation but for small firms and those just starting up, capital may be obtainable more easily in some places than in others. They are more obtainable in places where the firms are known than in unknown

places. Capital equipment, like land, is immobile. Machinery, buildings, and other kinds of physical plant are usually permanently fixed in space. Most industrial buildings are for all practical purposes perfectly immobile, and because in certain circumstances they can attract the more mobile factors after they have been vacated by their original owners, they tend to perpetuate existing industrial location patterns by successive reoccupation. This is part of the tendency sometimes referred as industrial inertia.¹³

Moreover, in some places machinery may be easier to obtain, repair, and replace than in others; cities concentrating on a particular activity often have specialized machine makers to serve it. And there may be situations where the cost of machinery varies between suppliers.

All manufacturing activities require raw materials, since the essence of an industrial process is the conversion of something into a good which has a greater value. Materials may be of an extractive value (like iron-ore, stone, timber) or they may be manufactured goods. Some activities like cotton spinning use a very small number of materials, sometimes only one of any importance, whereas others, like the manufacture of motor cars, require components from hundreds of separate suppliers. Materials vary enormously in bulk, weight, and perishability, and some need special means of transport as well as handling and storage facilities at the factory. The outlay incurred in acquiring materials involves both the cost of production and the

cost of transporting them to the factory. The cost of extracting a mineral or manufacturing a component will affect locational choice only if there are significant variations in the price from different sources. Because of their dependence on transportation charges, the cost of raw materials can vary with distance from their source in a fairly regular manner. However, if a uniform delivered price is adopted, as it often the case today, the cost of the raw materials will of course be the same anywhere, and the effect of that particular input as an influence on plant location need not be considered.¹⁴

Sources of power, like materials can exercise an important influence on plant location.

Electricity is the main source of motive power in most industries today. It is much more mobile geographically than water power and steam power (The earlier forms of Industrial energy) since it can be transmitted from one place to another at little cost. This means that over fairly large areas the cost of electricity may not vary much if there are no significant differences in local production costs, and in these circumstances its influence on plant location will be negligible. In Britain and some other small countries the transmission of electricity through a national grid makes this source of energy virtually ubiquitous for most practical purposes and the cost of electricity can often be ignored in making industrial location decisions. But there are cases where the availability of large supplies of cheap power has a very important influence on industrial location. Certain

metallurgical and chemical industries, such as aluminium and copper processing and the production of fertilizers are especially sensitive to the cost of power, and some areas that can produce electricity very cheaply have been able to attract important manufacturing industries of this type. The development of aluminium production in the Pacific Northwest of the United States, based on hydroelectric power, is a case in point.

The historical tendency has been for sources of power to play a steadily decreasing role in industrial location, since electricity has replaced water and steam power. However, there is a natural limit to the availability of the so called fossil fuels on which the advanced industrial world has come to rely on so heavily for its energy. There are also political uncertainties of oil supply like the Iraq's annexation of Kuwait (1990) which has reduced oil supply and this has in turn caused prices of oil to shoot up. These considerations, together with the rapidly rising price of oil and the environmental hazards associated with atomic energy production, may lead to cheap power (from whatever source) to reassert itself as a major consideration in industrial location.

Labour is needed to operate any plant, but the amount and type required vary from industry to industry and firm to firm. In some cases like motor-vehicle plant, an iron and steel works, or a petro chemicals complex, many thousands will be employed whereas some enterprises can still be operated by the owner and a few apprentices. Some industries need a highly skilled labour

force, some a large clerical and managerial staff, and others need many unskilled manual workers. In some industries the labour input is a large cost item while for the other activities it may be of only minor importance. The distinctive labour requirements of particular industries make some places more suitable locations than others. A firm needing a large labour force with a wide range of skills will find this easier to obtain in a major metropolitan area than in a small town. If workers with a specific skill are needed, a location in one region or city might suggest itself on the grounds of an existing concentration on a particular activity; traditional familiarity with industries can be an advantage to a firm seeking a particular kind of labor, if only because less training is involved. If the right kind of workers are not available at an otherwise attractive location, it may be possible to obtain them from elsewhere or from other local employers, since labor is mobile both geographically and in terms of occupation. A firm can attempt to attract workers from one place to another by providing good wages or conditions of employment, just as it may try to build up a labor force by enticing workers from neighbouring plants. Uniform wage rates negotiated by trade unions makes active competition between firms through wage differentials difficult today, but it certainly has been important in the past. Now a firm wishing to get more labour may incur additional costs not so much in higher wages as in expenditure on fringe benefits. Labour is likely to be more

expensive in large cities or national core regions than in the periphery where the cost of living is lower.

Management may be treated as a category of labour, though the policy making function also raises the issue of organizational structures no matter who performs the management of a firm's affairs, the skill with which this is done will have vital bearing on business success or failure¹⁵. Among the many decisions that must be made is of course the choice of location, involving the balancing of the various considerations and the assessment of such nebulous concepts as the local "business climate". Good decision makers are therefore very important, and because they are easier to obtain in some places than others, their availability can influence the location of a new plant or branch factory that expects to attract or locally recruit some of its upper-level managerial employees. For example, in Britain it is often said that high-calibre executives can be attracted to firms in London area more easily than to other regions, and that they need higher salaries to induce them to bear the discomforts thought to exist in the northern industrial cities¹⁶. The need for skilled managerial employees may bestow locational advantages on areas best able to supply them. For example a firm requiring a range of managerial personnel with specific skills is far more likely to find them in a major city than in a small town.

The importance of access to the market as a factor affecting industrial location has been recognized for a long time. In many industries the significance of the market is growing in relation

to such considerations as the cost of labour and materials. Freed from the original necessity of being on a coalfield or source of raw material, many firms now show a distinct preference for a location in one of the major metropolitan regions such as the northeastern megapolis of the United States and the Southeastern corner of England. The market is not the only attraction of a metropolitan location, but the large concentrated, and relatively affluent body of final consumers found in the city, together with its large industrial market, is certainly one of the main reasons for relatively rapid industrial growth in and around major urban areas. For any product the volume of sales and the price obtainable may be subject to geographical variations according to the nature of the market: the number, type and distribution of potential customers. For some products a location of relatively high per capita income or purchasing power may be an advantage. If a manufacturer requires a market with an assumed minimum volume of sales, choice of location may be restricted to cities of a given size and may also be influenced by the location of competitors. All these and many other considerations are relevant to the effect of the nature of the market on plant location, with different volumes of sales, different prices and total revenues, and perhaps also different elasticities of demand. The second way in which the market can influence plant location is through its effect on costs. Finished products have to be transported to the consumer, and in many industries the outgoing freight bill can be a substantial

addition to the cost incurred in acquiring the inputs and conducting the process of manufacture. Proximity to the market if it is spatially concentrated or a central location if consumers are dispersed can thus be an advantage. In some industries large sums are spent on sales promotion and this may be related to location for example, more advertising may be needed in a highly competitive market than in one where the firm has a monopoly, and because of existing habits or preferences people in some areas may need more persuasion as to the virtues of a new product than in other areas. However, these considerations are far less likely to be important enough to determine the choice of location than is the cost of transporting the product¹⁷.

The tendency to charge a uniform delivered price is important to industrial location because it means that proximity to sources of certain materials and components may be of no advantage. The adoption of uniform delivered price is also important to the sales side of the firm, because it enables prices to be kept down in distant markets where volume of sales would be low or non-existent if the customer had to pay the whole of the freight cost. The uniform delivered price system enables the producer to pass on part of the real cost of supplying distant customers to those close to the factory. The usual alternative to a uniform delivered price is the "free-on-board" pricing system. In this case, the price is established at the factory and the customer pays the transfer cost.

Thus, the farther away from the point of production a customer is, the higher the delivered price. It is in these circumstances that the structure of freight charges becomes very important in determining price of materials, components, or finished products in alternative locations. The "free-on-board" (f.o.b) plant pricing system, when applied to the supply of some industrial input, will make proximity to the source of supply a relevant consideration when plant location decisions are being made. When applied to the firm's output, an f.o.b system will generally have the effect of limiting the market area for the product, as the price will be higher for distant customers than it would be under uniform delivered pricing, although the exact outcome in any specific case will depend, among other things, on elasticity of demand.

A less frequent method of pricing, but one that has attracted much attention is the basing-point system. All production of a certain commodity is regarded as originating from a single point, a uniform price at the factory is set for all producers irrespective of their costs, and the price quoted to any customer is this, plus the cost of transportation that would have been incurred if the consignment had originated at the basing point. This system tends to protect the competitive advantage of firms at the basing point. The best example of the basing point price system is the "Pittsburgh plus" arrangement applied for sometime to the marketing of steel in the United States. Under this system all steel consignments irrespective of where they were

produced were charged to the consumer as if originating from Pittsburgh, a device that protected the Pittsburgh manufacturers from competition from locations with lower production costs.

Transportation is often considered to be the most important determinant of plant location of some industries.¹⁰ Few firms can ignore the transportation factor in making their locational choice, and for many the total freight charge will be the largest difference between costs at alternative sites. The past few decades have seen a number of important innovations in transportation, including the use of pipelines for moving bulky commodities like petroleum and oil, and the development of container systems that greatly facilitate the transfer of goods from road to rail and rail to ship. Again the effect of all this is to increase the flexibility of the system. The more efficient transportation becomes, as measured by decreasing costs of overcoming distance, the more freedom the manufacturer has to locate with regard to criteria other than freight costs. The nature of material or product to be moved can affect the means of transport required. Bulky goods of relatively low value, such as iron ore and coal, can be moved cheapest by waterway. While to justify air transportation a commodity must be of very high value in relation to its weight and volume. If it is important to move the goods quickly, the railway and road would be preferred to waterway. Some goods may require special facilities such as refrigeration or careful handling, and some means of transportation may be equipped to provide this additional service

while others are not. The distance over which the goods are to be moved is also important. For most commodities trucking is the cheapest means of transportation over short distances, while railroads are cheaper for medium distances and waterways are preferred for very long hauls.

There are three kinds of freight rate structures known as postage - stamp rates, blanket rates and mileage rates. A postage-stamp rate involves a uniform rate irrespective of distance anywhere within the country. A blanket rate is similar to a postage-stamp rate, but in this case a different uniform rate is adopted in different zones. The blanket rate customarily rises with distance of the zone from the origin of the shipment. The most common method of charging for transportation is by mileage rate whereby the cost is related to distance from the point of origin. It is important to make a distinction between two separate elements - The terminal cost and the line-haul cost. The terminal cost includes expenses incurred at each end of the journey, comprising the cost of loading and unloading, the preparation and handling of documents, and any other overheads. Because these costs arise irrespective of the distance that the consignment is moved, they are fixed for a given type and quantity of goods. The line-haul cost is that part of the total charge that is related to distance travelled. Because of the constant nature of the terminal charge, the total cost of transporting a certain quantity over a given unit of distance decreases with the length of one haul, since the overheads are

being spread over a larger distance.

The areal concentration of Industrial activity often provides firms with collective benefits that they would not enjoy in an isolated location. These take the form of external economies. Two types of external economies of agglomeration may be recognized, the first one involving one industry or a group of related activities, while the other concerns the advantages that a firm in any industry may gain from locating in some large urban-industrial complex. The advantages of a new firm locating among other firms engaged in the same activity includes a pool of labour with particular skills, special educational institutions geared to the needs of the industry in question, both of which will reduce the cost of training workers. Firms may also join together to develop a research institute, a marketing organization, and other collective facilities that individual manufacturers would be unable to provide for themselves. In addition, a city or a region specializing in one industry will often have machine makers and repairers, suppliers of components, containers, and so on, and other activities ancillary to the main one and providing goods and services for it. All these benefits of agglomeration when added together, may offer considerable cost advantages over alternative locations. Small industries generally have most to gain from a location in an existing industrial concentration; large ones can create economies internal to themselves that others have to obtain externally. The second aspect of agglomeration relates to the benefits that

arise in any large urban industrial area, and that are potentially available to any firm irrespective of the industry to which it belongs. The main advantages of a large city or industrial region arise from the existence of a relatively well-developed infrastructure, that is, highways, railroad lines and terraces, airports, utilities, commercial facilities, educational institutions, research organizations, and many other services that might not exist or would be less well developed in a smaller place. But for some inputs, a location in a larger city is no advantage, and it may even increase costs. In addition to the high price that a firm may pay for land, taxes, and perhaps labour, those who locate in the city centre must also contend with such problems as traffic congestion and lack of space, which are becoming increasingly important as diseconomies of urbanization. Indeed, the forces of deglomeration are leading many firms to leave the inner city for what they consider to be better sites outside. Nevertheless the balance of advantages still appears to favour the city.

Public Institutions, as local, regional, or national manifestations of the State form an important part of the operating environment of industry. They affect plant location in a variety of ways. Under capitalism, constraints on freedom of locational choice may be imposed in pursuit of the economic, social, environmental, and strategic policies that those who rule claim to be in the general public interest. An obvious example is land-use zoning in city planning whereby specific areas will

be set aside for industry. Many capitalist nations today engage in some form of regional planning, through which industrial development is encouraged in some places and discouraged in others by a system of financial incentives. The capitalist state can also engage directly in the process of industrial production, with some degree of freedom to locate plants according to social welfare criteria such as the alleviation of employment or the stimulation of a stagnant regional economy. Another public policy is spatial variations in taxation especially in major metropolitan areas with levels around the fringe often substantially lower than in the central area. These local tax differentiations can be expected to have some bearing on industrial location. In a Metropolitan area the cost of most other inputs may vary from place to place only to a minor degree, thus increasing the significance of difference in taxation levels. And if substantial variations in the cost of land exists these are likely to reinforce the trend indicated by the taxation figures rather than oppose it. Differences in the level of business taxation, with or without the assistance of other cost variations, are likely to favour the decentralization of industrial activity within major metropolitan area. The experience of New York city in recent years is an obvious example of this type of industrial dispersal. In socialist systems with centrally planned economy, the state is all-pervasive in industrial location. Each plant will be expected to perform an assigned role, both in its branch of industry and in the

territorial structure of production. Therefore the impact of public institutions on industrial location is considerable and likely to become even more important as industrial society becomes steadily more complex¹⁹.

The nature of industrial organization itself can have an important bearing on how the location decision is made. The outcome of whatever deliberations or calculations are undertaken may be quite different, depending on whether the organizational unit is a small privately owned firm, a multi-plant corporation, a transnational conglomerate, or a state agency. For example, there are numerous cases for the Lancashire textile industry in Britain of previously profitable independent mills being closed down after takeover by a larger concern. And a major corporation may be able to risk putting a branch plant in a location where a small independent business would more likely fail. The type of organization can hence, affect the motives and behaviour of its decision-makers.

Decision-making behaviour has been a focus of much recent attention in industrial location analysis. Almost any industry reveals cases of plant locations that cannot be explained by obvious economic factors. The choice of one site over possible alternatives might seem to be entirely a matter of chance, with historical accident or the personal whim of the entrepreneur as the only possible explanations. Some places have a particular industry by virtue of the birth of the founder of a business: the automobile factories of Ford at Detroit and Morris at Oxford.

England, are cases in point for example, the city of Nottingham in England owes the existence of two of its large businesses - Players Tobacco and the Boots Pharmaceutical concern - to two local entrepreneurs who had the initiative to build big manufacturing corporations out of the small shops that they had started with. The random factor in the diffusion of industrial innovation can also have a bearing on the spatial pattern of the adoption of new techniques, with some places and some entrepreneurs being more receptive to change than others.

Once a plant has been built, personal factors as well as immobility of fixed capital may prevent relocation, even if this seems desirable on other economic grounds. In addition to leaving familiar surroundings, a move involves an increase in managerial effort while it is planned and undertaken, with some degree of risk and uncertainty as to the outcome. Some manufacturers may simply prefer to stay put, no matter how much an alternative location may seem to be an attractive economic proposition. Such attitudes make an important contribution to industrial inertia and existing industrial location patterns, a degree of stability and permanence that economics alone may not justify.

In summary, it can be said that all entrepreneurs aim at finding a satisfactory location and "satisfactory" means a location which enables the business to survive and break-even. Effectiveness of location decision depends on the ability of the entrepreneur to perceive the relevant criteria and to evaluate

the complex mass of relevant data. Even an able entrepreneur may be frustrated by lack of suitable data on certain aspects of his enquiry, while the high cost of amassing the relevant evidence sometimes curtails the search for the best location for new enterprise. Location must be one of the very early decisions and is all the more important in that it is one of the most difficult to reverse if the choice should prove unwise.

Factors That Influence Industrial Location In Kenya

A study of the evolution of Kenya's Industrial patterns reveals numerous factors which in one way or another, have considerably influenced the existing generalised pattern of industrial location during its various evolutionary stages. These factors can broadly be classified into physical factors and human factors²⁰

The physical factors include the geological influence whereby a greater concentration of minerals are in the precambrian rocks and the influence of relief, rainfall reliability and ecological patterns. This is especially so for agro-industrial raw materials on which Kenya's generalised pattern of industrial location is found.

Human factors include demographic and other social factors; administrative and political factors; and economic factors.

Most of the important labour intensive manufacturing and service industries of Kenya are not, at present, located in the majority of the rural high population pressure areas. The

Industrial pattern is coincidental with the former "White Highlands" and the main urban centres resulting in waves of labour movements from high population pressure rural areas to those points where the industries are located. Labour supply as a factor of location in Kenya therefore exerts relatively less force than that exerted by several other locational factors. Availability of skilled labour, though a significant force in the larger urban areas of Nairobi and Mombasa, is generally not important in Kenya. This is especially so in the agricultural processing and fabricating industrial since most of the large companies train their own labour on the job; and the majority of the operatives in such labour forces are normally regarded as semi-skilled. Wage differentials in various parts of Kenya are not yet too large to significantly influence industrial location. However, the urban wages are relatively high though not high enough to cause decentralization of industries to the rural areas.

The partition of Kenya into alienated lands, African reserves and crown land during the colonial regime had a far-reaching influence on the evolution of the existing generalised pattern of industrial location. The alienated lands, especially the former "White Highlands" greatly benefitted by the concentration there of both private and Government capital. This politically influenced and administratively encouraged capital concentration (resulting in better infrastructure and the other attractive industrial location incentives), to a large extent,

determined the present pattern (s) of the manufacturing and service industries. Perhaps the best example of the influence of politics on industrial location in Kenya is that relating to the original pattern of the coffee industry. The latter was restricted, for a considerable period during the colonial regime to the "White Highlands" and only non-Africans could grow and process coffee at the time. Generally speaking, therefore, the consequent growth and consolidation of the industrial pattern assisted by both the industrial interdependence and other aspects of geographical association of industries was fully assured. This industrial pattern has been sustained by industrial inertia generated originally in the manner just explained.

Capital and managerial skill is one of the economic factors influencing location. In different parts of Kenya, capital for industrial development has a bearing on industrial location especially when viewed in the light of the availability and cost of the capital, first, to the organization establishing the manufacturing and service industries and secondly to the consumers and suppliers of the organization locating the industries. However, for large companies, especially those with financially strong overseas association (s), it seems that the availability of capital is a relatively insignificant determining factor in their location decisions although in certain cases, such large industrial firms especially the local ones, the availability of loan capital is often a limiting factor in plant location, and may be even more important than the relatively high

interest rates normally charged. Such interest rates, however, constitute a significant secondary location factor. Because of greater government interest in industrial development, financial institutions such as the Development Finance Company of Kenya (DFCK), the Industrial and Commercial Development Corporation (ICDC) and several others have been formed to allocate both small and big loans to organizations or individuals keenly interested in, and capable of carrying out industrial development. Nevertheless, the major industrial projects are still concentrated in major industrial towns such as Nairobi, Mombasa, Nakuru, Kisumu and Eldoret. This emphasis has been forced on the government by the high interest charged on borrowed foreign capital. In order that this capital may be of some profit to Kenya, the government must invest in those industrial projects located in areas with high and quick returns, hence further industrial concentration in the more industrialised areas of Kenya. However, in order to halt population drifts of unemployed persons from rural to urban areas, a long term policy of industrial zoning designed to decentralise industrial development to rural areas is essential. Moreover, special incentives could be extended to foreign industrial firms to locate suitable new industries in the rural areas. Incentives could be in the form of tax exemption period so that the farther one locates from the central zone, the longer the tax exemption period.

Managerial skill, as a factor of location exerts its influence through processing costs. Such talent is mostly

concentrated in the leading industrial towns, because a very large proportion of the managerial staff consists of expatriates, employed by parent companies usually overseas based. Such skilled staff may be available, as in the case of planned government sponsored industrial estates. The availability of local managerial skill is still limited though necessary. Thus, as a nucleus of skilled African managerial staff becomes available, its importance in location decisions will become more apparent.

Industrial raw materials as a factor of location can be grouped into organic and inorganic industrial raw materials. The leading organic industrial raw materials are those derived from agriculture, (agrico-industrial raw materials), Inorganic industrial raw materials include minerals and water-power resources for hydro-electric generation. The influence of raw materials on industrial location can best be examined with reference to transport costs.

It is perhaps only Nairobi district industrial unit alone, in the whole of East Africa which fully enjoys most of the characteristic industrial agglomerative advantages. During 1964, out of a total of 39 individual industries comprising the entire spectrum of the manufacturing and service industries located in East Africa, up to 37 were quantitatively well represented in Nairobi district. This considerable industrial agglomeration, which is mainly centred in Nairobi city and to a less extent in such towns as Mombasa, Kisumu, Thika, Nakuru favours the development of industrial interdependence. The most outstanding

agglomerative advantages serving as the foundation on which Nairobi's industrial interdependence is founded are such features as: a greater range of insurance facilities, the industrial and commercial advantages which the city offers in comparison with other industrial towns, the ease with which service and maintenance facilities (including spare parts) are obtainable; the proximity of the city to its airports. These agglomerative advantages also explain reasons for the location of certain important industrial estates (such as Ruaraka, Kasarani, Kahawa) and several industrial towns (for instance Athi River, Limuru, Thika etc) near the city of Nairobi. The two best examples of industrial linkage are to be seen in Thika Township. The first is that between Kenya Cannery factory and Metal Box tin can fabricating establishment. The second is that between the Kenya Tanning Extract factory and Bulley Tanneries close by. In both cases, each firm (out of the appropriate pair of firms enjoying the linkage facilities) depends to a considerable extent on the other; industrially or otherwise. Intensive cases of such interdependence may result in the need for amalgamation or total take-over, that is, an absorption of one firm by the other.

One of the root causes of industrial interdependence is the commercial aspect. As a factor in Kenya, the market influence on industrial location is three fold. First the market exerts an influence when it offers the greatest profit because of the absence of competition, there being no other markets. This aspect of industrial location is only partly true in Kenya, and

relates only to cases of certain large firms centralised in or peripheral to Nairobi or Mombasa and, to a less extent, elsewhere (for example: The Metal Box Company located at Thika). Firms which require the whole of Kenya market are in certain cases centralised and are located in or near leading urban centres which have high distributive networks. Secondly, the market is the governing factor when the market oriented industrial location yields large savings in the transportation of the finished products field observations during 1963-65 period indicated that Kenya's leading market oriented agricultural, processing and fabricating industries included large scale fruit and vegetable canning and soft drinks processing, large-scale grain milling, miscellaneous food products processing; baking and confectionary products manufacture; non-African alcoholic beverage processing, tobacco processing; soap and pyrethrum extract and allied products manufacture; textile processing and clothing fabrication and the processing and/or fabrication of both "furniture and fixtures" and pulp, paper and paper products". Most of the smaller meat, dairy and fruit and vegetable canning establishments are generally located in the raw material areas, although the main establishments are therefore regarded as raw material-cum-market oriented, the market attraction being the stronger of the two factors. In the soft drinks industry, transport costs are comparatively high in Kenya. This is partly overcome by locating branch factories in those industrial towns suitably situated to serve smaller scattered markets. The soft

drinks industry in Kenya has therefore become relatively decentralised. Thirdly, the market is a basic influence when a location near the consumer is a prerequisite to (or greatly enhances) sales, when the consumer demand is changeable, to satisfy the changed requirements as promptly and efficiently as possible, the market should be near the consumer and the market located manufacturers should be sufficiently enlightened and technically up-to-date to keep the changing needs of the customers in constant view. Broadly speaking, Kenya's chief internal markets (in terms of consumers with reliable purchasing power) are Nairobi, Mombasa, Nakuru and Kisumu. Numerous other medium and small market towns are scattered in many parts of Kenya. However, owing to the market attraction of the four largest Kenya industrial towns above, several of the smaller industrial towns and a large proportion of the industrial centres are located either just outside or within 30 mile limit of each of the four main industrial towns.

Infrastructure is another influence on industrial location. These include roads, railway lines, Airports, Seaport, water, electricity etc. The higher the transfer costs of commodities the greater is the degree of Kenya's industrial location.

Locational decisions based on the attraction of raw materials depend essentially on the significance of transport costs in relation to total production costs. In Kenya, the most typical raw material oriented processing and fabricating industries (some of which are at the same time, market oriented)

are agricultural based industries and some non-agricultural industries e.g. processing of cement and clay products. Other industries which are partly raw material oriented but which are more influenced by markets especially in terms of the location of larger establishments include meat and dairy products processing; fruit and vegetable canning, shoe fabrication, textile processing, manufacture of pulp, paper and paper products etc. In cases relating to raw material orientation, proximity to the raw material supply is the basic locational factor.

The four sources of power in Kenya include wood fuel; direct water power, mineral oil fuels and electricity for industrial purposes, however, electricity is the leading source of power. It is the need for industrial power, resulting from the ever expanding industrial development in Kenya, that underlies the current co-variation between both the patterns of industrial location and electricity distributing areas. Water supply is only a significant secondary factor of location.

Where raw materials and demand considerations have relatively weaker locational attraction, site selection may be determined either by the total industrial cost or simply the processing costs or by personal consideration factors. Under Cost Structure are included such cost items as labour and contract; materials and water; power (mainly electricity); rents; tools and a small group of miscellaneous costs. The most important processing and fabricating cost factors include: land, labour, capital, managerial skill and taxation. Though taxation

has changed considerably during the last decade, the rise has not been unduly steep. Thus taxation may, in future, become an important locational factor, although at present it is relatively unimportant.

Industrial land is becoming a significant locational factor because most of the land in Kenya is in private hands and it has become expensive as the demand rises. This is especially so in major towns like Nairobi. However, in smaller towns and centres there is plenty of land for future industrial expansion. In deed, in most of them the relevant local authorities seem to have over-allocated land for future industrial development. Thus, in Kenya, whilst industrial land is not vitally influential as a factor of location, it is the rents charged on the land which tend to influence location decisions in the larger towns. However, in the small towns the rents are comparatively low, hence the industrial popularity of such centrally located towns as Thika and Athi River. Higher rents in large towns may have a slight decentralizing influence, although the industries so decentralized tend to be located either just outside the relevant municipal boundaries or in smaller conveniently situated nearby towns where these industries still take advantage of most of the manufacturing benefits including such facilities as markets infrastructure and easy labour procurement for example Athi-River, Kikuyu, Limuru and Thika which are just outside the Nairobi city boundaries.

Personal considerations cannot be ignored as locational

decision factors. This is clearly seen in factories that are owned by an individual or where an individual starts a factory where he has some other businesses for convenience.

Apart from Ogendo (1972) who examines both location influencing factors and the structure of the agricultural manufacturing and fabricating industries mainly, other people who have examined the factors of location in Kenya include Nixon (1973)²¹ who examines the factors of location of manufacturing industries in Kenya and Uganda. Unlike Ogendo, Nixon does not go into the structural analysis; Obara (1976) examines the ecological factors affecting sugar growing in the "sugar belt" (Muhoroni-Chemelil-Miwani Cane growing zone) while Odada has undertaken an economic appraisal of the sugar cane industry in the lake Victoria Basin. Obiero (1980), on the other hand examines the location influencing factors and the development inducing role of the sugar industry in Kenya. Dosio (1973) discusses Thika as an "Industrial Base" and has therein discussed the factors that have attracted entrepreneurs to Thika Town.

Summary of the Chapter

Industrial location theories have evolved over time to the present day locational factors. However, the importance of each factor may vary in different areas and in different types of industries. The factors can be summarised as follows:

Land for industrial use must be physically suitable for the purpose or it must be rendered suitable before development

commences. Climatic conditions may affect the location of particular industries. Public utility services for industry must be planned and programmed so that they are adequate, and are available when development takes place. Some industries requiring large quantities of water will seek lake shore sites. Solid wastes and effluents may affect the location of certain industries²¹.

All industrial areas require good transportation system and must have direct access to primary distributor roads. Most industrial transportation will be by road as there is scarcity of land which can be served by railways. Early reservation of suitable land for rail served industrial expansion is essential.

Extractive industries (though none is found in the study area) are normally located in rural areas. Noxious industries should be suitably isolated from urban development. Service industries should be located adjacent to and integrated with commercial and retail shopping areas. Industries requiring real access and noisy industries should be located adjacent to railways.

General industrial areas should be suitably dispersed throughout the urban area, they should be in large units and should be sufficiently flexible in layout to allow for large, medium and small scale industry. Particular attention should be given to the provision of "Industrial Estates" within industrial areas.

Industries which are interdependent economically and

Technologically should be encouraged to develop in the same location for economies of scale.

If there is to be successful planned industrial development adequate land must be freely available at the planned location.

REFERENCES

1. G.K. King'orish, "Introduction to Land Economics", Department of Land Development, University of Nairobi, 1987, P.462.
2. King'orish, 464
3. King'orish, 471
4. King'orish, 473
5. King'orish, 477
6. D.M. Smith Industrial Location: An Economic Geography Analysis, 2nd Edition, (New York: John Wiley and Sons, 1981), 146
7. G.K. King'orish, "Introduction to Land Economics", 480
8. King'orish, 482
9. D.M. Smith Industrial Location, 102-105
10. F.E. Hamilton (Ed) Spatial Perspectives on Industrial Organisation and Decision Making, (New York: John Wiley and Sons, 1974)
11. D.M. Smith, Industrial Location 45-47
12. Smith, 48
13. Smith, 50
14. Smith, 53
15. Smith, 53
16. Smith, 55
17. Smith, 62
18. Smith, 64

19. R.B. Ogendo, Location And Structure of Kenya's Industries. (East African Publishing House), 1972
20. F.I. Nixon, Economic Integration and Industrial Location: An East African Case Study. (London: Longman Group Ltd), 1973, 107-127
21. Uganda Government, "Industrial Location", Kampala-Mengo Regional Planning Studies, No. 11, 1966.

CHAPTER 4

INDUSTRIES AROUND NAIROBI

The railway was responsible for the very existence of Nairobi and the selection of the actual site was based solely on railway considerations—the physical characteristics of the site and its relationship with the surrounding country combined to make Nairobi an excellent choice for the purpose for which it was intended. The Government administration of Ukambani Province (in which Nairobi lay) was transferred from Machakos to Nairobi in August 1899 and it is from this point onwards that Nairobi began to assume the functions of the future capital city. After some initial setbacks, Nairobi began to expand rapidly, and as Kenya developed it became important as a collecting, distributing and service centre for wealthy farming areas to the north, north-west and west. The development of the present Industrial Area started in about 1919 and thus after 20 years of existence, Nairobi was functioning (albeit on a small scale) as an administrative, railway, political, commercial and service, military and industrial centre.¹

In 1963, Nairobi was the only centre in Kenya to possess establishments in spirits, tobacco, paints and rolling stock sectors. But Nairobi's industrial dominance was far greater than that and in the following industries, 50% or more of the total number of establishments in Kenya were located in Nairobi: confectionary, clothing, footwear, furniture and fixtures, printing and publishing, tanning and leather goods, rubber

products, miscellaneous chemicals, clay and concrete products, glass and products, metal products, electrical machinery and motor vehicles. Employment was similarly concentrated in Nairobi and all the above industries (with the exception of footwear, miscellaneous chemicals and metal products sectors, but with the addition of grain mill products, bakery products, beer and malt, soft drinks, soap, non-electrical machinery and miscellaneous manufacturing), had over 50% of the total labour force employed in Nairobi. Throughout history in general, average plant sizes were larger in Nairobi than elsewhere the notable exceptions to this being the miscellaneous chemicals, metal products, footwear and motor vehicle sectors. Overall, by 1973 Nairobi contained 44% of manufacturing establishments employing over 5 persons and accounted for 41.7% of total Kenya Industrial labour force. Nairobi also produced 47.6% of Kenya's total value added in the manufacturing sector.² In 1977 alone, the city accounted for 54% of all recorded industries in Kenya and 42% of total employment in the industrial sector throughout the country.

This industrial dominance is explained by the fact that first, being the principal city, Nairobi has over the years acquired enormous economies of agglomeration and Industrial Linkages that influence potential investors to favour the city more than the rest of the urban centres in the country. Secondly, Nairobi receives a high percentage (over 50% in 1977) of the total budgetary allocations for infrastructural development although it holds only 5% of the nation's

population³.

Although Nairobi's position is impressive it would be misleading to consider it in isolation. Nairobi is surrounded by a ring of smaller manufacturing centres - Thika, Kiambu, Limuru, Ruaraka, Athi River, Machakos and Kajiado-and these are important both as manufacturing and market centres.

Thika is the most important of these 'satellites' and a relatively wide range of industrial enterprises is located there-fruit and vegetable canning, bakery and confectionery products, textiles, sawn timber, wood products, furniture and fixtures, paper products, printing and publishing, tanning and leather goods, basic industrial chemicals, metal products and motor assembly & repairs. The basic factors in its growth have been the availability at a low price, of land suitable for industrial development and availability of plentiful supplies of water⁴. It has also been Government's policy to attempt to attract industries away from Nairobi whenever possible, and because of its cheap land and proximity to Nairobi, Thika has proved to be an ideal location for many large industrial enterprises. The largest single industry in Thika is fruit and vegetable canning, and although the company considered raw material availability to be the most important locational consideration (it is well placed to receive fruit and vegetables from both the small scale farmers of Kiambu district and the large scale farmers of the surrounding areas), the availability of adequate supplies, of water and suitable site were also considered to be other major factors.

The paper mill and textile mill considered availability of water to be the major locational consideration and climate was also an important factor in the textile mill's decision. The metal products producer commenced production in Thika in 1948 at a time when Nairobi was extremely overcrowded and African accommodation in short supply. The government felt that the situation gave rise to both health and security risks and hence the further growth of Nairobi was temporarily discouraged. The company considered a market oriented location essential and Thika was chosen on the basis of its nearness to Nairobi and the availability of land. It can thus be concluded that the town's proximity to Nairobi and a good road network system has benefited Thika in the field of Industrial and Commercial development not to mention its vast room for expansion and ample water sources.⁵

The other centres, although not as important as Thika, are still of some significance. Ruaraka is a smaller settlement closer to Nairobi, having a character somewhat similar to that of Thika. The principle industry there is brewing though in recent years other industries have been developed mostly along Baba Dogo Road. Limuru is of importance for the large shoe producer located there and close by is the bacon factory at Uplands well situated to receive pigs from the farms on the Kinangop plateau.

Machakos presents an interesting example of industrial inertia. The canning factory (which also produces jams and sweets) was established in the expectation of large crops from the orchards of the European settlers on the Mua Hills. These

were not forthcoming and neither the raw materials nor the markets are now local.

Athi River is dominated by two large establishments - the abattoir and factory of the Kenya Meat Commission and the cement factory. An abattoir is regarded as somehow obnoxious and thus is well sited away from the main population concentration. Raw material availability was considered to be the most important locational consideration although the company is well sited to serve Nairobi market. The location of cement works is somewhat unusual in that the majority of its raw material requirements comes from a deposit of crystalline limestone, south of Sultan Hamud, 96km away from the plant. But water supplies were not adequate at the site and control over the land, which is Masai Country, would have presented difficulties.⁴

Kiambu is of importance for its agricultural processing industries extensively exploited for a number of years, but this is a purely raw material based activity and does not have any functional relationship with Nairobi. In recent years Ruiru town which is dominated by a textile industry has been growing as an industrial town. Some of the industries found in Ruiru are textile related industries like towel manufacturing, wool processing, chemical industries timber processing, metal engineering and pharmaceutical industry.

Agricultural and raw material processing industries in Nairobi region as a whole (defined as including Kiambu, Thika, Machakos and Kajiado districts as well as the city of Nairobi)

accounted for 32% of the region's total value added.

The main factors that have favoured industrial location in the Nairobi Area include: relatively high relief; rich volcanic soils in the surrounding which have enabled agricultural activities which have in turn been sources of raw materials in agricultural manufacturing industries, suitable ecological conditions, moreover, the geological component of the Nairobi Area environment favours several other industries like Basic non-vegetable industrial chemicals processing, clay and concrete products manufacture and cement glass and allied products manufacture⁷.

The dynamic historical background of Nairobi city as the railway headquarters and Kenya's transport focus has resulted in the city and its region becoming the industrial core of Kenya. The city, including the rest of Nairobi Area, benefits from the availability of capital management and other skills and enjoys some of the best transport facilities and market in Kenya. Because Nairobi Area already has the highest industrial concentration in the whole country, it benefits from the economies of industrial agglomeration. Some of the best examples of industrial interdependence (or linkage) are found in the Nairobi area. Moreover, personal consideration factors apply best in the city and its environs Nairobi city with its region enjoys adequate supply of Industrial power and water and these are supported in industrial output by the Area's availability of some of Kenya's best high level manpower, also with substantial

purchasing power. Facilities such as banks, insurance, industrial security, including those against fire and other losses are fully available in Nairobi Area.

Within the Nairobi region itself, the highest concentration of manufacturing industries lies in the Nairobi Extra Provincial District, particularly in the city of Nairobi, where most industries are located in the industrial Area situated in the South East. There are appreciable concentrations in Thika, Kiambu district, Athi River and to a smaller extent Machakos and virtually negligible in Kajiado District. A circle of radius 48KM centred on Nairobi enclosed most of the leading industrial towns and centres of the Nairobi region. Most of these lie to the north-west, north or north-east of the City of Nairobi and in the city itself.

In conclusion, the Nairobi region contained only five out of the forty-one districts in Kenya in 1961 but they had between them most of Kenya's factories and manufacturing workers, and consequently contributed most of the value added by manufacturing in the entire country. The locational factors operative in the Nairobi region include transportation, raw material sources; capital, markets and labour reservoirs; power and fuel (including electricity, diesel, petrol and wood); industrial water supply and geographical association of industries. The influence of the central government and various local authorities is also significant in deciding industrial location.

Considering mainly the major regional location factors,

manufacturing industries in the Nairobi region fall into two principal categories, viz: raw-material oriented and market-oriented industries. An intermediate group may be conveniently termed 'Material-Market-oriented' industries. (See table 4.1 below)

Provision of Industrial Land in Nairobi

Nairobi has a total of 2290 hectares earmarked for industrial development according to the 1973 Nairobi Metropolitan Growth strategy. The areas that were set aside for industrial development are as shown on table 4.0.

The number and location of industrial areas were the result of consideration given to three criteria; accessibility,

Table 4.0Industrial Orientation Towards Materials or Markets

Material Oriented Industries	Material-Market-Oriented Industries	Market-Oriented Industries
Coffee Processing (first stage)	Animal and vegetable oils and fat processing	Baking
Tea Processing (first stage)	Fruit & Vegetable canning Grain Milling	Confectionary products manufacture
Sisal Processing (first stage)	Fibre processing (second stage)	Coffee processing
Miscellaneous group processing (first stage)	Miscellaneous crop and Food processing (second stage)	Tea Processing (Second stage)
Dairy products processing (mainly	Meat preparation & canning	Wood carving
Milk pasteurizing and packaging Sawmilling (first stage)	Dairy Products processing Wattle Extract Manufacture	Beer brewing & spirit distillation
Manufacture of of Pencil slats	Leather preparation & tanning	Tobacco processing (Final stage)
	Textiles and clothing manufacture	Tyre Retreading Match & Match Box Manufacture
	Clay and concrete products manufacture	Resawing of timber
	Cement, glass and other mineral products processing	Manufacture of paper and products
	Pyrethrum and other chemical products processing	Metal and other general Engineering products manufacture
	General of electricity	Manufacturing of machinery

Treatment of
water

and its repair

Manufacture of
Railway products

Motor vehicle
assembly and
repair

Printing and
publishing

Miscellaneous
Manufacturing.

Source: Extracted from Ogendo's "Manufacturing Industries in
Morgan's Nairobi City and Region

Table 4.1 Availability of Industrial Land

Site	Area (ha)	Capacity Workers		
		50WPH	75WPL	100WPH
Central Industrial Area	970	48,580	72,750	97,000
Firestone	100	5,000	7,500	10,000
Dagoretti	120	6,000	9,000	12,000
Langata	200	10,000	15,000	20,000
Dandora	280	14,000	21,000	28,000
Ruaraka	110	5,500	8,250	11,000
Kasarani	230	11,500	17,250	23,000
Ruiru I	180	9,000	13,500	18,000
Ruiru II	100	5,000	7,500	10,000
Total	2,290	114,000	171,750	229,000

Source: Nairobi, Metropolitan Growth Strategy 1973.

Optimum Size, and land availability. It was important that sites selected offer efficient accessibility to transport links and to labour. While it has almost been a tradition in Nairobi to serve Industry with both road and rail access, there is an increasing dependence upon the use of road transport.

Because rail grades are easier on the eastern side of the city, industrial districts in that direction can have both road rail access; truck access is more important in the city's western sector.

Another fundamental criterion was land availability. Industry requires relatively flat sites and access to utilities such as water, drainage, power. The topography north and west of Nairobi offers a relatively limited amount of land of this nature. To the north-east and east of the city, land is flatter, and as a result, most of the selected sites are on this side.

With the exception of the old industrial area which is fully developed and in fact congested in terms of service provision (roads, water, sewers, telephones) the rest are only partially developed for example in Dandora and Villa Franca the services are not enough and others are not fully developed like roads, and sewers. The Dagoretti industrial area has been frozen to other forms of permanent development since its designation as an industrial zone in 1973⁸. Along Mombasa Road and especially at the boarder of Nairobi and Athi-River the main hinderances to development of industries is lack of water, telephone and power. Entrepreneurs have to obtain these services from as far as the

Internal Container Depot near Firestone factory at very high costs. The small scale industries have found this very expensive and have opted to stay in their poor state until they can get alternatives.

Therefore, although land for industrial use is a problem, the critical issue here is that even the land that is set aside for industrial development is not all being utilised for lack of necessary infrastructure.

REFERENCES

1. F.I. Nixon, Economic Integration And Industrial Location, An East Africa - Case Study, (London, Longman Group Ltd, 1973), 52
2. Nixon, 54
3. Republic of Kenya, "National Urban Land Use Planning and Development Committee", Office Of the President-Ongoing Unpublished Report, 107
4. Daily Nation, Thursday April 26, 1991, 20
5. Nixon, 56-59
6. R.B. Ogendo "Industrial location In Nairobi Area", Geo Journal, (1978), 461
7. R.B. Ogendo "Manufacturing Industries" in Morgan's, Nairobi, City and Region P.128,
8. Republic of Kenya, "National Urban Land Use Planning and Development Committee, 108.

CHAPTER 5

DATA ANALYSIS

The Case Studies

This research was based on the hypothesis that Athi River-Nairobi Corridor is proving to be a more industrial magnet than the Thika-Nairobi Corridor. This is a contradiction to the expected general growth of Nairobi City which was to be concentrated on the Thika-Corridor. To achieve the objectives of the study which was to find out the reasons for this phenomenon, the factors that influence industrial location as gathered from the literature review were analysed for the two areas.

In this chapter, the data collected is analysed factor by factor. Each location factor is isolated and a comparative analysis made for the two areas, that is, the Nairobi-Thika Corridor and the Athi River-Nairobi Corridor. The research also identifies the problems faced by industrial entrepreneurs, their causes and gives possible solutions. A small summary of the findings is given at the end of the chapter.

LAND AND ITS ATTRIBUTES

The main attributes to land that are given a major consideration include size and cost; land use; access to water for use in industrial processes and proximity to a river into which effluence can be deposited; level of land; and availability of services such as sewers, gas, electricity connections.

a) Size and Cost of land

Along Nairobi-Thika Corridor, out of the 42 industrial entrepreneurs interviewed, 90.5% of them considered the cost and the size of the land to be a very important factor in their location decision, while only 60% of the 40 industrial entrepreneurs on the Athi River-Nairobi Corridor considered the cost and size of the plots to be a very important factor. The percentage for Nairobi-Athi River Corridor is lower than that of Nairobi-Thika Corridor because the costs of land in most areas in Embakasi are not very different from those of Central Industrial Area. Hence it is only entrepreneurs who are far from the Central Industrial Area who experience the difference in prices of land between Central Industrial Area and where they are located.

Along Thika-Nairobi Corridor, and especially within the city boundaries, size and cost are considered together in most areas because of the subdivision practice. For example the City Commission regulations did not, until 1990 allow subdivision of land to less than 5 acres in Ruaraka. Hence most of the entrepreneurs before 1990 were people who wanted spacious land at reasonable costs. However, when subdivision to less than 5 acres was allowed, the entrepreneurs sold out the land they did not need.

Land tenure on the two corridors is as shown on the table below.

Table 5.1 Land Tenure on the two Corridors

Tenure	Thika-Nairobi Corridor		Athi River-Nairobi Corridor	
	No. of Industries	%	No. of Industries	%
Owners	36	85.7	30	75
Tenants	6	14.3	10	25
Total	42	100	40	100

Source: Field Survey 1991

To find out whether there is a significant difference between the two corridors in relation to land tenure, a statistical tool, chi square was used to test significance.

Step 1: formulation of hypotheses

H_0 : There is no significant difference in land tenure between the two Corridors.

H_1 : There is a significant difference in land tenure between the two corridors.

Step 2: An α level of 5% was chosen.

Table 5.2 Observed and Expected frequencies

Land Tenure	Thika Corridor	Athi River Corridor	Total
1. Owners	36 (33.8)	30 (32.2)	66
2. Tenants	6 (8.2)	10 (7.8)	16
Total	42	40	82

The expected frequencies are in brackets. These are obtained by multiplying the total of the row in which that cell appears by the total of the column in which the cell appears and the resulting product is divided by the grand total, n . In the above table, $n=82$.

Table 5.3 The contingency table

Land Tenure	observed (O_i)	Expected (E_i)	($O_i - E_i$)	($O_i - E_i$) ²	$\frac{(O_i - E_i)^2}{E_i}$
Owners	36	33.8	2.2	4.84	0.14
	30	32.2	-2.2	4.84	0.15
Tenants	6	8.2	-2.2	4.84	0.59
	10	7.8	2.2	4.84	0.62
Total	82	82			1.5

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = 1.5, \chi^2_{\alpha}(1) = 3.841$$

The critical region is $\chi^2 \geq \chi^2_{\alpha}$. Since χ^2 in the above table is not in the critical region, we accept H_0 that there is no significance difference between the two corridors as far as land tenure is concerned. This implies that land tenure is not an important determinant of where one may put up an industry because an entrepreneur may own land on any of the two corridors. Moreover, there are industrial sites for renting on both corridors so that one may become a tenant on any of the two corridors since there is no significant difference between them.

Table 5.4 Plot sizes

Plot Sizes (Acres)	Thika-Nairobi Corridor		Athi River Corridor	
	No. of Industries	%	No. of Industries	%
0.5-2.5	17	41.7	22	56.7
2.6-5	12	27.8	4	10
5.1-10	5	11.1	7	16.7
Over	8	19.4	7	16.7
Total	42	100	40	100

Sources: field survey 1991.

The difference in sizes of plots between the two corridors is statistically tested using χ^2

Hypotheses

H_0 : There is no significant difference in plot sizes between the two corridors

H_A : There is a significant difference in plot sizes between the two corridors.

Step 2: An α - level of 0.05 was used.

Table 3.5 Observed and expected frequencies

Plot sizes	Thika Corridor	Athi River Corridor	Total
1. 0.5-2.5	17 (20)	22 (19)	39
2. 2.6-5	12 (8.2)	4 (7.8)	16
3. 5.1-10	5 (6.1)	7 (5.9)	12
4. Over 10	8 (7.7)	7 (7.3)	15
Total	42	40	82

The expected frequencies are in brackets.

Table 3.6 Contingency table

Plot sizes	Observed (O_i)	Expected (E_i)	$(O_i - E_i)$	$(O_i - E_i)^2$	$\frac{(O_i - E_i)^2}{E_i}$
0.5-2.5	17	20	-3	9	0.45
	22	19	3	9	0.47
2.6-5	12	8.2	3.8	14.44	1.76
	4	7.8	-3.8	14.44	1.85
5.1-10	5	6.1	-1.1	1.21	0.20
	7	5.9	1.1	1.21	0.21
over 10	8	7.7	0.3	0.09	0.01
	7	7.3	-0.3	0.09	0.01
Total	82	82			4.96

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = 4.96$$

$$\chi^2_{\alpha} (3) = 7.815$$

Since χ^2 is less than χ^2_{α} we accept the H_0 that there is no significant difference in plot sizes between the two corridors. This means that the variation in plot sizes between the two corridors is similar and therefore an entrepreneur looking for any size of a plot can look for it on any of the two corridors. Therefore this factor alone will not make an entrepreneur prefer one location over the other.

Although there is no significant difference in plot sizes between the two corridors, there is a lot of variation within the same corridor.

Along Nairobi-Athi River Corridor, the plot sizes vary a lot depending on the specific area. For example, on the right side of Enterprise Road from Ngong River the plots (which were already serviced) were divided into 1/2 acre plots. Hence all the entrepreneurs interviewed have owned between 1/2 acre and 2 acres of land. There is only one Veterinary Vaccine Production Institute (Kevavapi) which owns 250 acres because of the nature of the work and again it is an old industry which was allocated land in the early 60s. It is a quarantine area and therefore a big piece of land was required for deglomeration reasons. On the left side of Enterprise Road from Ngong River, the land belonged to the Government and was allocated to individual entrepreneurs according to the sizes that they needed. Hence the size of plots vary between 5 acres and 8 acres for the industries interviewed. Other industries have big pieces of land for example Firestone has 92 acres, General Motors, 31 acres, and those industries on the Athi

River side along Mombasa road own between 5 acres and 40 acres.

Along Nairobi-Thika Corridor, there is no order in the plot sizes but it was noted that industries with big plots are old industries that were located in isolated places as at the time of their establishment. For example, Clay Works owns 285 acres, Premier Bag and Cordage, 150 acres. The smallest plot sizes on this Corridor is one acre and there are only 4 out of the 42 industries interviewed on this corridor that are on one acre plots. On the Nairobi-Athi River Corridor, the smallest plot size is 1/2 acre, 4 out of the 40 industries interviewed have 1/2 acre plots while 8 have one acre plots. This is an indication that plot sizes on the Thika-Nairobi Corridor are generally bigger than those on the Athi River-Nairobi Corridor.

Land values decrease as one moves away from the city centre towards Athi River and towards Thika.

Table 5.7 Cost of Land

Thika Nairobi Corridor	Athi River-Nairobi Corridor
1. Ruarakai: Kshs 400,000 - 500,000	1. Firestone area: Kshs 1.3 million
2. Kahawa: Kshs 250,000 per acre	2. ICD & Galcheeti: Kshs 1 million
3. Ruiru: Kshs 200,000 per acre	3. Athi River: Kshs 250,000
4. Juja: Less than Kshs 200,000	

Source: field survey 1991

It should be noted all the costs indicated on table 3.7 are per acre.

The costs of land are lowest in Athi River and Juja because this land was formerly agricultural land whose rates were also agricultural. It was also noted from the field survey that plots near Ngong River along Enterprise Road were sold when they were already serviced unlike those on the right side of Nairobi-Mombasa Road. There was thus a difference in Cost whereby those plots near Ngong River were costing Kshs 850,000 while those on the right side of Nairobi-Mombasa Road were costing Kshs 800,000 per acre. This was in the late 1970s and early 1980s.

The rates payable are different in Nairobi and areas outside Nairobi. The rates payable for industrial land in Nairobi is 10% of unimproved site value, while in areas outside Nairobi on the two corridors rates are 4.5% of unimproved site value for industrial land. However in areas like Juja and Athi River where the land was formerly agricultural land, the rates payable are still flat rates.

(b) Land Use

The intention of the Urban Study Group which conducted a study on Nairobi Metropolitan Growth Strategy in 1973 was to have urban land use controlled closely within their study area. Their recommendations were therefore aimed at increasing this control by the Central Government and the City Council.

Along Nairobi-Thika Corridor, the land on both sides of the dual carriageway is almost flat with only a few flattish hills

that would be no major handicap to development, land ownership on both sides of the highway was in large farms, fifty hectares or more; and it was envisaged that large land owners would be easier to negotiate with if such land was to be acquired for urban housing and infrastructural development. It must be pointed out that one of the main recommendations of the Metropolitan Growth Strategy was land banking in anticipation of future development. This anticipated availability of funds to purchase all these farms compulsorily. However, the Government did not have money for land acquisition in peripheral Nairobi as was expected in the policy circles during the early 1970s. As a result, land that could be acquired on the Nairobi-Thika Corridor (Especially in the immediate periphery of the city) was rapidly purchased by co-operative societies. These subdivided their land holdings and allocated plots to members. Ngunyumu, Korogocho, Kasarani, Githurai, Zimmerman and Dandora are some of the new informal-sector residential areas that sprang up as a result of this development. Since there was a mixture of medium income and low income owners in these societies, there sprang a variety of residences and unplanned commercial activities of varying types. Consequently, most of these areas have serious infrastructural and design constraints and most of them have either developed or are fast developing into slums. Land acquisition was expected to be easier in this direction because land was owned by large scale former ranchers and sisal farmers but now this condition has been overtaken by events such that most of this land is now owned by

numerous small scale low income developers who are members of various co-operative societies that acquired the large farms². Even areas like Kasarani and Ruaraka that were zoned for industrial development have been subdivided into small plots by the co-operative societies who have sold them out to small scale low income developers for residential housing.

There are very few industries located in areas not zoned for industrial development. These are agro-based industries, for example, Kamiti Tanneries which was located here to be farther away from other industries due to the obnoxious smells that it produces. There is also Premier Bag and Cordage at Juja which is an old industry started here in 1934 because of the nearby sisal plantations which provided it with raw materials. Another factory that has come up at Juja recently (1991) is a fruit juice factory which is also agro-based. All industries in Ruiru and Ruaraka are within areas zone for industrial development. Other land uses on this Corridor include coffee farms between Ruiru and Juja, Ranches and some vacant land awaiting development.

Along Nairobi-Athi River Corridor, the land is flat and thus it is of no major handicap to development. Land on both sides of Mombasa road was owned by Ranchers. These ranchers are still there in some places while in other places land has been subdivided and converted to industrial use. However, all the land is in private hands except a few areas like Villa Franca and Airport area where the land is owned by the Government. Land uses on this corridor have been affected by the same factors that have

affected land use on the Nairobi-Thika Corridor. Land on this corridor has been put to various use as the land nearest the City centre has been used for residential housing, farther on, industrial development has taken place in the Embakasi area, Firestone area, around Internal Container Depot and around Villa Franca. These industries are being overspilled from the Central Industrial Area which has no more room for expansion and is heavily congested. The area around the airport has not been developed into industries because the land is meant for airport related activities. As a result, industries have moved farther on to the border of Nairobi and Athi River. From here all the way to Athi River, the land was formerly owned by a co-operative society. After the 1988 Presidential directive that all land buying companies and co-operative societies subdivide their land to the shareholders, this land was subdivided into 5 acre plots. These plots attract industrial developers because they are too big for small scale residential developers. Some land on this corridor is still being used for ranching.

Industrial development on this corridor has been accelerated by the fact that the area is zoned for industrial use, it is near the Central Industrial Area and there is little competition with other land uses. The only hinderance to farther expansion of industries in Embakasi area is the Airport and the industries have moved farther on the Nairobi/Athi River boundary. Therefore all industries on this corridor are in areas zoned for industries except for those on the Athi River side where land was formerly

agricultural land. Though change of user has been accepted by the Mavoko/Athi River County Council, the land is still rated as agricultural land. Residential development on this corridor and especially in areas not zoned for industrial development has been hindered by lack of public transport and the subdivision practices which have tended to discourage low income early from buying land here for residential development.

Summary of land development on the two Corridors

Thika-Nairobi Corridor	Athi River-Nairobi Corridor
Large farms	Large scale Ranches
Co-operative Societies	Co-operative Societies & Government
Small scale informal sector commercial and Residential housing	Industrial plots & Airport Related activities

(c) Access to Water

Along Thika-Nairobi Corridor, the issue of water is an important one. It is important because whether an industrial site has water or not reflects the initial costs. In Ruaraka, water is not a big problem. The only problem is the cost involved in

piping the water from Outer Ring Road or from Thika Road to the site. This has come about because the City Commission has been very slow in providing the water necessitating the entrepreneurs to provide water for themselves on "Harambee" basis. In fact, all the early entrepreneurs in the area sank their own boreholes because it would have been very expensive for them to get water from Outer Ring Road when they were so few. It is only in the late 70s that people decided to provide themselves with water on "Harambee" basis.

In Ruiru and Juja, most entrepreneurs have sank their own boreholes and especially those that consume plenty of water. This is because the local authority water is not reliable and in the long run, it is more expensive than the borehole water.

Along Athi River-Nairobi Corridor, water is not as big a problem as on Thika-Nairobi Corridor. All industries along this corridor have City Commission water which they either found at the site (for those who bought serviced plots) or they did not have to pipe it from far. For the industries that have come up on the right side of Mombasa Road as one goes to Mombasa, they get their water from Inland Container Depot which is not far from the sites. The only entrepreneurs who have had to get piped water from far are those in Athi River because they get it from Inland Container Depot. One industry of those in Athi River gets its water from a neighbour who owns a borehole.

So far the Mavoko/Athi River County Council has not made

efforts towards providing water in the Athi River area, because they are waiting for the Government to provide water to its Export Processing Zone at Athi River from Nairobi. They are also waiting for the Mount. Kilimanjaro supply. They will then connect all the industries on Mombasa road to this water.

The issue of a river being near for the purposes of depositing effluents is not an important one as long as the industry is connected to a sewer. Use of sewers is being encouraged even in the policy circles in order to avoid pollution of rivers.

From the above analysis, it seems that Athi River Corridor is better serviced with piped water than the Thika-Nairobi Corridor.

(d) Sewers

Along Thika-Nairobi Corridor, the only industrial area that is connected to the sewer is Ruaraka. The entrepreneurs in Ruaraka had to connect their pipes to the main sewerage system that had been connected to Kenya Breweries. Others still have septic tanks which require frequent emptying, at a fee, by the City Commission. Other areas like Kahawa, Kassarani, Ruiru and Juja have septic tanks.

Along Athi River-Nairobi Corridor, it is only areas that are off-Enterprise Road that are connected to the sewer lines. More than 50% of the operating industries that were interviewed are found here. Therefore one can conclude that of all the industries that were interviewed about half of them are connected to the sewer. Other industries on the corridor have septic tanks.

However, except for those industries that are in Athi River, the rest are not far from the sewer lines and could easily be connected. In this respect, Athi River-Nairobi Corridor seems to have benefitted more from the sewers than the Thika-Nairobi Corridor.

(e) Level of Land

The level of land cannot be said to be a basis for comparison between the two corridors because the two fall under the same topographical region of the Athi Kapiti Plains with very little variations in topography. Moreover, all the industrial entrepreneurs interviewed did not seem to think that configuration of the land was an important factor.

(f) Power: Electricity is the main source of power today and is much more mobile geographically than water power and steam power since it can be transported from one place to another at little costs. Hence costs of electricity per unit do not vary over large areas. Hence it has no influence on industrial location decisions and especially in one region like the Nairobi region.

CAPITAL, FINANCE AND EQUIPMENT

This is needed before land or any other inputs can be acquired. From the research, it been found out that all industrial entrepreneurs are financed by the local banks or financial institutions. They do not however control the location decisions. They expect the entrepreneur to have done the research for himself

and found out the best location for his industry. Their major concern is that the entrepreneur is able to service his loan without failing. The amount of profit that an entrepreneur makes is not a priority concern for the financiers provided the loan is repaid within the stipulated period. All entrepreneurs interviewed have their financiers in Nairobi because it is convenient for both parties (the financier and the entrepreneur) to be near one another.

The interest rates for the loans were the same as at the time of the field survey for all banks and for all financial institutions because they were under the control of Central Bank of Kenya. Hence an entrepreneur will go to the nearest and most convenient bank or financial institution that can give him a loan. However, with the recent decontrol of interest rates by Central Bank of Kenya, one will expect entrepreneurs to approach the bank or financial institution that will offer the best terms.

The cost of construction of a factory may vary from place to place, and this can have an important bearing on the locational choice of a firm where construction costs form a significant element in total cost or in the initial investment. However, from the field survey carried out, there is no variation in the cost of construction between Nairobi-Thika Corridor and Athi-River-Nairobi corridor. The two corridors are within the Nairobi region and entrepreneurs say that it would not make a difference whichever area one is constructing. Moreover, the type of soils found in these areas are the same "black cotton soils".

The other major item of fixed capital is the Machinery and equipment placed in the factory in order to assist transformation process. In the case of the industries interviewed on the two corridors, it was observed that the machinery and equipment is imported by more than 50% of the factories. These machines either come by sea to Mombasa and then by rail or road to the factory or by air. In such cases, the Nairobi-Athi River Corridor is more accessible and nearer than the Thika-Nairobi corridor.

Even when the machinery and equipment have to come by air, Jomo Kenyatta International Airport and Wilson Airport are still nearer Nairobi-Athi River Corridor than Thika-Nairobi Corridor. Again one does not have to go through the City Centre which can be quite cumbersome especially during the rush hours due to traffic jams.

The transport cost may not vary between the two corridors except for extreme distances like Ruiru and Juja. Most areas under discussion are considered to be in Nairobi. It has also been observed that of those industries that obtain their spare parts locally, more than 50% get them from central industrial area. This gives the industries along Nairobi-Athi River Corridor the advantage of being nearer the central Industrial Area than those on Thika-Nairobi corridor.

RAW MATERIALS

All manufacturing activities require raw materials since the essence of an industrial process is the conversion of something into a good which has greater value. From the field survey, it has

been observed that the raw materials affect locational choice only if there are significant variations in the prices from various sources or the entrepreneur has to meet transport costs from various sources. Hence, he will choose that source that gives him materials at least costs or where the transport costs are lowest.

From the field survey, it was observed that industries get their raw materials from various sources. These include: at the site; imported; within Nairobi; in the same industrial area and from the rest of Kenya. This is shown on the table below.

Table 5.8 Raw Materials

sources	Industries on each corridor			
	Thika-Nairobi Corridor		Athi River-Nairobi Corridor	
	No.	%	No.	%
1. Nairobi's Industrial area & Town	29	69	18	45
2. At site or the same area	2	4.7	5	12.5
3. Imported	21	50	22	55
4. Rest of Kenya	15	36	20	50

Source: Field survey 1991.

The sources of raw materials are statistically tested using chi-square to see whether there is a significant difference between the two corridors as far as sources of raw materials are

concerned. The sources on table 5.8 are numbered 1 to 4.

Table 5.9 Observed and Expected frequencies for raw materials

Source	Nairobi-Thika Corridor	Athi River	Nairobi Corridor	Total
1	29 (23.9)	18 (23.1)		47
2	2 (3.6)	5 (3.4)		7
3	21 (21.8)	22 (21.2)		43
4	15 (17.8)	20 (17.2)		35
<hr/>				
Total	67	65		132
<hr/>				

The expected frequencies are in brackets.

Step 1: formulation of hypotheses

H_0 : There is no significant difference between the two corridors as regards various sources of raw materials.

H_A : There is a significant difference between the two corridors as regards sources of raw materials.

Step 2: An α -level of 5% was chosen.

Since one source of raw materials has an expected frequency of less than 5, (No.2), it is combined with No. 3.

The degrees of freedom become $(3-1) (2-1)=2$

Table 5.10 Contingency table

Source	Observed (O _i)	Expected (E _i)	(O _i - E _i)	(O _i - E _i) ²	$\frac{(O_i - E_i)^2}{E_i}$
1	29	23.9	5.1	26.01	1.09
	18	23.1	-5.1	26.01	1.13
2	23	25.4	-2.4	5.76	0.23
	27	24.6	2.4	5.76	0.23
3	15	17.8	-2.8	7.84	0.44
	20	17.2	2.8	7.84	0.46
Total	132	132			3.58

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = 3.58$$

$$\chi^2_{\alpha} (2) = 5.991$$

Since χ^2 is less than χ^2_{α} we accept the H_0 that there is no significant difference between Thika-Nairobi Corridor and Athi River-Nairobi Corridor as far as the sources of raw materials are concerned. This means that if the sources of raw materials was the only factor that an entrepreneur had to consider, then he may locate his industry on any corridor because none is better than the other.

From table 5.8, it can be seen that both corridors rely a lot on imported raw materials while Thika-Corridor relies most on raw materials from Nairobi's Industrial Area and Town, Athi River-Nairobi Corridor relies more on the rest of Kenya. Thus the Thika-Nairobi Corridor can be said to be more raw material oriented than industries on the Athi River-Nairobi Corridor though this may not be to a statistically significant degree. Industries on Athi River-Nairobi Corridor are more diverse as far as raw

materials are concerned. They do not rely a lot on central Industrial Area for raw materials and so their being near the central Industrial Area is not significant.

MARKET AND PRICE

Market:

The importance of access to the market as a factor affecting industrial location has been recognized for a long time. In many industries the significance of the market is growing in relation to such considerations as the cost of labour and materials.

The market is not the only attraction of a metropolitan location, but the large, concentrated and relatively affluent body of final consumers found in the city, together with its large industrial market, is certainly one of the main reasons for relatively rapid industrial growth in and around major urban areas. Nairobi region is a rapidly growing industrial area with all the aforesaid advantages. In fact, it is a major market for industrial products, and even when it does not consume the products, it acts as a distributing centre to other areas in Kenya.

The major markets for industrial products from the two corridors include Nairobi area, the rest of Kenya, P.T.A. countries and the rest of the world. Table 5.11 shows the distribution of the major markets.

Table 5.11: Major Markets for Products

Market	Industries on each Corridor			
	Thika Corridor		Athi River Corridor	
	No.	%	No.	%
1. Within the same area and Nairobi	8	19	14	35
2. Whole of Kenya and Export	24	57.1	5	12.5
3. All over Kenya only	7	16.7	19	47.5
4. Export only	3	7	2	5

Source: Field survey 1991

The markets for the products are statistically tested using chi-square to find out whether there is a significant difference between the two corridors as far as distribution of major markets is concerned.

Step 1: Formulation of hypotheses

H_0 : There is no significant difference between Nairobi-Thika Corridor and Athi River-Nairobi Corridor with respect to the

distribution of the major markets for the products.

H_0 : there is a significant difference between Nairobi-Thika Corridor and Athi River-Nairobi corridor with respect to the distribution of the major markets for the products.

Step 2: An α -level of 0.05 was set.

Table 5.12 Observed and Expected Frequencies for Markets

Market	Thika Corridor	Athi River Corridor	Total
1	8 (11.3)	14 (10.7)	22
2	24 (14.9)	5 (14.1)	29
3	7 (13.3)	19 (12.7)	26
4	3 (2.6)	2 (2.4)	5
<hr/>			
Total	42	40	82
<hr/>			

The markets on table 5.11 have been numbered 1 to 4 in the above table. The expected frequencies are in brackets.

Since market 4 has expected frequencies of less than 5, it is combined with three so that the degrees of freedom become $(3-1)(2-1) = 2$.

Table 3.13 The Contingency Table

Market	Observed (O_i)	Expected (E_i)	$(O_i - E_i)$	$(O_i - E_i)^2$	$\frac{(O_i - E_i)^2}{E_i}$
1	8	11.3	-3.3	10.89	0.96
	14	10.7	3.3	10.89	1.02
2	24	14.9	9.1	82.81	5.56
	5	14.1	-9.1	82.81	5.87
3	10	15.9	-5.9	34.81	2.19
	21	15.1	5.9	34.81	2.31
Total	82	82			17.91

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = 17.91$$

$$\chi^2_{\alpha} (2) = 5.991$$

Large values of χ^2 indicate poor agreement between observed and expected.

Since χ^2 is greater than χ^2_{α} , we reject H_0 because χ^2 is in the critical region and accept H_A that there is a significant difference in market distribution between Nairobi-Thika Corridor and Nairobi-Athi River Corridor. Industries on the Athi-River Corridor seem to be more market oriented than those on the Thika-Nairobi Corridor. This is because a big percentage (35%) of the products are sold in the same area and in Nairobi as compared to 19% on the Thika Corridor. Moreover, a high percentage of the products (47.5%) are sold in the Kenyan market only as compared to 19% on the Thika Corridor.

Industries on the Thika-Nairobi Corridor cannot be said to be market-oriented because 57.1% of their products are not only sold in the whole of Kenya but they are also exported. From the field survey, it was observed that most industries on the Nairobi-Thika

corridor sell their products to the whole of Mount Kenya region, Central Kenya and they go as far as Eastern and North-Eastern Kenya. All these areas are accessible by road even without having to go through the city centre. Therefore their being near Nairobi City or Industrial Area is not as important as for those industries on the Athi River-Nairobi Corridor.

Although only 5% of the industries on the Athi River-Nairobi Corridor are export oriented, this percentage is expected to increase faster than on the Thika-Nairobi Corridor because of the introduction of Export Processing Zones at Firestone and in Athi River. This means that even the customs bonded factories will find it better, for agglomeration reasons to be on this corridor.

(b) Prices

Finished products have to be transported to the consumer, and in many industries, the outgoing freight bill can be a substantial addition to the cost incurred in acquiring inputs and conducting the process of manufacture. In Kenya however, the issue of prices is not a major one as far as location is concerned because the manufacturers in most cases are not the distributors. Hence the distributors will determine the prices of goods going by the recommendations of the manufacturers or depending on how much profit they want to make while maintaining the customers.

The distributors in most cases transfer the transport costs to the consumers by differentiating their products according to distance. The differentiation usually involves small amounts of money, usually less than Kshs 1 for daily consumer products.

70% of the entrepreneurs interviewed have adopted a free-on-board pricing system whereby the price is established at the plant and the customer pays the transfer cost. Thus, the farther away from the point of production a customer is the higher the delivered price. A free-on-board pricing system will generally have the effect of limiting the market area of the product, as the price will be higher for distant customers.

About 30% of the industries that were studied have adopted a

uniform delivered price in the whole of Kenya i.e. Cost, Insurance, freight (c.i.f.) system. This means that the producer pays the costs involved in getting the product to the market or the consumer and spreads this over all customers irrespective of their location because it means that proximity to sources of certain materials and the components may be of no advantage. The adoption of the uniform prices is also important to the sales side of the firm, because it enables prices to be kept down in distant markets where volume of sales would be low or non-existent if customers had to pay the whole of the freight cost. The c.i.f. pricing system enables the producer to pass on part of the real cost of supplying distant consumers to those closer to the factory.

All entrepreneurs interviewed with this kind of pricing system are not market oriented. Their markets are all over Kenya.

LABOUR

The distinctive labour requirements of particular industries make some places more suitable than others. In Kenya, there is very little variation in the cost of labour as this is determined by labour organisations in the country. Moreover, labour is not a problem in Kenya whether skilled or unskilled. The only problem is lack of specialized labour tailored for specific factories. Hence the entrepreneurs are forced to train their employees so as to get specific skills. In the area studied, wage rates are the same since almost all the areas studied are within Nairobi. The only difference is in the rural towns like Ruiru, Juja and Athi River where the wages are 2% lower than in Nairobi.

For entrepreneurs who require large work-force that has to work in shifts, being in Ruiru or Athi River becomes an advantage because it is easier to get houses for the workers in such towns at reasonable rents and closer to the factory than in Nairobi. For example, the textile industry at Ruiru has all the semi-skilled and unskilled labourers residing close to the factory such that they can easily get to the factory to work for any shift even

night shift.

TRANSPORTATION AND FREIGHT

Transportation is often considered to be the most important determinant of plant location. This is much less true than it has been historically but nevertheless, it is still a major factor in the location of some industries. The various aspects of transport that were taken into consideration by this study included the mode of transport, the number of roads, the railway and accessibility.

Along the Thika-Nairobi Corridor, industries are served by the Nairobi-Thika highway which is a dual-carriage, Outering Road, Baba-Dogo Road (Ruaraka), Kamiti Road, Kassaranj Road and Kiambu Road (Ruiru).

Some roads are Government owned like the Nairobi-Thika highway while others are built and maintained by local authorities and entrepreneurs for example Kamiti Road and Outering Road are maintained by the City Commission. Baba Dogo Road and small surram roads leading to various industries are built by the entrepreneurs.

The Thika-Nairobi Corridor is also serviced by a railway line but this is only used in Ruiru and Juja. Ruaraka has no access to a railway line. Other means of transport used on this corridor are air which is used for urgent and perishable goods, the sea which is used for bulky commodities and those that are not urgent. The railway is normally used to transport goods to distant places and especially neighbouring countries. The rail is slow and inefficient at times. Thus, most entrepreneurs will use road transport to take their goods to distant places like neighbouring countries.

Along Nairobi-Athi River Corridor, industries are served by the Nairobi/Mombasa highway, Enterprise Road and other small roads leading to the sites. The Enterprise road is normally characterised by traffic jams during the rush hours since the road joins the Central Industrial Area to Embakasi. As a result, Mombasa Road serves as an alternative route. The corridor is also

served by a railway line, railway sidings and the Internal Container Depot where imports and exports are cleared by customs department. The corridor also has direct access to the Jomo Kenyatta International Airport, Wilson Airport and Mombasa.

Table 5.14 Transport Mode for Raw Materials

Mode	Industries Using it			
	Thika-Nairobi Corridor		Athi River-Nairobi Corridor	
	No.	%	No.	%
1. Road	40	95	40	100%
2. Air	9	21	6	15
3. Rail	13	31	6	15
4. Sea	8	19	11	27.5

Source: field survey 1991

To test statistically whether there is a significant difference between the two corridors in the modes of transport used, Chi-square was used.

Step 1: formulation of hypotheses

H_0 : There is no significant difference in the mode of transport used between the two Corridors for raw materials.

H_A : There is a significant difference in the mode of transport used for raw materials between the two corridors.

Step 2: An α -level of 0.05 was used.

Table 5.15: Observed and Expected frequencies for Modes of Transport for Raw Materials

Mode	Thika-Nairobi Corridor	Athi River Corridor	Total
1. Road	40 (42.10)	40 (37.90)	80
2. Air	9 (7.90)	6 (7.10)	15
3. Rail	13 (10)	6 (9)	19
4. Sea	8 (10)	11 (9)	19
Total	70	63	133

The expected frequencies are in brackets.

Table 5.16: Contingency table

Mode	Observed (O_i)	Expected (E_i)	($O_i - E_i$)	($O_i - E_i$) ²	($O_i - E_i$) ² ----- E_i
Road	40	42.10	-2.1	4.41	0.10
	40	37.90	2.1	4.41	0.12
Air	9	7.90	1.1	1.21	0.15
	6	7.10	-1.1	1.21	0.17
Rail	13	10	3	9	0.9
	6	9	-3	9	1
Sea	8	10	-2	4	0.4
	11	9	2	4	0.44
Total	133	133			3.28

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = 3.28$$

$$\chi^2_{\alpha} (3) = 7.815.$$

Since χ^2 is smaller than χ^2_{α} at 0.05 alpha level, we accept the H_0 that there is no significant difference between the two corridors in respect to the mode of transport used for raw

materials.

On both corridors road transport is the most widely used. This means that although Nairobi-Athi River Corridor is served with railway sidings, unlike most areas on Nairobi-Thika Corridor, it does not seem to be better used by the entrepreneurs. The main reason given by entrepreneurs for not using the railway line is because it is slow and inefficient. Moreover, there is a lot of bureaucracy to be followed before goods are finally put on the wagons. Again, once the goods are on the train one has no control over their speed of moving. Therefore there is need for the City Commission to improve the roads in industrial areas to enhance industrial development as lack of roads has been seen to be a hinderance in some areas like Ruaraka where entrepreneurs incurred a lot of expenses in constructing and maintaining Baba-Dogo Road.

The sea and the railway lines are slow modes of transport but the cheapest. They are used for transporting bulky raw materials and those that are not urgently needed. Air transport is used for perishable and urgent raw materials like medicines.

Table 5.17 Transport Modes for Products

Mode	Industries Using it			
	Thika Nairobi Corridor		Athi River-Nairobi Corridor	
	No	%	No	%
1. Road	40	95	40	100
2. Air	5	12	2	5
3. Rail	7	16.6	4	10
4. Sea	2	4.8	3	7.5

Source: Field Survey 1991

To test whether there is a significant difference between the two corridors as regards modes of transport used χ^2 is used.

Step 1: formulation of hypotheses

H_0 : There is no significant difference between the two corridors as regards transport modes for the products.

H_a : There is a significant difference between the two corridors as regards transport modes for the products.

Step 2: An α -level of 0.05 was chosen.

Table 5.18 Observed and Expected Frequencies for Modes of transport for Products

Mode	Thika Corridor	Athi River Corridor	Total
1. Road	40 (41.94)	40 (38.06)	80
2. Air	5 (3.67)	2 (3.33)	7
3. Rail	7 (5.77)	4 (5.23)	11
4. Sea	2 (2.62)	3 (2.38)	5
Total	54	49	103

The expected frequencies are in brackets. Since the expected frequencies of Mode 2 and 4 are less than 5, they will be combined with mode 1 and 3 respectively so that we have a 2 by 2 matrix with one degree of freedom. See the table below.

Table 5.19 Frequency for modes of Transport for products

Modes	Thika Corridor	Athi River Corridor	Total
	45 (45.61)	42 (41.39)	87
	9 (8.39)	7 (7.6)	16
Total	54	49	103

Table 5.20 Contingency table for modes of transport for products

Modes	Observed	Expected	$(O_i - E_i)$	$(O_i - E_i)^2$	$\frac{(O_i - E_i)^2}{E_i}$
1	45	45.61	-0.61	0.3721	0.0008
	42	41.39	0.61	0.3721	0.0009
2	9	8.39	0.61	0.3721	0.0443
	7	7.61	0.61	0.3721	0.0489
Total	103	103			0.095

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} = 0.095$$

$$\chi^2_{\alpha} (1) = 3.841$$

Since χ^2_{α} is larger than χ^2 meaning that χ^2 is not in the critical region, we accept the H_0 that there is no significant difference in the mode of transport used to transport products on

the two corridors. Therefore, the fact that Athi River corridor seems to have more railway networks than the Thika corridor is not statistically significant. Athi-River corridor is nearer the Jomo Kenyatta International Airport and Wilson airport than the Thika Corridor and would be expected to make use of the airports more than the Thika Corridor but this is not the case as it has been proved that there is no significant difference between the two corridors in the modes of transport used.

Road transport is the most widely used even for transporting products to long distances like to Mombasa and to neighbouring countries.

As far as accessibility to places of work is concerned and especially from the city centre, Thika-Nairobi Corridor seems to be better located than the Athi River-Nairobi Corridor. This is because workers are always moving against the traffic flow on the Thika Corridor while roads leading to most industrial areas on the Athi River-Nairobi corridor are characterised by traffic jams during rush hours.

Where transport costs are directly related to distance Athi River-Nairobi Corridor is more advantaged for imports coming via Mombasa or the Airport or for exports going via Mombasa and via the airport because it is nearer than the Thika-Nairobi Corridor.

Public Transport for Employees

In Juja and Ruiru on the Thika Corridor, employees reside within the towns and so they do not incur the daily transport costs to places of work. In Ruaraka, public vehicles drop workers at the junction of Outer ring road and Baba Dogo Road and they have to walk the rest of the distance. The few residential houses that have been put up at the end of Baba Dogo Road by individuals for renting are not enough for all employees who work in Ruaraka and Kassarani. There are no public vehicles going inside Kassarani area, and so workers have to walk to Thika Road. In Kahawa, housing is not a problem as there are residential houses for renting nearby. Thus, workers stay within reasonable distance to

the factories and do not need "Matatus".

Along the Athi River-Nairobi Corridor, public transport is a big problem for industries that are very far from Enterprise Road. They rely on "Matatus" that go to Athi River and pay as much as if they were going to Athi River i.e. Kshs 15. To reduce the problems of workers most employers provide transport for their employees and this becomes an extra cost to them. Those workers working along Enterprise Road have no transport problems because there are "Matatus" that ply the route all the time. Public transport is vital on the Nairobi-Athi River Corridor as there are no residential houses of reasonable rent within walking distance for the workers. The rent for residential houses that are within walking distance (South 'C') is too high for the workers i.e. Kshs 7000 per month.

HOUSING FOR WORKERS

In Nairobi, housing for workers is a big problem because majority of the employers have just enough land for their factories. Again this can be attributed to high costs of land in Nairobi and thus the entrepreneurs restrict themselves to buying only the land they require for the factories. As shown on table 5.21 below, a few entrepreneurs house the employees that they must house like the security personnel, expatriates and one factory on Athi River Corridor houses its senior employees.

Table 5.21: Housing for employees

Type of Housing	People Housed	Thika Corridor	Athi Corridor	River
1. Industrial Houses	Security Personnel	14%		7.5%
2. Industrial Rented houses	Top Management	48%		0
3. Renting their own houses	The Rest	The Rest		The Rest

It should be noted from the above table that although 48% of industries on the Thika Corridor rent houses for their top management staff, it is not all the management staff. Normally, they rent the houses for the expatriates.

Along Athi River-Nairobi Corridor, it should be noted that there are some management staff who are housed within industrial premises. Of the 40 industries visited there is only one that has built houses for its employees. This is because it has a large area of 250 hectares and the nature of the work necessitates employees to reside within industrial premises. Thus, the 7.5% of the industrial housing security personnel includes the one industry housing its employees including management staff.

PUBLIC POLICY

Included here are taxation and zoning regulations. Many capitalist nations today engage in some form of regional planning, through which industrial development is encouraged in some places and discouraged in others by a system of financial incentives. The positive inducements offered to industry to set up plants in certain areas can often swing the balance of advantage in favour of a location that would not otherwise have been chosen on profit seeking grounds.

The Kenya Government's policy as far as taxation is concerned is one that encourages decentralisation of industries from Nairobi and Mombasa. There is a reduction on custom's duty for all imported machinery for all industries outside Nairobi. For example the reduction on custom's duty in Ruiru, Athi-River and Juja is by 50% for all imported machinery. There is also some investment allowance for the same areas. The reduction on custom's duty increases as one moves farther away from Nairobi. This, together with the Presidential directive of 1988 that all land buying companies subdivided their land to the shareholders and wide up has encouraged the development of industries along Mombasa Road in Athi River. The land here was formally owned by a land buying Company which subdivided it and sold it out to private individuals.

In Ruiru and Juja, development of industries has been encouraged by tax incentives, low land values and proximity to Nairobi.

In Ruaraka, Kasarani, Embakasi, Villa Franca, Kahawa and even Ruiru, zoning has been a major policy encouraging industrial development. These areas were zoned by the Nairobi City Commission as industrial areas and hence development of industrial premises is quickly approved by the City Commission. Whenever possible, the City Commission also develops the necessary infrastructure in these areas. This has facilitated faster development of industries in these areas.

Table 5.22 Summary of Policies Encouraging Industrial Development

<u>Policies</u>	<u>Industrial areas affected</u>
1. Zoning Regulations	-All industrial areas within the city boundaries. Ruiru
2. Reduced Rates	-All industries outside Nairobi City boundaries
3. Investment allowance	-All industries outside Nairobi city boundaries
4. Reduced Custom's duty on Imported machinery	-All industries outside Nairobi city boundaries

AGGLOMERATION, LINKAGE AND EXTERNAL ECONOMIES

The main advantage of agglomeration relates to the existence of a well developed infrastructure. Included here are roads,

rail-road lines and termini, airports, utilities, commercial facilities etc. 40% of the Industries interviewed along the Nairobi-Athi River Corridor consider agglomeration to be a major factor of location while about 38.1% of the industries interviewed along Nairobi-Thika Corridor consider agglomeration to be a main factor of location.

The Nairobi Athi River Corridor has a more established infrastructure than the Thika-Nairobi Corridor because even the services that are not found on each specific industrial site are not far from the site and one can easily connect his factory to these services for example sewers, water and electricity. In actual factor, it is only three of the 40 industries interviewed that are far from such services like water and sewers. These are on the Athi River side of Mombasa Road.

Along the Nairobi-Thika Corridor, some services like sewers are up to Ruaraka only. All the areas beyond Ruaraka towards Thika are not connected to the sewer and have to rely on septic tanks which need to be emptied regularly.

When the issue of services given to industries is considered, Athi River-Nairobi Corridor is better off than the Thika Corridor. The services considered here include clearing and forwarding, hiring of Trucks and containers, Banks, Hardware shops etc. All these services are found on the Athi River Corridor while it is only a trucks hiring company, hardware shop and banks that are found along Thika-Nairobi Corridor.

Athi River-Nairobi Corridor industries have the advantage of

transfer economies because of their closeness to Internal
Container Depot, Central Industrial Area, hence savings are
realised on transport costs.

PROBLEMS FACED BY ENTREPRENEURS IN THEIR PRESENT LOCATIONS AND POSSIBLE SOLUTIONS

Parake: The problems faced by entrepreneurs in Ruaraka include:

- a) Maintaining the roads for themselves
- b) lack of facilities such as post office, fire-
brigade and banks.
- c) Frequent power failures and telephone break-downs.
- d) Having to get water from outer Ring Road on Harambee
basis.
- e) Long delays in being connected to the sewer lines
which have resulted in entrepreneurs doing it at
their own costs.
- g) Lack of eating places.
- h) Having to sink boreholes because of long delays by
City Commission in piping water to the sites.

Most of the above problems are caused by inefficiency of the
City Commission. The reason given by the City Commission
authorities for not providing industrial entrepreneurs with the

necessary facilities has been lack of finance. With the introduction of service charge whereby even the entrepreneurs pay a lot of money per month, the City Commission should provide the entrepreneurs with the necessary services such as well maintained roads, water, sewers. It should also licence capable people to put up proper kiosks and canteens to serve the workers with food. This would be an improvement to the present unhygienic system whereby workers are sold food on dusty road-sides by women.

The Kenya Power and Lighting Company and the Kenya Posts and Telecommunications Company should boost their services in areas where entrepreneurs have aired a lot of complaints.

Ruiru

- a) Lack of enough water is the biggest problem that is faced by industrial entrepreneurs at Ruiru. Hence most entrepreneurs have stopped relying on local authority water and have sunk their own boreholes.
- b) Lack of sewers and the local authorities are slow in emptying the septic tanks.
- c) Frequent Power failures twice a week. It should be noted that Juja Industrial entrepreneurs face the same problems as those of Ruiru.

In order to alleviate some of the problems the local authority should set aside some of the money obtained as service charge and rates from the industrial entrepreneurs to sink boreholes and then provide the entrepreneurs with water. This way, they would boost industrial development in the area and

especially the small scale entrepreneurs who are not able to sink their own boreholes. The local authority should also build a sewage system to replace the septic tanks.

Athi River-Nairobi Corridor

The problems faced by entrepreneurs here are similar to those faced on the Thika-Corridor but the levels are different and some problems are also different. The problems include:

- a) Lack of tight security resulting in frequent thefts from the factories.
- b) Traffic jams on Enterprise Road.
- c) Lack of eating places.
- d) Very high transport costs for employees for industrial areas far from Enterprise road along the Mombasa road i.e. Kshs 15/=
- e) Poorly maintained Roads
- f) Lack of such facilities as the fire brigade, banks, post office
- g) No garbage dumping ground - they have to take it all the way to Dandora.
- h) There are thick bushes in the surrounding areas and this promotes thuggery.
- i) Industries on the Nairobi/Athi River border get their water from Internal Container Depot which is very expensive.

Most of the above problems have been caused by inefficiency in the local authority offices and sometimes lack of finance.

With the introduction of service charge the local authorities should maintain the roads properly, provide entrepreneurs with water, services of fire brigade, police station and clear the surrounding bushes.

The City Commission should also consider setting land aside for dumping garbage on this side of Nairobi. This will serve the entrepreneurs on this side so that they stop throwing the garbage all over the area with the excuse that Dandora is too far.

Summary of the Chapter

The summary of the analysis is brief because the findings are summarised in the next chapter.

It was found out from the field survey that the number of industries will grow faster on the Athi River-Nairobi Corridor than on the Thika-Nairobi Corridor because land has not been subdivided into small portions along the Athi-River Corridor as on the Thika Corridor. This has in turn discouraged residential development by small scale low income developers. Thus the demand for industrial land here is higher partly because the competition with other land uses is not there and also due to its nearness to the Central Industrial Area. As a result, the cost of industrial land here is higher than on the Thika Corridor.

As far as land tenure and plot sizes is concerned, there is no significant difference between Thika Corridor and Athi River Corridor. Though there is no variation in plot sizes between the two corridors there is a lot of variation within the same area.

such that on each corridor there are very big industrial plots and very small ones of one acre or even half an acre.

The costs of land can be said to decrease as one moves farther away from the city centre and from the Central Industrial area.

The annual rates payable also decrease as one moves farther away from the city boundaries. In areas within the City boundaries the rates for industrial plots are 10% of unimproved site value while the rates for industrial plots outside the city boundaries are 4.5% of unimproved site value.

The congestion at the Central Industrial Area has caused Industries to move farther on towards Athi River. The Government's policy of introducing Export Processing Zones on this corridor means that it will encourage provision of services in the area. This will certainly attract industrial investors on the corridors.

Though industries are growing in number on the Thika-Nairobi Corridor and land has been zoned for industrial development, the demand for other land uses seems to be more. Hence residential housing is on the increase within this corridor.

Some land at Kasarani was used for constructing Moi International Sports Complex. More land in Kasarani which was zoned for industrial development has been subdivided by land buying companies into small residential plots and sold out to individuals. Therefore, the greatest demand for land at a specific area should not be ignored when zoning areas. Thus, it

is important for all the area on the Athi River-Nairobi Corridor to be zoned for industrial development all the way to Athi River because it seems to be the greatest demand. This should be backed by the relevant local authorities by providing the required services for industrial development since the Government recognizes the important role played by industries in economic development.

As far as the market is concerned, it was observed that industries on the Athi River Corridor are more market oriented than those on the Thika Corridor. Costs of labour and pricing system have no effect on location decisions because they are the same on both corridors.

On both corridors, road transport is the most widely used because it is faster and more efficient. The Athi River Corridor, however, has more railway networks than the Thika Corridor. It is also nearer the Airports, Mombasa Seaport, Internal Container Depot than the Thika Corridor.

Railway transport is used for long distances and mostly for bulky goods while the sea is used for imports and exports that are bulky, not perishable and not urgent.

It was also found out that on both corridors, few workers are housed. However majority of the workers have to rent their own houses.

Government Policy favours decentralisation of industries away from Nairobi. Thus there is reduction on import duty for industrial machinery for industries outside Nairobi. The rates

are also lower for the unimproved site value. There is also investment allowance for industries outside Nairobi. This has encouraged industrial development in such areas as Ruiru, Juja and Athi River.

REFERENCES

1. H.T. Hayslett & P. Murphy, Statistics Made Simple
2. G.K. King oriah, "The Nairobi-Thika axis as an overflow Corridor for Nairobi's metropolitan Development" in Report and Proceedings: Workshop on Housing, Nairobi, 1987, (Post Graduate Centre Human Settlement, University of Leuven, 1987), 391

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

This study was developed from a statement by the Nairobi Urban Study Group, 1973 for the alternative strategies for the growth of Nairobi which prioritized a linear form of growth linking Nairobi to Thika.¹ It was however observed that the growth of industries has deviated from the expected general trend of growth, and instead, there is concentrated development of industries between Nairobi and Athi River. The main reasons why industries are moving more towards the Nairobi - Athi River corridor than towards Nairobi-Thika corridor in relative terms were identified. To achieve this, various factors that affect the location of industries were considered and a comparison made of the two corridors.

Summary Of Findings

The findings are summarised from the analysis in Chapter 5. The factors considered were obtained from the Literature reviewed and from the field survey.

It was found out from the field survey that availability of land for industrial development is the first consideration for any industrial entrepreneur. This has become an issue because almost all vacant land along the two corridors is in private hands and therefore local authorities have little control over it. Land for industrial development is more easily available along Nairobi-Athi River corridor than along Thika-Nairobi

corridor because, except for the airport area, there is hardly any competition with other land uses and especially the area between Firestone factory and Athi River. This is because this land used to be ranches and although it is in private hands, it is still vacant unlike on the Thika-Nairobi corridor where land has been put to various uses like residential housing, commercial buildings, coffee and sisal plantations thus making it most difficult to acquire land for industrial development except in areas that have specifically been zoned for industrial development like Ruaraka, Kasarani, Kahawa and Ruiru.

Moreover, along Thika-Nairobi corridor land that belonged to co-operative societies was subdivided into small plots and sold to low and middle income earners for residential and commercial development. Thus, it becomes difficult for an investor to buy a big plot from the many small plot holders for industrial development.

The demand for industrial land is more on the Athi River-Nairobi corridor than on the Thika-Nairobi corridor. This is because Athi River corridor has a higher level of services like roads, electricity, water and sewerage system than the Thika corridor. As a result, industrial land values are higher on this corridor than on the Thika-Nairobi corridor.

The subdivision practice along Athi River-Nairobi corridor favours large industrial land development because the cooperative society that owned most of the land from Nairobi/Athi River boarder all the way to Athi River subdivided their land into 5

acre plots thus discouraging middle income and low income people from buying the land for residential development since they could not afford the five acres.

The land rates payable to local authorities are higher in Nairobi than in areas outside Nairobi like Ruiru, Juja and Athi River. In Nairobi, the rates are 10% of unimproved site value while in other towns on the corridors they are 4.5% of the unimproved site value. Hence the rates are an incentive to decentralise industries away from Nairobi. Since the introduction of service charge in 1989, entrepreneurs have been paying this on a monthly basis in addition to the rates.

It was found out from the analysis that industrial plots on the Thika-Nairobi corridor are bigger, on average, than those on the Athi River-Nairobi corridor.

The smallest plot size on the Thika corridor was found to be one acre, while there are many entrepreneurs on Athi River corridor with 1/2 acre and one acre plots.

Along Thika-Nairobi corridor there are residential houses in areas zoned for industrial development due to the great demand for houses on this corridor. However, no industries that are found outside the industrial zoned area except those that are agro-based like Lamiti Tanneries, Premier Bag and Cordage and the fruit juice factory of Juja. Moreover, these are old industries except for the fruit juice factory at Juja.

On the Athi River-Nairobi corridor, all the industries in Embakasi are in industrial zoned area and even those around

Internal Container Depot and Villa Franca. However industries between Athi River/Nairobi border and Athi -River are in agricultural areas but change of user has been approved for industrial development by the Mavoko town Council due to the great demand for industrial land on this corridor.

Most of the raw materials and spare parts for both corridors are either imported or obtained from the Central Industrial Area. This means that the Athi River -Nairobi corridor is more advantaged when these two factors are considered because it is nearer the source than the Nairobi-Thika corridor.

Four modes of transport are used by entrepreneurs to transport raw materials and products. These are road, railway, air and sea. However, the most widely used is the road because it is faster and convenient. It was found out that on the Nairobi-Thika corridor, most of the entrepreneurs have to maintain the roads for themselves. In fact, it is only industries that are situated next to Central Government roads like the Thika highway, Kiambu Road and Lamiti road that do not have to maintain the roads. On the Athi-River -Nairobi corridor, all roads are maintained by the Government or the local authorities except the roads leading to an entrepreneur's site from the main road.

Public policy has been seen to favour areas zoned for industrial development because approval for development or industries is easily obtained. The rural towns like Ruiru, Juja and Athi River have been favoured by the Government policy of

taxation and investment allowance. There is reduction on duty for imported machinery if one is establishing an industry outside Nairobi: for example in Athi River and Ruiru, the reduction is by 50%. An investment allowance is given for the same areas.

From the analysis, it was observed that employees who work far from Enterprise Road on Mombasa road pay high fares in relation to distance than those working on Nairobi -Thika corridor because they depend on Athi River "matatus" and so they pay as much as if they were going to Athi River i.e Kshs 10/=. On the Thika-Nairobi corridor the fares seem to be more related to distance and they increase with distance. In Ruaraka, fares are Kshs 5/=. Kahawa - Kshs 7/= and Ruiru Kshs 10/= from the city centre.

Agglomeration, linkage and external economies are factors that have facilitated the growth of industries along Athi River-Nairobi corridor because it has been like a continuation of the Central Industrial Area which has good and efficient infrastructure. Although industries along Thika-Nairobi corridor have agglomeration, linkage and external economies factors favouring them, the magnitude is less than on the Athi River-Nairobi corridor because the concentration (number of industries per unit distance) is less on this corridor than on the Athi-River-Nairobi corridor.

For the following factors of location, no corridor seems to be better than the other. These include level of land, source of capital, finance and equipment; source and cost of labour.

housing for workers, wages and pricing system.

As far as access to the city centre is concerned, Thika-Nairobi corridor has the advantage of being free from traffic jams and especially during the peak hours when workers normally move against the traffic flow. Enterprise road on the Athi River-Nairobi corridor is characterised by traffic jams during rush hours.

Conclusions

The study set out to examine the reasons why industries are moving more towards Athi River than towards Thika contrary to the recommendations of the Nairobi Urban Study Group of 1977. The study has revealed that industries are moving more towards Athi River-Nairobi corridor than towards Nairobi-Thika corridor. This has been indicated by the fact that there are more operational industries along Nairobi-Athi River corridor. Moreover, there are more industries under construction on this corridor than on the Thika-Nairobi corridor.

The main reasons given for industries moving more towards Nairobi-Athi River corridor than towards Nairobi-Thika corridor were: that land is difficult to acquire on Thika corridor because it is owned by numerous small scale low income developers who are members of various co-operative societies that owned the large farms which were there originally. Along Nairobi-Athi River corridor, the co-operative society that owned land between Nairobi/Athi River border and Athi River town subdivided it into five acre plots which discouraged residential development and

favoured industrial development.

Land use planning is difficult along Nairobi-Thika corridor because of the informal and unplanned development that take place in this area without the local authority's approval. For example Kasarani area was zoned for industrial development but a lot of the land in this area has now been subdivided by the co-operative societies who owned the land into numerous small scale plots for low income developers. Such developments are not there on Athi River-Nairobi corridor, hence, making it easier for entrepreneurs to acquire land for industrial development.

As has been seen in the analysis, the study was able to identify reasons that have caused industries to locate more on the Athi River-Nairobi corridor than on the Thika-Nairobi corridor. Hence the hypothesis that Athi River Nairobi corridor is proving to be a greater industrial magnet in relative terms than the Thika-Nairobi corridor was accepted.

The growth of industries was noted on both corridors as has been reflected by the fact that industries are being put up on both corridors. The difference is in the rates of construction whereby it was noted that Nairobi-Athi River corridor has more industries operating than the Thika corridor. Moreover Athi River corridor has many more industries under construction when compared to Thika corridor.

The main reasons given for industries coming up on both corridor include zoning regulations, availability and cost of land, accessibility, land use, transport costs, availability of

services such as water, sewers, electricity and telecommunications, nearness to the city centre among others.

The major constraints to development of industries in these areas have been identified as:

1. Laxity by Local Authorities in providing services in these areas and in implementing planning regulations. This has hindered the development of industries on the Thika-Nairobi corridor as there are other more lucrative developments taking place on the corridor. These include residential housing and commercial activities.
2. Along Thika-Nairobi corridor development of industries is not in a continuous manner. It is concentrated in Ruaraka, Ruiru, Kahawa and Juja. This is because in other areas there are already other kinds of developments.
3. Between Ruiru and Thika, the Ministry of agriculture wished to see urban development discouraged, except where necessary for the support of agricultural industry² like Premier Bag and Cordage and the fruit juice factory at Juja.
4. The safety zones and noise corridor around Jomo Kenyatta International Airport, Embakasi has hindered the development of industries on the left side of Nairobi-Mombasa Road between General Motors factory and the Nairobi/Athi River boundary.

5. The general flatness of the Nairobi-Athi River corridor and the black cotton soils have made this corridor less attractive for residential development. This has also made it quite expensive to build industries as all the black cotton soils has to be removed before laying the foundation. The market offered by the population of the Nairobi City and other agglomeration and linkage factors associated with a big city have contributed largely to industries locating within the city boundaries and its environs. Nevertheless, it has been proved statistically that industries on the Athi River corridor are more market oriented than those on the Thika corridor whose market is more widely spread. However, the reason for preferring one corridor to the other is not something that entrepreneurs sit down to analyse. Their main reason for being where they are located is availability of land and services at reasonable costs.
- At this juncture, it is important to note that though one corridor may be said to be better than the other, it cannot be concluded that that is the best location for industries around Nairobi because other areas outside the two corridors have not been studied.

Recommendations

1. From the study of the two corridors it has been found out that in relative terms, the growth of industries is more towards the Nairobi-Athi River corridor than towards the

Thika-Nairobi corridor.

This is contrary to the recommendations of the Nairobi Urban Study Group. Thus, the recommendations of the Nairobi, metropolitan growth strategy of 1973 have largely been overtaken by events and the recommendations of Urban Study Group needs to be reviewed. A new study to guide the future development of Nairobi is long overdue. In this study, a study team comprising indigenous planners should be constituted. Foreign experts must be avoided because they may fail to understand the realities of socio-economic forces of the Nairobi metropolis.

2. It has been observed that those industries that are far from Embakasi and those on the Athi River side have major problems of water, lack of sewers and other services like roads.

It is the recommendation of this study that the government provides these entrepreneurs with these services when they are servicing the Export Processing Zone at Athi River whose water is expected to come from Nairobi.

3. Since the introduction of service charges by the local authorities, the industrial entrepreneurs have constantly been paying the charges to the local authorities.

Therefore it is recommended that the local authorities

should provide the necessary services to the entrepreneurs like repairing of roads, providing water and sewers, garbage collecting so as to encourage more industrial development.

4. The Government should try as much as possible to acquire land which is in private hands but not yet developed especially along Athi River-Nairobi corridor so that they are able to control development of Nairobi a metropolis and elsewhere in Kenya since it has been observed that this is not easy when land is under private hands.
5. The inspectorate division of local authorities should be more efficient than it is now so as to make sure that planning and zoning regulations are strictly adhered to so that no residential and commercial building come up in areas that were originally zoned for industrial development and vice-versa.
6. There is need for a close relationship between zoning regulations and the demand for a given use of land so that land should be zoned to cater for the greatest demand for land use. In this connection, all agencies that deal with land development and related infrastructural service provision should work in joint consultation in order to maximise land use.
7. Furthermore, in order to halt population drifts of unemployed persons from rural to urban areas, a long term policy of industrial zoning and incentives designed to

decentralize industrial development to rural areas is essential.

Areas For Further Research

Nairobi. Urban Study Group recommended various areas as industrial areas. However, some have not really taken-off as industrial areas while congestion problems continue to increase in some other industrial areas like Central Industrial Area.

A study with a view to coming up with, ways and means of achieving a balanced industrial development in all the areas allocated for industries around Nairobi would help in alleviating the problems caused by congestion.

There is need to evaluate the relationship between the present land use patterns around Nairobi and the land use policies for the same area with a view to seeing whether policies are actually adhered to and if they are not, recommendations should be made on what can be done in order to achieve sound policies.

REFERENCES

1. Nairobi, Urban Studies Group, Metropolitan Growth Strategy.
(Nairobi, City Council of Nairobi, 1973) Vol.Paragraph 60
2. Urban Study Group, paragraph 60

BIBLIOGRAPHY

- Alonso W. Location and Land Use, Towards a General Theory of Land Rent.
New York: Harvard University Press, 1964
- Bialock H.M. Social Statistics. New York:
McGraw-Hill Book Company, 1960.
- Byarugaba Sendere "The Relationship Between
Industrial Location And Employee Place of Residence"
M.A. Thesis DURP, University of Nairobi, 1980.
- Bhagwan M.R. "Industrialization and Transfer of
Technology in Kenya, Tanzania and Zambia" in
Proceedings of the International Research Association,
7th General Conference, 1972
- Cambell, William Giles, Bolton and Slade. Form and Style
These, Reports Term Papers.
8th edition Columbia University: Houghton Mifflin Co.,
1990
- Chapman I. & Hurnhrys G. Technical Change and Industrial
Policy. Oxford: Basil Blackwell Ltd, 1987
- Chapman K. & Waller D.F. Industrial Location: Principles
and Policies. 2nd Edition Oxford: Basil Blackwell Ltd,
1991
- Collins and Waller D.F. Locational Dynamics of Manufacturing
Activities.
London: John Wiley and Sons, 1975
- Devine F.s. and Others. An Introduction to Industrial Economics.
4th Edition London: University Hayman, 1985
- Dasio J.G.O. "Thika Industrial Base".
M.A. Thesis, DURP, University of Nairobi, 1973.
- Estall R.C. & Olorivie R.B. Industrial Activity and Economic
Geography: A Study of the Forces Behind the
Geographical Location of Productive Activity in
Manufacturing Industry.
London: Hutchinson & University 1973.
- Gathungu Karuli "The Impact of Nairobi-Thika Highway on
Land Values, Land Use Planning". M.A. Thesis, DURP,
University of Nairobi, 1977.
- Hamilton F.E.I. Some Perspectives on Industrial
Organisation And Decision Making.

London: John Wiley and Sons, 1979

- Hamilton F.E.I and Linoe G.J.R. Spatial Analysis, Industry and the Environment.
London: John Wiley and sons, 1979
- Havalett H.T. and Murphy Patrick, Statistics Made Simple..
London: Heinman Ltd, 1974
- Isard W. Location and Space Economy: A General Theory Relating to Industrial Location, Market Areas, Land Use, Trade and Urban Structure, Massachusetts:
The Massachusetts Institute of Technology, 1968.
- Karani L.K. "The Industrialization of Kwale District, Kenya".
M.A. Thesis, DURE, University of Nairobi, 1980.
- Kinorish G.I. "Economic Development and Industrial Location in Kenya". Archi Journal of Land Development,
Vol.I. No. (April 1981): 2-11
- _____ "Introduction to Land Economics".
Unpublished Manuscript: University of Nairobi, 1987.
- _____ "Policy Impacts on Urban Land Use
Patterns in Nairobi, Kenya".
Ph.D Dissertation, Indiana State University, 1980.
- _____ "The Nairobi - Thika axis
as an overflow
Development". Report and Proceedings Workshop on Housing,
Nairobi.
Human Settlements, University of Leuven, 1987.
- I R D I Directory of Industries in Kenya, 1987
- Irishpatrick C.H. & Nixon F.I. Industrial Structure and Policy in
Less Developed Countries.
London: Allen and Unwin, 1984
- Iituula S.E. "Industrial Real Estate Lending in
Kenya". M.A. Thesis, Department of Land Development,
University of Nairobi, 1981.
- Krishna K.G.V. "The Industrial Sector in Kenya a Plan".
East African Institute of Social Research Conference,
Kampala, 1964.
- Kvalo F.J. "The Impact of Industrial Development on
Environmental Quality with Special Reference to Kenya
Meat Commission And East African Portland Cement
factory

in Athi River". M.A. Thesis. DURP. University of Nairobi, 1985.

- Lasin L.L. Statistics for Modern Business Decisions.
New York: Harcourt Brace Jovanovich, 1973.
- Loach A. The Economics of Location.
London: John Wiley and Sons Ltd, 1967.
- Mbwaona R.K." The Impact of Industrial Growth on Housing in Eldoret".
M.A. Thesis DURP. University of Nairobi, 1978.
- Machache J.M.H. "A study of Cottage Industries in the Urban Informal Sector: A case study of Gikomba Belt Neighbourhood, Nairobi, Kenya". M.A. Thesis DURP. University of Nairobi, 1981.
- Moroney W.T.W. East Africa.
London: Longman Group Ltd, 1973.
- Nairobi: City and Region
Oxford: Oxford University Press, 1967.
- Mwangi J.W. Planning Standards for future Urban Industries Based on the Performance of the Present Nairobi's Industrial Area". M.A. Thesis DURP. University of Nairobi, 1975.
- Nairobi. Urban Study Group Nairobi Metropolitan Growth Strategy.
Nairobi: City Council of Nairobi, 1973.
- Ndwigha C.F. "Urban Land Policy and Urban Land Values: A case study of land zoning". M.A. Thesis, Department of Land Development, University of Nairobi, 1986.
- Nixon F.I. Economic Integration and Industrial Locations: An East African Case Study. London: Longman, 1973
- "Factors influencing the Location of Industry in Uganda". University of East Africa Social Science Conference Nairobi: Makerere Institute of Social Research, 1966.
- Ogendo R.B. Industrial Geography of Kenya, with special Emphasis on the Agricultural Processing and Fabricating Industries. Nairobi, Nairobi: East African Publishing House, 1972.

"Industrial Location in the Nairobi Area".
Geo Journal 2.5 (1978): 451-462.

"Industrial Role of the main Kenyan
Towns" University of East Africa Social Sciences
Council Conference
University College, Nairobi, 1969.

The Location and Structure of the
manufacturing and service Industries in Kenya's Central
Provincial Industrial Unit". Department of Geography,
University College, Nairobi Kenya 1969.

The significance of industrial zoning to
rural development in Kenya: A study of the facts and
methodology Nairobi: East African Publishing House,
1967.

Ojany F.F. and
Ogondo R.B. Kenya: A Study in Physical and Human
Geography. Nairobi: Longman Kenya Ltd, 1973.

Owour R.O. "Relationship of Kisumu's Industrial Sector
to the Resource hinterland". M.A. Thesis, DUK,
University of Nairobi, 1979.

Republic of Kenya. A guide to Industrial Investment in Kenya.
Government Printers, 1972.

District Development Plans: Machakos 1989
1992. Ministry of Planning and National Development,
CBS.

District Development Plan: Kiambu 1989
1993. Ministry of Planning and National Development,
CBS.

National Development Plans 1989-1993
Ministry of Planning and National Development, CBS.

Safier M. "Patterns of Industrial Location and Urban
Growth in East Africa". University of East Africa
Social Science Conference. Makereke Institute of
Social Sciences, 1968.

Sibanda B.M.C. "Planning for basic Infrastructural Services
in Thika with specific Reference to Water Provision,
Sewerage and solid waste". M.A. Thesis, DUK,
University of Nairobi, 1980.

Smith D.H. Industrial Location: An Economic Geography

- Analysis. London: John Wiley and Sons, 1981.
- Soderman Sten Industrial Location Planning: An Empirical Investigation of Company Approaches to the problem of locating new plants. Stockholm: Almqvist and Wiksell International, 1975.
- Swainson N. "The Role of the state in Kenya's Post war Industrialization". IDS Working Papers Nos 181-200. University of Nairobi 1976.
- Uganda Government. "Industrial Location." Kampala-Mengo Regional Planning studies No. 11 Department of Town and Regional Planning, 1966.
- UNIDO Industry and Development. Global Report, 1987.
- Wachira L. "Criteria for Location of Industries in Rural Settlements: Case Study of Kirinyaga District". M.A. Thesis DURE. University of Nairobi, 1976.

APPENDIX A

Questionnaire for Industrialists

1. (a) Interviewer.....
(b) Respondent.....
(c) Designation of Respondent.....
(d) Date of Interview.....
2. (a) Name of Industry/firm.....
(b) Owner of the Industry.....
(c) Location.....
(d) Date/year it was developed.....
3. (a) Size of plot.....
(b) Cost per acre (Estimates for the area).....
(c) Annual rates per year per acre.....
4. How did you acquire the plot? Tick the one appropriate
(i) Bought.....
(ii) Allocated by Local Authority.....
(iii) Other (specify): gift inheritance etc.).....
5. Raw materials: (Type) Source: distance
a).....
b).....
c).....
d).....
e) (Any addition on separate sheet)
6. How many people have you employed?
(a) Skilled (in the operation of the industry).....
(b) Semi-skilled.....
(c) Unskilled.....

11. What is more bulkier to transport (Tick whichever is applicable).
- (a) Your raw materials ()
- (b) Your products ()
12. What is more expensive to transport? (Tick whichever is applicable).
- (a) Your raw materials ()
- (b) Your products ()
13. By what means of transport are raw materials delivered to the site (Tick whichever is applicable)
- a) By road ()
- (b) By air ()
- (c) By rail ()
- (d) Others (Specify).....
.....
14. By what means of transport are finished products delivered to the market? (Tick)
- (a) By road ()
- (b) By rail ()
- (c) By air
- (d) Others (Specify).....
.....
15. Name of financiers if any.....
- (a) Where are their offices?.....
- (b) Did they advise you to establish your industry where you are.... ..

16. Where do you get your spare parts from?.....
- (a) Local industries - immediate area.....
 - (b) Nairobi area (specify).....
 - (c) Any other area in Kenya.....
 - (d) Imported.....
 - (e) Any other.....
17. Where do your employees reside (Tick)
- (a) Within the industrial premises ()
 - (b) Industrial rented houses ()
 - (c) Rent their own houses outside (state areas) ()
 - (d) Anywhere else (Specify) ()
18. Was your decision to establish here influenced by any government policy
- (a) Was there any inducement by the government?
(Specify).....
 - (b) Were you prevented from locating anywhere?
 - (c) Were you attracted by the L.A.
 - (d) Was there any tax incentive (i) L.A.
(ii) Central Govt.
 - (e) Did the government/L.A. provide any extra services for you to move Yes/No
If yes, please specify.....
19. Locational factors in the industry. Tick those factors that were important in your location decision
- (a) Cost of land ()
 - (b) Physiography of the land ()

- (c) Access to infrastructure ()
- (d) Attitude of industrial financiers ()
- (e) Cost of construction ()
- (f) Attitude of the advisers ()
- (g) Sources of machinery, repairs and
specialized machines makers ()
- (h) Sources of raw materials ()
- (i) Sources and costs of labour ()
- (j) Access to the market ()
- (k) Prices of finished products ()
- (l) Transport costs for raw materials ()
- (m) Transport costs for finished products ()
- (n) Housing for workers ()
- (o) Presence of other industries/agglomeration ()
- (p) Absence of other industries/agglomeration ()
- (q) Public government policy ()
- (r) Chance ()
- (s) Personal consideration ()
- (u) Software (amenities and services, banks,
educational institution) ()
- (v) Sharing of infrastructural facilities ()
- (w) Any other specify.....

20. Which of the above do you consider to be the most important factors (in order of importance)

- 1.i...
- 2.
- 3.
- 4.
- 5.

21. (a) Does your industry produce any obnoxious smell?.....
 (b) If Yes, has this contributed to your location, how....

 (c) Are there any regulations governing control of air pollution?.....

22. (a) Are you exempted in part or in full from taxation by the Government (Tick)

- i) In full ()
- ii) In part ()
- iii) Not exempted ()

(b) If Yes, what reason(s) makes the government exempt you from taxation.....

(c) How long (No. of years) is the tax exemption period?

23. (a) Are prices of your finished goods the same all over Kenya?.....

(b) If not, how are they differentiated.....

- 24. (a) How do you get rid of your industrial wastes if any?
.....
.....
- (b) Has the issue of getting rid of it played a part in your locating here?.....
(Specify).....
- 25. Do you have any plans to expand this factory in area.....
b) If Yes, where (Tick wherever is applicable)
i) On the same plot ()
ii) At another plot in the same ()
iii) In another area (Specify) ()
- 26. What problems do you face because of your present location (specify).....
1.
2.
3.
4.
5.
- 27. What is your opinion on this general area as an industrial region?.....
.....
.....
.....

28. Which of the following locations do you prefer

- i) Thika-Nairobi Corridor ()
- ii) Athi River-Nairobi Corridor ()
- iii) Nairobi-Ngong Corridor ()
- iv) Nairobi-Limuru ()
- v) Any other ()

29. Why do you prefer any in (Q.28)?

APPENDIX B

Questionnaire for Local Authority Officials

1. (a) Interviewer.....
- (b) Respondent.....
- (c) Designation of Respondent.....
- (d) Date of Interview.....

2. Name of Local Authority and Status.....

3. Which areas have been zoned for Industrial development and what are their sizes?

Area	No. of hectares/areas
(a)
(b)
(c)
(d)
(e)

4. What are your reasons for zoning this area for Industrial development (in order of importance)

1.
2.
3.
4.
5.

5. (a) Are there industries that have been developed outside the areas planned for industrial development?.....

- 1.
- 2.
- 3.

(b) If so, why is this (Give reasons)

- 1.
- 2.
- 3.

(c) Do you encourage such developments?.....

(d) If yes, under what circumstances?.....

6. (a) Are there other developments in the area set aside industrial development such as residential commercial?

(b) If yes, who approved their being erected there.....

7. (a) Do you give an entrepreneur a chance to choose where wants to locate his industry?.....

(b) Is there a preference for some areas others?.....

(c) If yes, which areas are more preferred?.....

Give reasons for the preference

- 1.
- 2.

3.
4.
8. (a) Is there a limit to the plot size that you can allocate an entrepreneur?.....
- (b) If Yes, what is the limit (Hectares/Acres).....
- (c) Is this limit the same for all the areas within your jurisdiction.....
- (d) If not, how is the limit determined.....
- (e) What reasons are given for the limit
- i)
- ii)
- iii)
9. What are the annual rates per acre for industrial plots in each area.....
10. (a) Do you liaise with the Ministry of Commerce and Industry in connection with industrial location
- (b) If yes, state how.....
11. Apart from allocating the plot, what role does the Council play in the actual development of the industry.....
12. How do you encourage industrial development in your area of jurisdiction keeping in mind the Government Industrial decentralization policy?.....

13. (a) Have the current industrial developments adhered to your plans?.....

(b) If No, state in which areas the plans have not been adhered to

14. If plans have not been adhered to, which of the following factors do you think has led to plans not being taken seriously?

- (a) Physical environment - Topography Climate ()
- (b) Poor Accessibility ()
- (c) Land Ownership and subdivision practices ()
- (d) Land allocation practices ()
- (e) Social tastes and preferences ()
- (f) High land values ()
- (g) Customs and cultural background ()
- (h) Planning authorities not being strict ()
- (i) Agglomeration factors from other industries ()
- (j) Others (specify).....

15. Any other comments on industries in this area (please name)

1

2

3

4

5

6