

"
THE RELATIONSHIP BETWEEN MACHAKOS TOWNSHIP
INDUSTRIAL SECTOR WITH ITS RESOURCE HINTERLAND"
"

BY

ALFONSE MAKAU KIOKO, B.A. (Econ.) HONS.

UNIVERSITY OF NAIROBI

A THESIS SUBMITTED IN 'PART' FULFILMENT FOR
THE DEGREE OF MASTER OF ARTS (PLANNING) IN THE
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DECLARATION

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

Signed:

Alfonse M. Kioko.

(Alfonse M. Kioko)
(Candidate)

This thesis has been submitted for examination with my approval as University supervisor.

Signed:

Dr. Elijah Ndegwa
(Supervisor)

DEDICATION

This thesis is dedicated to my loving wife Juster Kioko whose deep understanding was a great asset in this study and to my lovely daughter Lilian Kavete Kioko who is too young to understand but will one day know that "success comes after grim struggle".

ACKNOWLEDGEMENT

This work could not have been a success without the assistance of several people and institutions who offered me assistance in one way or the other and whose efforts I feel indebted to acknowledge.

First, I wish to register my appreciation to the German Academic Exchange Services (DAAD) with whose scholarship I was able to pursue the two year Masters Degree course.

I wish to express my deep gratitude to my supervisor, Dr. Elijah Ndegwa for his timely and constructive criticisms, comments and supervision throughout the period of research and thesis writing. I would also like to thank the other members of staff in the Department of Planning as well as my fellow colleagues for providing a healthy academic atmosphere.

I also feel indebted to the Manager of Makos Millers, Mr. Hechsler, the Production Manager of Kenya Orchards Limited Mr. Hassan, who provided me with essential information about their industries. My thanks is also extended to all my respondents in the industries as well as the farmers who provided me with useful information. The several government officers and all the people who in any way rendered

some assistance to me, either directly or indirectly in the course of my research, to you I say "thanks".

Lastly I would like to thank Mrs. Sarah Lugusa and Mrs. Mary Muthigo for typing my thesis.

ABSTRACT

It is expected that industries in any geographical setting when closely linked with their resource hinterland, will contribute to the development of the resource hinterland through provision of employment, incomes, as well as giving incentives to the agricultural sector through purchasing the agricultural raw materials.

This study examines the relationship between Machakos township industrial sector with its resource hinterland. This is done with a view of assessing how the industries located in the township have promoted the development of their resource hinterland. For detailed investigations, two agro-based industries namely Kenya Orchards Limited (KOL) and Makos Millers were selected.

The study revealed that there exists a weak relationship between the Machakos township industrial sector and its resource hinterland. This is because, although the industries employ majority of the workers from Machakos District, majority of the workers earn low incomes. In addition, the fruits farmers earn relatively low incomes from the sale of their fruits to the fruit processing industry. This is

because, they (farmers) are given low prices for their fruits, and the fact that the Kenya Orchards Limited also obtains some of the fruits from outside the district while the district produces more than the industry's demand. This is largely due to ignorance on the part of the management on the availability of the raw materials within the District as well as lack of incentives from the industry to the farmers.

Some of the industries were found to encounter problems which limit their expansion and consequently their contribution to the development of their rural hinterland. These problems include poor transportation and water among others.

However the study found that there was potential for establishment of certain industries.

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CHAPTER ONE

1:0 INTRODUCTION:

Most of the Less Developed Countries (LDCs) rely heavily on agriculture for their economic growth and development. Most of these countries produce agricultural raw materials for domestic and Export Markets. Kenya is no exception. Basically, Kenya is an agricultural country and the majority of the people are engaged either directly or indirectly in agriculture. This is especially the case for those people living in the rural areas who comprise about 80% of the total population. The importance of agricultural sector is reflected in the number of people engaged in the sector as well as its contribution to Gross Domestic Product (GDP). According to the 1985 statistical abstract 85% of Kenya's Labour Force is employed in agriculture. The statistical abstract Notes that agriculture contributes about 30-35% of Kenya's Total GDP.

Despite these contributions, the Development Plan (1979-83) pg. 45 notes that agricultural sector in Kenya has been faced with several constraints, the principal ones being lack of inputs, machinery, technology, credit facilities and markets for the output. These constraints have limited the contribution of agriculture to the economy. The effects of such constraints are reflected in the low agricultural

output yields per unit area and per worker. Low output, translates itself into Low Incomes thereby lowering the absorptive capacity, of the economy in terms of employment opportunities in the agricultural sector. The decline in contribution of agricultural sector is felt mainly by the rural agricultural communities who are engaged directly in agriculture and depend heavily on it for employment, incomes and general subsistence. As a result the rural areas have relatively lower standards of living as compared to their urban counterparts where incomes are generally higher. In addition, the urban areas especially the large ones like Nairobi and Mombasa are more favoured in terms of provision of social infrastructural facilities such as health facilities, roads, electricity and water. Besides the constraints noted above, the investment policies in the past have also been in the favour of the big urban areas like Mombasa, Kisumu, Nairobi as opposed to rural areas. Industrialization policies have followed similar patterns even in cases where raw materials were agro-based obtained from the rural areas. Such industries include Unga Limited which produces wheat and maize flour which are both from food crops which are primarily grown in the rural areas. A World Bank Paper (1981 pg. 7) reports that,

"the desirability of promoting industry outside Nairobi, Dar-es-salaam and Copper Belt in Zambia was mentioned half-heartedly after independence". This might help explain why majority of the industries are located in major urban areas. As a result of the low economic opportunities in the rural areas especially due to bias in siting of the industries and other employment generating activities in the large urban areas, many job seekers have often opted to move to the urban areas which are considered to have high employment opportunities. The perceived high employment opportunities in the urban areas has played a big role in attracting a large population from the rural areas to the urban areas. Within Kenya, the 1979 population census revealed that the population of Nairobi, Mombasa and Kisumu had grown from 509,286, 19,959, 32,431 respectively in 1969 to 827,775 for Nairobi, 341,148 for Mombasa and 152,643 for Kisumu Municipality in 1979. On the basis of 1979, population census data, it can be seen that Nairobi had 2.43 times the population of Mombasa and 5.42 times that of Kisumu. With regard to the concentration of industrial activities, in 1981, Kenya Republic of; (1981 p.g 8) notes that the main urban areas had the following numbers of manufacturing industries, Nairobi 950, Mombasa 304, Kisumu 69; Nakuru 79 and Thika 45 . The above named urban areas had the highest concentration

of industries and consequently employment emanating from them were higher. During this period, the population of Machakos Town, the largest town in Machakos District which is our study area had grown from 6,312 in 1969 to 84,320 in 1979. In 1981 Machakos Town had only 10 industries and Athi River, another town within Machakos District had 8 industries. These two towns together with Thika have emerged to be suitable among other towns within Nairobi's metropolitan area for the location of industries decentralized from Nairobi.

The "push" and pull effects caused by the above mentioned factors (i.e concentration of industries and higher standards of living in the urban areas) have continued to attract increasing numbers of people to the larger townships. This concentration of people in the urban areas have caused socio-economic problems including pressure on existing social infrastructural facilities like housing, water and even recreational facilities. Other problems include high rates of unemployment and crime. These problems coupled with the fact that the rural areas still require lots of attention as the majority of the population resides there, have made the Kenya Government

to explore several policy options aimed at reducing the rural-urban imbalance. Among these policies and strategies adopted by the Government of Kenya have included the introduction of the Growth Centre Policies which were first discussed in 1967 in the Central Province Physical Development Plan. Rural industrialization was also considered to be a healthy Programme which could help in decentralising industries and in helping to raise the standards of living of rural areas, by creating employment and generating incomes. A basic aim of the growth centre policy was to facilitate the decentralization of industries. The basic assumption of this industrial decentralization policy through induced development of selected centres was that if industries were decentralised from the then industrial towns, such industries could stimulate development within and around the areas in which the industrial activities were located through the operation of forward and backward linkages. This process was expected to operate through the investment of incomes derived from such industrial activities. It was argued that if such earnings were reinvested within the rural areas, such investments would help raise the standards of living for people living within and around such growth centres.

1:2:0 STATEMENT OF THE PROBLEM

The idea of forward and backward linkages postulates that, ceteris paribus where industries in a geographical setting are linked with their resource hinterlands such industries are capable of promoting the development of areas within which they are located through the provision of employment to the rural population living in the hinterlands, offering ready market to the agricultural output thereby earning the rural population more incomes with which they could improve their standards of living, supplying the agricultural sector with inputs such as fertilizers, machinery and in some cases help in the provision of infrastructural facilities like roads. Effective demand for the raw materials would induce the farmers to respond to such demand, given incentives such as good prices. The higher incomes earned by persons working within the agricultural sector would offer incentives to industrialists to produce goods demanded by such persons which would in turn encourage the growth of the industries. This would be by way of offering effective demand to the industrial products and by offering such industries cheap raw materials.

Through this forward and backward linkages offered by each sector of the economy to the other sectors it is expected that the sectors so linked would realise a sustained growth and development. The link between the two sectors is important since both are interdependent.

Although the above is what is expected of industries generally, and industries in Machakos for that matter, this expectations does not seem to be fulfilled in Machakos.

For one thing, industries in Machakos District have not shown evidence of rapid development with time. This is evidenced by the fact that while in 1980 there were 10 industries, in 1986 there were 12 industries. Thus only two industries were established within a period of 6 years. Secondly, the earnings from the industries are relatively small and consequently offer small employment opportunities. For instance in 1976 when data on employment in industrial enterprises was available there were only 175 people employed in the industries forming 6.0% of total employment in the town. In the same year 615 people were engaged in Agriculture and Forestry forming 21.2% of total employment in Machakos Town.

There rest were employed in the other sectors of the economy especially service industry sector.

That the contribution of the manufacturing sector in terms of employment and income in Machakos town is low when compared with other towns like Athi River and Thika among others is clearly illustrated in Table I given on page 9. It is evident from Table I that the contribution of industry to employment creation in Machakos Town is smaller when compared with similar towns like Thika and Athi River, whose establishments are relatively of later dates than Machakos Town. Similarly the industries in Machakos Township have not grown in number as rapidly as in the other two towns. This evidenced by the fact that Machakos Township had only 10 establishments (manufacturing) while Thika had 45 establishments and Athi River had fewer establishments than Machakos, the industries at Athi River had offered employment to 2,611 persons while industries in Machakos Township had offered employment to 159 persons.

Some of the industries in Machakos township such as the Kenya Orchards Limited (K.O.L) was established in 1948. One would have expected that by now, it should have induced development of more industries within Machakos town and encouraged the

Table 1:0 . Employment and earnings in manufacturing sector, in Machakos, Athi River and Thika, 1985

	Year	No. employed in manufacturing	Earning from manufacturing in K£'000	No. of total wage employment in Town	% of industrial employment to Total wage employment.
Machakos	1980	114	78.3	3,746	3.04%
	1981	159	147.3	3,961	4.01%
	1982	149	98.7	4,285	3.48%
	1983	1,108	1,162.1	9,312	11.90%
	1984	1,883	2,074.5	9,280	20.29%
Athi River	1980	2,554	2,013.4	2,982	85.64%
	1981	2,611	3,153.8	3,048	85.66%
	1982	1,734	2,212.4	2,142	80.95%
	1983	1,594	2,850.8	1,961	81.29%
	1984	3,103	1,937.6	3,471	89.40%
Thika	1980	9,043	7,083.7	13,996	64.61%
	1981	9,418	6,754.6	14,513	64.89%
	1982	9,518	7,465.2	15,097	63.05%
	1983	10,197	8,006.2	17,299	58.95%
	1984	9,117	9,243.0	15,024	60.68%

Source: Statistical Abstract 1985.

development of agricultural activities, within its hinterland through securing market opportunities for horticultural products. This does not appear to be the case. Further more, one would also have expected there to be strong linkages between this industry and other industries within Machakos township. Once again this does not appear to be the case.

The above observations leads one to conclude that there is some weak link somewhere which hinders industrial development in Machakos township and its hinterland as reflected by the limited employment opportunities and by the small number of industries which have so far been developed in Machakos town. Alternatively the industries are independent of their immediate hinterlands and hence interaction between the two is limited.

1:3:0 STUDY JUSTIFICATION AND RELEVANCE

In order to achieve a faster economic growth and development, it is necessary to mobilise resources, especially the domestic ones. It becomes imperative to seek and exploit new opportunities as well as utilising the existing ones to full capacity. To bridge the development differential between the urban and rural areas, mobilization of the resources at the

rural areas is therefore important. But since no economy, either at macro-level or micro-level, urban or rural based is capable of sustaining itself in absolute, a close relationship between the two levels ought to be developed for each has its contribution for the development of the other. In essence agricultural and industry ought to be developed together in order to strengthen the links between both the sectors. This requirement, necessitates studies involving investigations of the relationship between the industrial sector and the agricultural sector in a bid to strengthen their links in order to foster rapid development. The researcher is not aware of any research work on the relationship between Machakos township and its resource hinterland. This is the justification for this study on the linkages between the industrial sector of Machakos Township and its resource hinterland.

Although some studies have been carried out on the relationship between some industrial activities in Kenya and their hinterlands, Awour (1979), Khaguli (1979), Adolwa (1985), each of these studies considered only one industrial activity. Awour's study (1979) concentrated on the relationship between Kisumu industrial sector with its hinterland. But the author took

the case of the impact of the Pan African Paper Mills on the growth of Webuye Town, while Khaguli (1979) examined the impact of Mumias Sugar Factory on the growth of the town.

This study looks in detail at two agro-based industries namely the Kenya Orchards Limited (K.O.L) dealing with fruit processing and Makos Millers Limited which produces maize flour known as Tausi from maize. In addition the study looked briefly at other industries in Machakos Township with a view to identifying problems facing industries in Machakos Town. The two agro-based industries named above, constitute 15.4% of the total industries found in Machakos Township excluding the Kenya Industrial Estates Sheds.

The Government policy as outlined in the 1983/88 development plan is to ease the congestion of industries in Nairobi by taking some of the industries to Machakos. It is imperative first to know the constraints faced by existing industries and how they link with their hinterland. This is based on the assumption that there appears to be some problems facing the industries in Machakos township thereby limiting their contribution to rural development. Unless identified and solved such problems could be repeated in other industrial

entreprises. The study is likely to make a contribution towards an understanding of the extent to which Machakos can be developed as an industrial town.

1:4:0 OBJECTIVES OF THE STUDY

The study was conducted with the following objectives:

1. To find out the relationship existing between the industries located at Machakos township and their resource hinterland. This relationship was examined through a survey of employment data, market opportunities for the agricultural products produced by farmers in the hinterland of Machakos Township and the extent to which industries in Machakos Township supply the farmers with the inputs.
2. To identify the problems encountered by industries located in Machakos Township and the extent to which such problems limit the contribution of industries to the development of the hinterland and vice-versa.
3. To suggest policy recommendations to strengthen the linkages between industries in Machakos Township and their resource hinterland.

1:5:0 SCOPE OF THE STUDY

Broadly speaking, it would have been more desirable to undertake a linkage study involving all the industries in Machakos Township in order to see how they have induced the development of their resource hinterland. Such a study would have entailed the detailed investigation of the contribution of each industry to the development of its resource hinterland and vice versa. A study of such nature would come up with the opportunities and limitations faced by the industries in the process of developing their hinterlands, constraints which would have to be overcome if future industrial development of any type is to succeed. However an exercise of this nature would require a large number of personnel, finance and time which are all major constraints to the researcher at the moment.

In light of the above considerations, detailed investigations were carried out for two industries, namely, KOL and Makos Millers Ltd. The study was taken at two main levels within the recognised linkage structure. The first level of analysis is the factory level, where the management revealed the employment capacity, type and source of the raw materials. At the factory level a workers questionnaire

established their (workers') origin, place of residence, their incomes, and the activities into which the incomes are expended.

The second level of analysis was at the farm level. This level obtained information on market opportunities for the farmers produce and the incentives given by the industries, sources of their seeds and their expenditure pattern.

The factories provided a list of the agents and farmers who sold the raw materials to them. The lists formed the basis for the sampling frame. Thus random sampling technique was used to sample the farmers to be interviewed.

1.6.0. DATA ANALYSIS

The study used various techniques at different levels to analyse the data obtained from the field. The value added by different factors of production was used at one point, while fractions were used to analyse the source of raw materials as well as expenditures accruing to such areas. This fractions may be taken to represent a very simplified form of input-output technique, where the input is represented by raw materials sold to the industry and output, to be represented by the incomes earned from the sale of the raw materials.

1.7.0 LIMITATIONS OF THE STUDY:

This study was faced with a number of limitations;

Firstly, most of the workers did not keep record of their expenditure patterns. As a result a proper record on expenditure was missing; impulse expenditure and expected income earnings expenditure behaviour affected the workers as well as the farmers budgets. In such circumstances the respondents estimated the average expenditure.

In the second place, some statistics was treated as confidential by the factory and as a result was not released. This included information on production.

CHAPTER TWO

2.0 PHYSICAL AND ECONOMIC BACKGROUND

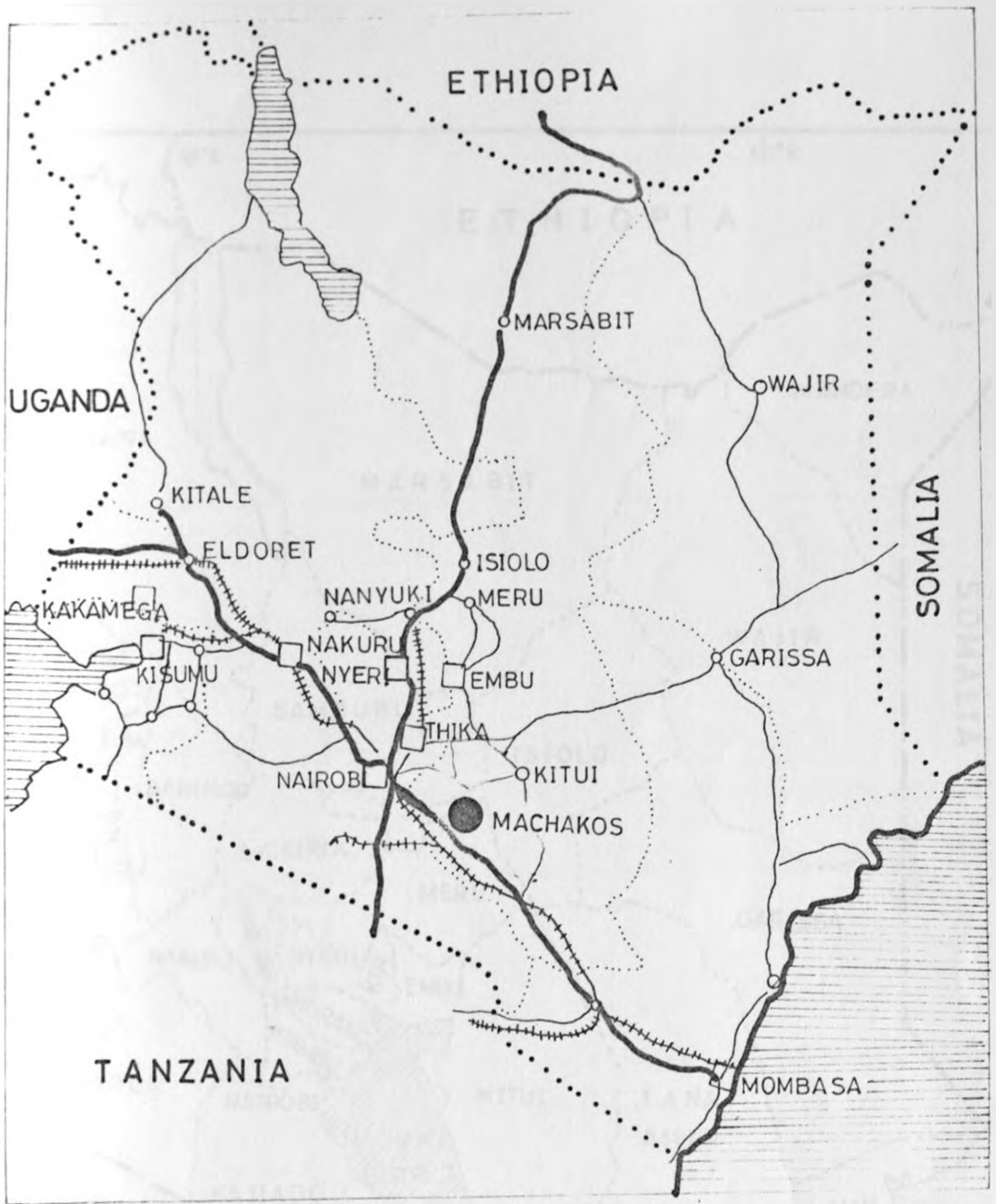
This chapter deals with the physical and economic background of the study area. The chapter also focuses on industries in Machakos Township.

2.1.0 STUDY AREA

The study area includes the Machakos Township, which covers an area of 320 sq.km., within which the industries are located, as well as the resource hinterlands from which the industries studied obtain their raw materials. These hinterlands were largely identified as consisting of Parts of; Mutituni Location, Mitaboni Location, Mua Hills, and Kaewa, all of which are within Iveti North and South Divisions, Kiteta Location in Mbooni Division, Makueni location in Makueni Division, Yatta Division and Mwala Location in Kangundo Division,

2.1.1. LOCATION

The resource hinterlands for these industries encompasses many parts of Machakos District whose location is shown in Map 2. Machakos Town itself lies between longitudes $37^{\circ} 22'$ and $37^{\circ} 08'$ East and latitudes $1^{\circ} 38'$ south. The town is approximately 65 km. south east of Nairobi and 45 km. from Athi River which is one of the fast growing urban centres



Legend

- Principal towns
- Machakos town
- Other towns
- International trunk roads
- Other major roads
- ⊢ Rail roads

- National boundary
- Provincial boundary



MAP No. 1

Title

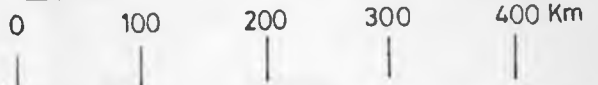
THE LOCATION OF MACHAKOS TOWN.

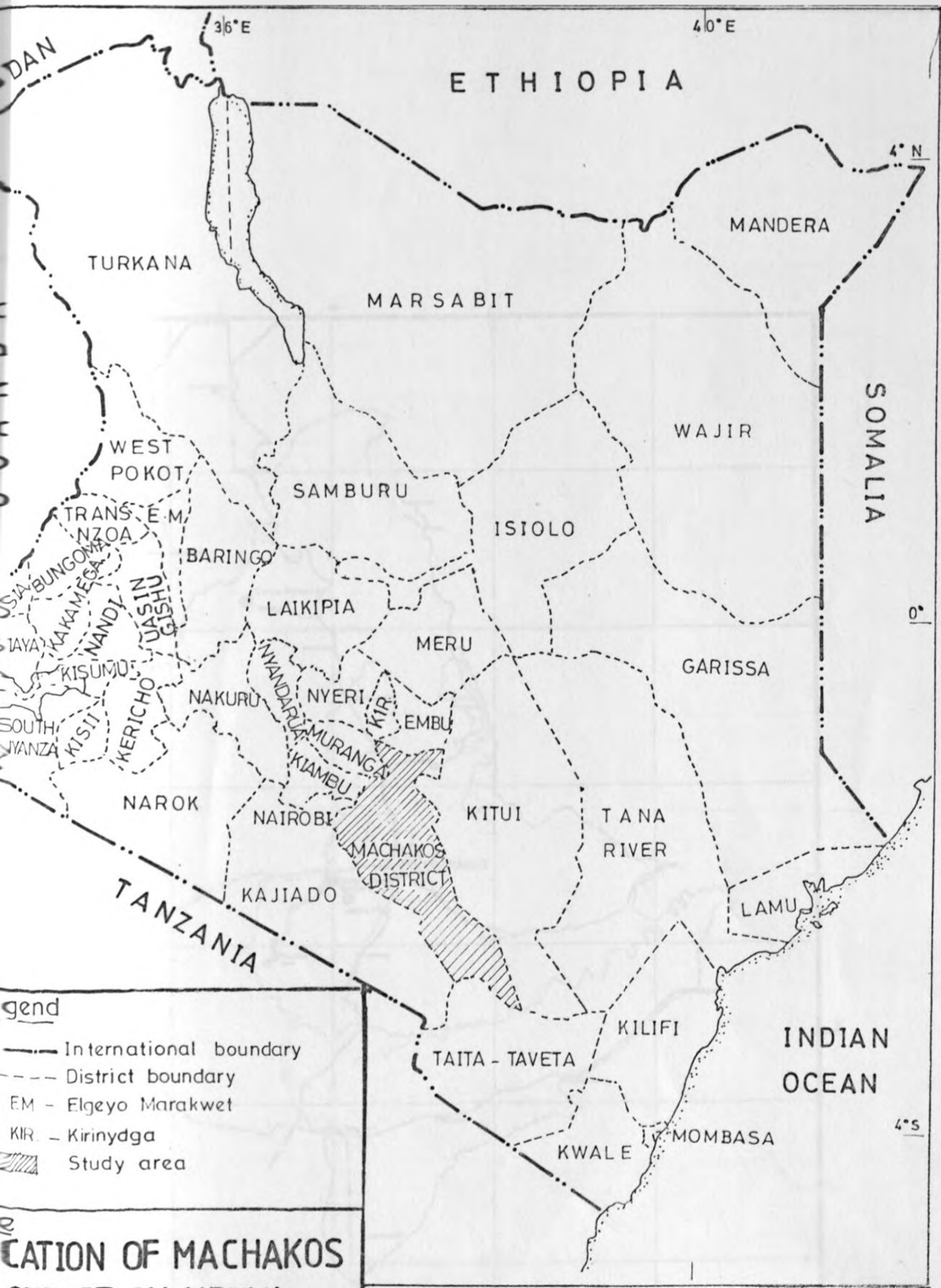
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KIOKO A.M
M.A THESIS 1987

Scale

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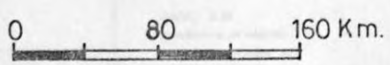


LOCATION OF MACHAKOS DISTRICT IN KENYA

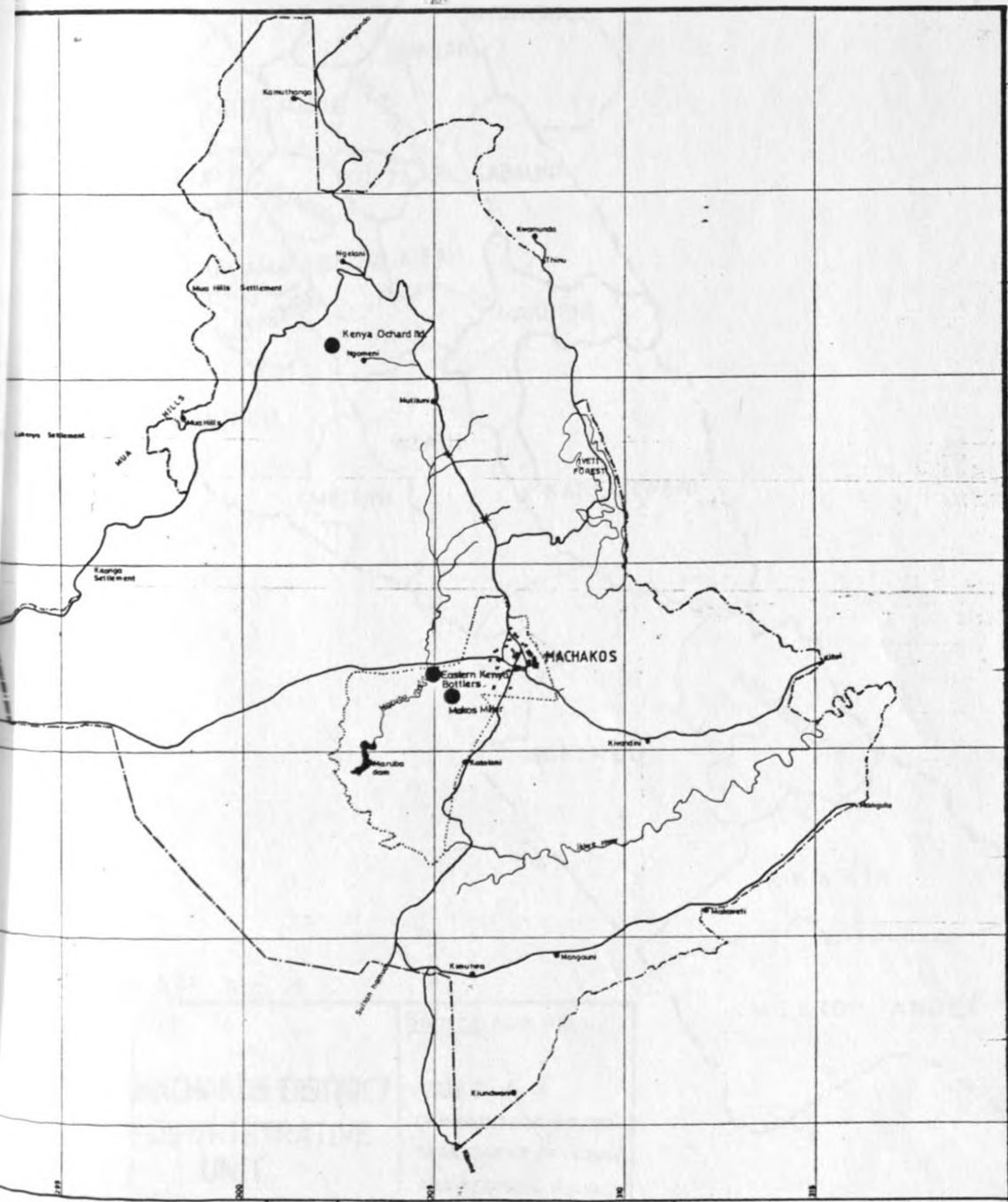
OKO A.M

THESIS 1987

Scale



MAP No. 2



MAP No. 3
MACHAKOS TOWNSHIP BOUNDARY
AND LOCATION OF THE INDUSTRIES

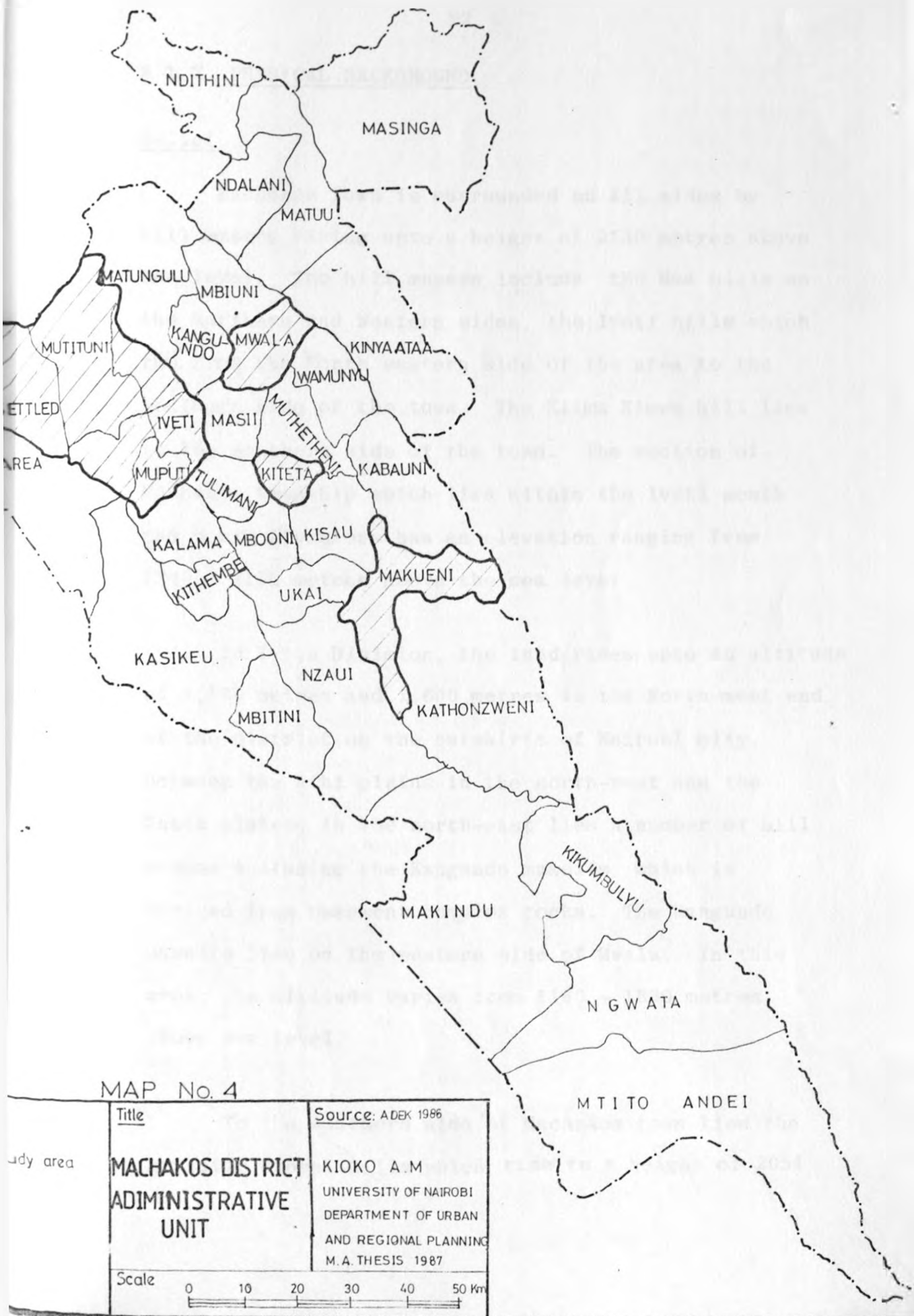
Legend

- Old boundary
- - - - - Extended boundary

Scale

0 1 2 3 4 5

KIKO A M
 UNIVERSITY OF NAIROBI
 DEPARTMENT OF URBAN AND
 REGIONAL PLANNING
 M A THESIS 1987



MAP No. 4

<p><u>Title</u></p> <p>MACHAKOS DISTRICT ADMINISTRATIVE UNIT</p>	<p><u>Source:</u> ADEK 1986</p> <p>KIOKO A.M UNIVERSITY OF NAIROBI DEPARTMENT OF URBAN AND REGIONAL PLANNING M.A. THESIS 1987</p>
<p><u>Scale</u></p> <p>0 10 20 30 40 50 Km</p>	

Study area

2.1.2 PHYSICAL BACKGROUND

Relief

Machakos Town is surrounded on all sides by Hill masses rising upto a height of 2130 metres above sea level. The hill masses include the Mua hills on the Northern and Western sides, the Iveti hills which run from the North eastern side of the area to the southern side of the town. The Kiima Kimwe hill lies to the southern side of the town. The section of Machakos township which lies within the Iveti south and north Divisions has an elevation ranging from 1340 - 2130 metres above the sea level.

In Yatta Division, the land rises upto an altitude of 1,100 metres and 1,600 metres in the North-west end of the district on the outskirts of Nairobi city. Between the Athi plains in the north-west and the Yatta plateau in the north-east lies a number of hill masses including the Kangundo massifs which is derived from basement complex rocks. The Kangundo massifs lies on the western side of Mwala. In this area, the altitude varies from 1160 - 1830 metres above sea level.

To the southern side of Machakos town lies the granitic Mbooni hills which rise to a height of 2054

metres above sea level. This area of Mbooni Division lies at an altitude of 1160 - 1280 metres above sea level. Kilungu hills are found within the same region and rises to a height of 1,900 metres above sea level. These hills are also notable at Nzaui where they rise to a height of 1800 metres above sea level.

Makueni Division has relatively low lying terrain varying from 790 - 1280 metres above sea level.

2.1.3 Climate

2.1.3.0 Rainfall and Temperatures

The rainfall is to a large extent influenced by the altitude of the land.

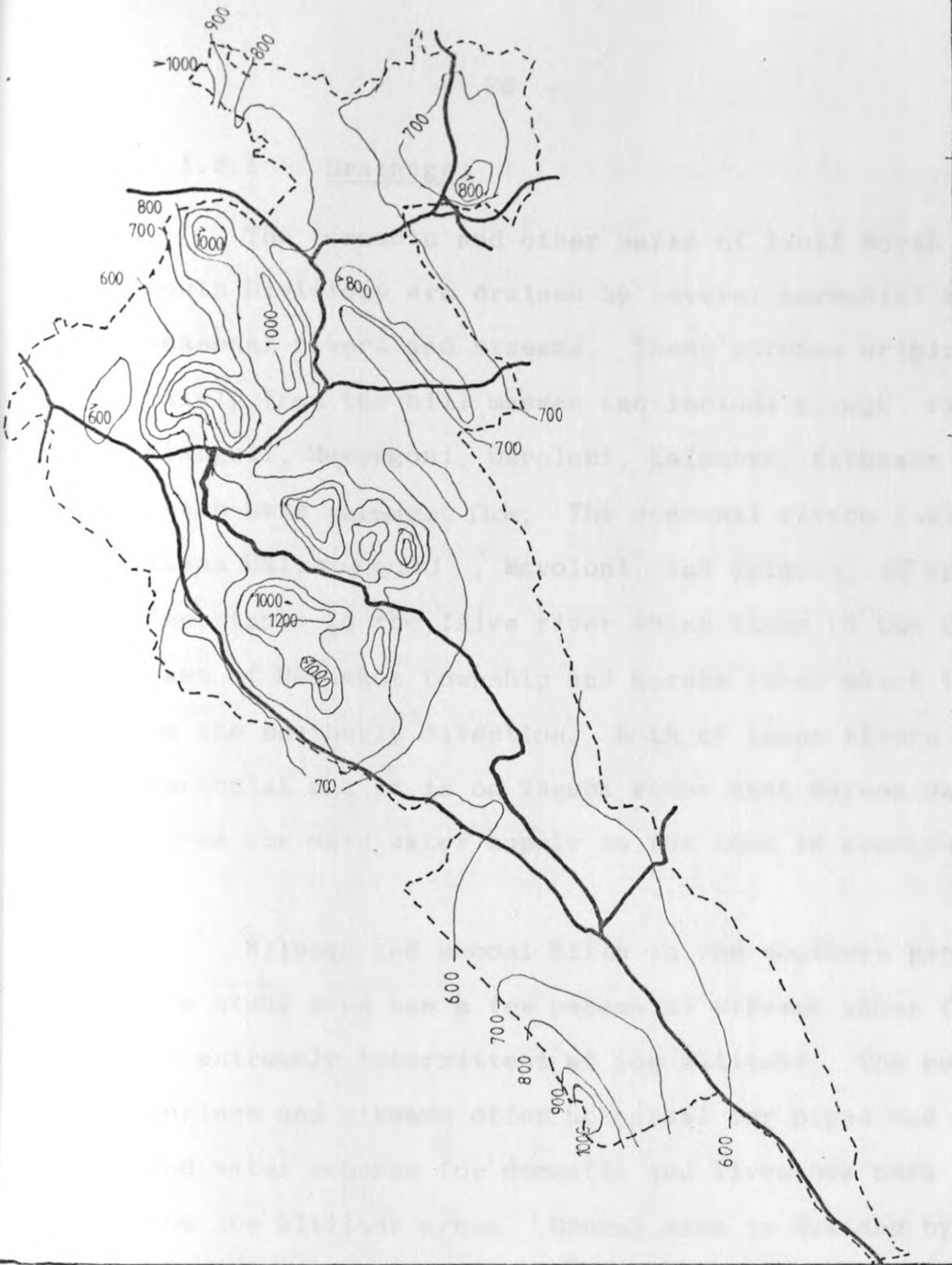
Machakos township has an average annual rainfall of 750 - 1,000mm. This rainfall is distributed over the year within the two rainfall seasons March to May and October to December. The two rainfall maxima are experienced in April and November with April being the principal maxima. Within the region the temperatures vary locally with the maximum annual mean temperature being 22.7°C and minimum annual mean temperature being 14°C in Machakos town. Within the township and other parts of Iveti North and south divisions not within the township, the average mean temperatures ranges from 16.0°C - 20.9°C. This wide range of temperature can be

attributed to the differences in relief, Kangundo division experiences the same rainfall and temperature conditions as Iveti North and south Divisions. Mwala location in Kangundo division has temperatures ranging from 21.3°C - 22.0°C and rainfall varying from 700 - 850 mm annually.




Makueni Division within which Makueni Location lies, has rainfall varying from 500mm - 1,000 mm. Only a small portion of the area experiences rainfall between 750mm - 1,000mm. In particular most of Makueni Location, Kathonzweni Location as well as parts of Mbitini Location receive an average annual rainfall varying between 700 - 850 mm. The temperatures experienced here are $22 - 21.3^{\circ}\text{C}$. As one moves southwards, the altitude drops and annual mean temperature rises up as high as $24.0 - 21.0^{\circ}\text{C}$ and annual average rainfall drops to between 600 - 750mm. per annum.

Mbooni Division experiences mean annual rainfall of 750mm - 1250mm, per year but Kiteta Location which lies in Mbooni Division receives annual mean rainfall of 700 - 850mm, and annual mean temperatures of $22.0 - 21.3^{\circ}\text{C}$.

Yatta Division, experiences rainfall between 500 - 750mm. This amount is experienced in Makindu and Kibwezi. The distribution of rainfall within the study area is shown in Map 5.



LEGEND

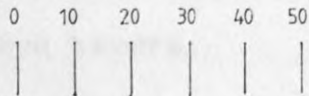
-  ISOHYET (in mm)
-  ROAD
-  DISTRICT BOUNDARY

MAP No. 5

AVERAGE ANNUAL RAINFALL IN MACHAKOS

KIOKO A.M.
 M. A. THESIS 1987

SCALE



2.1.3.1 Drainage

The township and other parts of Iveti North and south Divisions are drained by several perennial and seasonal rivers and streams. These streams originate mainly from the hill masses and include Kyondu river, Kyanguli, Muwongoni, Unyoleni, Kalambya, Kathaana rivers which have permanent flow. The seasonal rivers include Kalua Uki, Mbanyani, Mavoloni, and Kaigoto. Of special importance is the Ikiwe river which flows to the south east of Machakos township and Maruba river which flows on the southerly direction. Both of these rivers are perennial and it is on Maruba river that Maruba dam which forms the main water supply to the town is constructed.

Kilungu and Mbooni hills in the southern part of the study area has a few perennial streams whose flow is extremely intermittent at low altitude. The perennial springs and streams offer potential for piped and gravity fed water schemes for domestic and livestock uses in the low altitude areas. Mbooni area is drained by Ngaa and Tawa rivers which are all tributaries of the Thwake river.

In Makueni, Kasikeu region is drained by Mkuyu river while Nzau is drained by Kiangini river while Makueni Location is drained by Kaiti river which is an extension of Thwake and Chunyu rivers.

Kangundo Division is drained by Mbilini river and Eyumo which are tributaries of Athi. Eyumo river also serves Siathani (Mwala) region. Yatta Division is served by the massive Masinga dam, and rivers Kitambui, Mukengesia, Euma, and Kithioko which are all perennial rivers.

Kibwezi division is drained by Kibwezi, Kambu, Kiboko and Mtito Andei rivers all of which are tributaries of Athi river. Most of the other water sources are seasonal in nature and they usually have subsurface flow. These subsurface rivers are an important source of domestic and livestock water in many parts especially in the dry seasons. Generally, Athi river is the major perennial river and drains most of the District. Tana and Thika rivers drain the northern most parts of the District.

Kibwezi and Yatta Divisions are better favoured for irrigated agriculture because they have more access to perennial rivers which are tributaries of the river Athi. In Yatta the massive Masinga dam forms a large water reservoir which can be utilised for irrigation.

2.1.1.2 Other Sources of Water

There are also other sources of water in the district. The following table summarises other sources of water and their level of utilization.

Table 2.0

Types of Water Sources

Division	Piped water project	Borehole without piping	Dam projects with piping	Completed but not operational	% operational projects	% partially implemented	% increase in completed projects	Population projected ratio (1983)
Kangundo	10	-	-	1	54%	27%	16%	19,150
Kibwezi	6	1	-	-	28%	28%	35	17,150
Mbooni	11	-	3	-	35%	27%	266	11,850
Makueni	9	5	-	-	66%	14%	7.6	11,550
Yatta	8	1	2	1	50%	16%	41	13,550
Iveti North	11	-	-	1	46%	30%	50)	12,775
Iveti South	6	-	-	-	50%	16%	33)	
Kilome	6	-	2	-	83%	16%	50	23,500
Total District	67	7	7	3				

Source: Machakos District Development Plan - 1984/88 pg.32.

The above data on water shows there are different sources of water in the study area. Water is a very important factor in agricultural production, and as a result the water data could be utilised to show to what extent water is a constraint in the development of Machakos district as well as possibilities of increasing its level of utilization. The dam projects with piping in Mbooni, Yatta and Kilome for instance would show the possibility of irrigated agriculture. The piped water projects and the boreholes show the possibility of irrigation as well as sources of water for domestic consumption.

2.2.0 SOILS AND ECONOMIC ACTIVITIES

Adequate water sources is not the only resource needed for good agriculture. Soils of a particular area coupled with the temperatures also influence the type of economic activities which take place in different areas.

The soils in the study area differ from region to region and there are even local variations. Due to this variation in soil types and their fertility the productivity of the soil differ from place to place.

Within Machakos township, and in parts of Iveti north and south divisions, Kangundo and Yatta divisions have varied soil types. The dominant soil types are the red friable clays (Latosolic soils). These soils are dark, redish brown and have medium humic (i.e. containing 1.5% carbon) content. These soils are derived from both volcanic and basement complex rocks and occur on gently rolling land between 3,000 - 6,000ft. In addition to these types of soils, the area also has shallow stony soils with rock outcrops. These soils owe their characteristics to the recent accelerated erosion which has made them (the soils) lose their former original characteristics. These erosion surfaces are clearly evidenced in the Iveti hills. The dark redish brown soil mentioned above is fertile and suitable for agriculture. With the high rainfall (750 - 1,000mm) the area is productive agriculturally. On the slopes of the hill masses of Iveti north and south and Mbooni hills (Kiteta), fruits are widely grown. These are also some of the areas suffering from massive erosion. Mua hills and the surrounding areas are also important farming areas with the main crops being maize, coffee, beans, pigeon peas and vegetables in addition to fruits. Although Kangundo division is suitable for maize production, the emphasis is on coffee and little land is set for maize production.

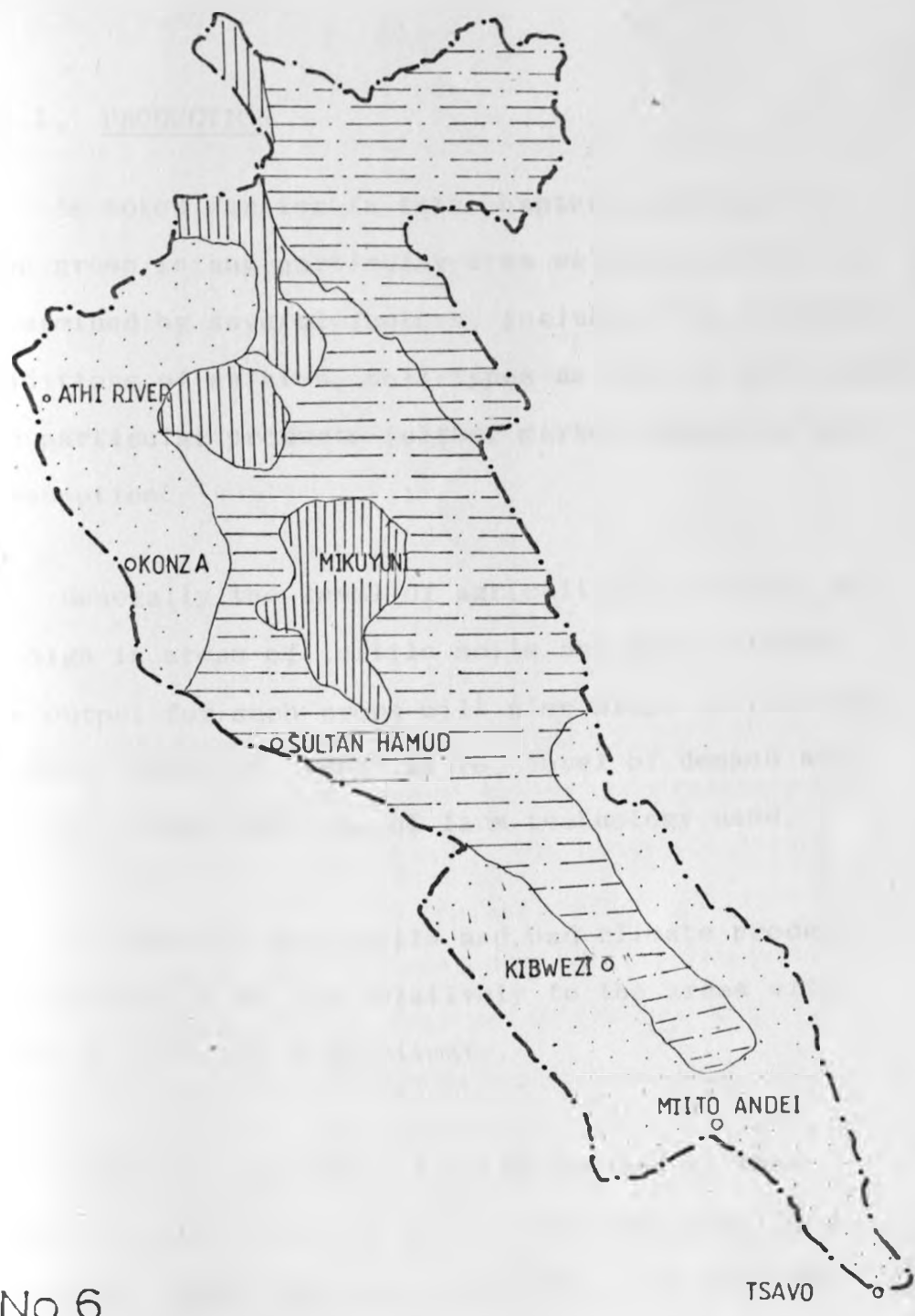
Mwala location which lies in Kangundo division is the exception mainly because the soils and temperatures as well as rainfall are not suited to coffee growing. Mwala is covered by light yellow-brown sandy loams with laterite horizon. These soils range from dark greyish brown to dark brown soils. The rainfall here ranges from 700 - 850 mm. and temperatures range from 21.3 - 22.0°C. The kind of agricultural activity practised here is farming with the dominant crops being maize and beans, sunflower, pigeon, peas, cotton, fruits especially mangoes and oranges. Livestock keeping is also practised.

Makueni Division has varied soil types, some parts of the division especially the Makueni Location has light yellow-brown sandy loams. They are generally the black cotton soils. The agricultural activities practised in here are growth of maize and beans, cotton, pigeon, peas, and livestock is also kept. In some areas fruits are also grown.

Mtito Andei, Makindu, and Sultan Hamud lies within a semi arid region. These areas have dark red sandy loams (latosolic soils) which are derived from the basement complex and volcanic rocks and are mainly associated with peneplains between 1,000 - 6,000 ft. These soils are considered relics of a past more humid climate. The type of crops grown here are vegetables, maize and beans, pigeon peas.

37°

38°



MAP No.6

<p>end</p> <p>Land of high potential Over 35 inches (889mm) rainfall</p> <p>Land of Medium potential 25 35 inches (635- 889mm) rainfall .</p> <p>Rangelands Below 25 inches (635mm) rainfall</p> <p>10 20 30 20 40</p>	<p><u>Title</u></p> <p>MACHAKOS DISTRICT.</p> <p>AGRICULTURE POTENTIAL</p> <p>LAND CATEGORIES</p>	<p>KIOKO A.M</p> <p>UNIVERSITY OF NAIROBI</p> <p>DEPARTMENT OF URBAN</p> <p>AND REGIONAL PLANNING</p> <p>M.A. THESIS 1987</p>
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2.2.1. PRODUCTION

As noted earlier in this chapter, the type of crop grown in any particular area will greatly be determined by several factors, including the climatic conditions of an area, soil types as well as the demand for particular products (either market demand or home consumption).

Generally the level of agricultural activity will be high in areas of fertile soils and good climate. The output for such crops will also hinge on the soil type(s), rainfall, temperature, level of demand and to some extent the type of farm technology used.

In areas of poor soils and bad climate production is expected to be low relatively to the areas with fertile soils and good climate.

Table 2.2 and Table 2.3 (at the end of this chapter) helps show the type of activity practised, levels of output and where possible, the earnings from such activities. Table 2.3 also shows the potential for other economic activities (products).

2.3.0 COMMUNICATION

Communication network is one of the essential things in Agricultural sector as well as the

integrated system. This is because the means of communication from the channels through which farmers market their produce, and also forms the channel through which the farmers transport the farm inputs from the industries or market areas to the farm level. Further, communication network accelerates the economic development.

4.3.1 Inputs

The part of Washam District which falls across the study area is fairly well served with road

network. The town is served by several tarmacked roads. The Bulindi-Machakos road forms the link between the town and the capital city while the Machakos-Kangundo road forms the eastern link to Machakos town and the Machakos-Kisumu road joins the southern parts of the district to the town. The Machakos-Kathiani road links the N.E. side of the town. The Machakos Kitui road joins the district with the neighbouring Kitui district. Each of these roads has branches of minor roads which have sprung up in various areas.

The other areas of the Machakos District are fairly well served by road networks with all classes of roads including Extra-national trunk road, primary roads,

secondary roads, minor and track roads fairly well distributed all over the District. The central part of the district is better served with road network than the southern side. But even within that part of the district, there are local variations in the road coverage, so that accessibility for some farmers is still a major problem.

2.3.2 Railway:

The Machakos township is not served by railway but the railway passes through Athi river, which competes with Machakos for the location of industries and through other much smaller centres like Kibwezi.

2.3.3 Power

Machakos town is served well with electricity but the rural electrification programme has not gone far.

2.3.4 Machakos Town Water Needs

Water is an important component in industrial development. Some of the industries especially the main water consumers like soft drinks industry consider the issue of availability and reliability of water supply before a decision of where to locate the factory is finally made. Other industries like bakeries and

industries dealing with food processing generally require high sanitary standards and therefore presence and adequacy of water are important considerations. Water is also important for use in other activities complementary to industries. This includes water for domestic consumption and essential services like health facilities. Thus water is an important component in industrial production and often influences the location of industries. This means that complementary industries dependent on the presence of the primary industry, of necessity have to follow the location of primary industries.

2.3.5 Water Source:

The main source of water for Machakos town is the Maruba dam which is situated in Maruba river to the southerly direction of the town. The dam was designed during the colonial times and the population served then was obviously smaller, as compared to today's. The dam produces 2,600 cubic metres of water a day which is the maximum that can be pumped a day. But the demand is estimated to be 5,200 cubic metres a day. As a result water has to be rationed for 12 hours which is mainly from 7 p.m. - 6 a.m.

In addition there are 5 boreholes within the town. Of the 5, two are not fully equipped. Only 3 are operational and 2 are rented to the Eastern Kenya Bottlers

Ltd., the main industrial water consumer within the township. The boreholes have a capacity of 7 - 9 cubic metres per hour which is 648m³ per day (assuming 9m³ per hour). Even then, the water from the boreholes is slightly saline and has to be blended with the water from Maruba dam in order to make it more suitable for domestic consumption. The water from the boreholes run by East Kenya Bottlers is used for cleaning the bottles as it is not suitable for soft drinks production because of its salinity.

Table 2.I : Water Demand and Supply

Demand	Present Demand Amounts (m ³)	% of Total
Industrial	812.00	25.0%
Institutional	1001.00	30.8%
General public/ domestic	1435.00	44.2%
Total demand =	5,200 m ³ /day	
Current supply =	3,248 m ³ /day	
Deficit	1,952 m ³ /day	

Source: District Water Engineer, Machakos, 1986.

N.B. The East Kenya Bottlers Ltd, takes 90% of the total water used by the industries.

2.3.6. FUTURE PLANS

Currently another dam is being designed to form an additional water supply to the town. It is estimated that the new Miwongoni dam, will supply the town with an additional 2,600 cubic metres. It is near the Maruba dam. This is a short run solution.

A long run solution has been sought and it is on its way to implementation. This is through the harnessing of water from Mt. Kilimanjaro. According to the Minister of Water Development (Daily Nation Feb. 3rd p. 5) the project is set to start in July 1987 and will cost the Government Kshs. 590 million.

2.4.0 INDUSTRIES

The industries discussed in this study are located within Machakos township which covers an area of 320 km.². The industries include: Makos millers, Luki bakery, Jalas industries, KIE (sheds), East Kenya Bottlers, Kenya Orchards Limited (KOL), Moon Industries, Kathuli Timber Sawmill, Simba African Food Industries, Rural Food Industries, Mafco Honey Packers, Ukamba Printers, Eastern Printing Works. Although these industries are not concentrated on one zone within the town they are all located within the township boundaries.

2.4.1 General discussion of the Industries

The East Kenya Bottlers is one of the largest employer as far as industrial employment is concerned. It employs 100 employees and manufactures soft drinks and therefore uses very little raw materials from Machakos District. 80% of its employees come from Machakos District and therefore contributes significantly to employment. Apart from employment and occasionally sponsoring some sports within the district, especially through buying them uniforms and paying the Council some money for the trade licence, the industry bears little links with the district as most of the inputs are imported. It is however a major water consumer in the town. Scarcity of water within the town is a major constraint to its expansion. It has to operate boreholes to curb the problem, but even then the borehole water is saline and has to be treated for further use. The industry does not have any links with the other industries in Machakos town.

4 Luki Bakery employs 50 workers and majority of them are from Machakos District. It uses little of the local raw materials, since wheat is not grown in Machakos district, but it has interaction with Makos millers industry to whom they sell empty wheat flour. Like the East Kenya Bottlers water is a problem to the industry especially during the dry season. Stiff

competition from other firms outside the district hinders its expansion.

All the honey processing industries named above get their honey from Machakos District. However the employment in these industries is limited ranging from 3 - 5 employees. These industries operate in hired business premises mainly shops.

The printing firms, Eastern Printing works, Ukamba Printers produce labels, calenders and stationaries for Business enterprises firms and schools within Machakos district. These two firms employ approximately 15 people majority of whom come from Machakos District.

Kathuli Timber sawmills produces mainly timber and related hardware. The industry employs about 50 employees. Most of the soft wood is obtained from Machakos District, and hard wood is obtained from outside the district. Hardwood is scarce and not obtained easily. The Industry also faces problems of scarce softwood as there are not many concentrated soft wood forests in the district.

The Kenya Orchards Limited, and Makos millers the industries selected for detailed investigation. The Kenya Orchards Limited is one of the oldest industries in Machakos Township having been established in 1948.

It processes fruits and employs 90 employees majority of who come from the district. Makoš millers produces maize flour known as Tausi, It employs 90 employees and majority of them come from the district. It has a direct linkage with the district since all the maize it uses is obtained from the district. These two industries are discussed in detail elsewhere in this study.

Table 2.2

2.4.2 CROP PRODUCTION FOR THE DISTRICT

Maize

<u>Year</u>	<u>Area(Ha.)</u>	<u>Production(tons)</u>	<u>Value(£)</u>
1983	135,491	121,942	8,957,147
1984	106,000	38,375	5,442,720
1985	230,000	174,000	52,215,000

Beans

1983	77,606	69,846	17,461,525
1984	43,500	5,872	2,283,750
1985	77,000	35,000	17,000,000

Sorghum/Millet

1983	23,970	10,790	-
1984	33,000	1,790	-
1985	38,000	7,284.6	-

Pigeon peas (drought resistance)

1983	2,340	4,206	315,450
1984	15,500	1,240	120,000
1985	42,000	26,420	6,605,000

Coffee**

<u>Year</u>	<u>Production (kg.)</u>	<u>Earnings</u>	<u>Paid to Farmers. (Kshs.)</u>
1983	16,962,660	329,799,684	109,343,732
<u>Mbuni</u>	641,621	20,874,317	20,874,317

Cotton**

<u>Year</u>	<u>Area</u>	<u>Production (Ha.)</u>	<u>Value (£)</u>
1981/82	27,387	4,216,039	15,943,153
1982/83	28,000	4,886,390	20,277,489
1983/84	30,175	2,140,931	9,927,210
1984/85	32,000	7,565,228	34,197,694

**Although coffee and cotton may have enough factories and ginneries in Machakos District. Of importance is the incomes earned from their sale (earnings) since the incomes so earned are likely to find their way to the people and consequently increase the demand for products produced within and without the district.

Cowpeas

<u>Year</u>	<u>Area (Ha.)</u>	<u>Production</u>	<u>Value K£</u>
1983	23,979	10,790	3,237,273
1984	33,000	1,485	220,000

Cassava

1983	1,209	6,045	302,250
1984	1,360	8,800	400,000

Sweet potatoes

<u>Year</u>	<u>Area(Ha.)</u>	<u>Productions</u>	<u>Value(K£)</u>
1983	1,159	4,632	4,632,000
1984	1,040	5,200	520,000

Sunflower

1983	255	127	12,750
1984	260	120	12,000

Fruits and vegetables:

Bananas

1983	3,169	18,602	620,018
1984	3,220	12,880	429,300

Cabbages:

1983	485	3,228	242,950
1984	498	2,490	62,250

Citrus

1983	1,255	8,198	409,960
1984	2,210	11,050	276,200
1985	-	8,675	-

Guavas

1983	305	112	250
1984	310	712	155
1985	-	-	-

Tomatoes

1983	668	12,692	616,890
1984	1,400	11,200	224,000
1985	-	29,850	-

Passion fruit

<u>Year</u>	<u>Area (Ha.)</u>	<u>Productions(Tons)</u>	<u>Value Kf</u>
1983	53	720	580
1984	68	952	47,600
1985	-	178	-

Avocado

1983	68	17	-
1984	17	172	8,600
1985	-	132	-

Apples

1983	1983	3	17	-
	1984	3	30	3,000
	1985	-	63	-

Peaches:

PEACHES, NECTARINE AND DEKRAZ PRODUCTION					
Year	Area (Ha.)	Production (Kg.)	Value (Kf)	Total Value in Kf	
1983	16	-	-	-	-
1984	16	90,280	48	2,400	71,880
1985	-	36,000	76	-	127,880
<u>Capegoes berries</u>					
1983	16	172,810	7,000	1,314,300	-
1984	4	183,480	12	1,577,600	-
1985	-	10,410	63	-	34,380
<u>Loquarts</u>					
1983	11	3,140	-	-	32,180
1984	27	3,000	154	770	74,000
1985	-	-	113	-	3,402,700

Mangoes

<u>Year</u>	<u>Area (Ha.)</u>	<u>Production(Tons)</u>	<u>Value (£)</u>
1983	2,390	1,316	65,800
1984	2,390	1,195	59,750
1985	-	6,066	-

Plums

1983	8	-	-
1984	13	42	2,100
1985	-	76	-

Source: Moald report 1985

MIDP Report, 1986.

2.4.3. Other Economic activities

Table 2.3

HIVES FIGURES, HONEY AND BEEWAX PRODUCTION

<u>Division</u>	<u>Log hives</u>	<u>KTB hives</u>	<u>Honey(Kg.)</u>	<u>Beewax</u>
Kangundo	2,141	231	60,560	
Kilome	4,974	222	16,035	
Yatta	5,500	548	19,240	
Makueni	50,255	409	152,815	
Kibwezi	60,600	344	183,420	
Iveti North	1,311	296	5,410	
Iveti South	689	217	3,140	
Mbooni	2,700	114	8,620	

Source: MOALD - MACHAKOS DISTRICT ANNUAL REPORT 1983.

The above data for the various crops, fruits and honey production shows level of production in the district. It not only shows where some of the agro-based industries obtain their raw materials, but also shows the kind of raw materials available and their stock. This data indirectly shows what raw materials are available and therefore gives an oversight of what kind of industry could be established. The data also indicates what fraction the relevant raw materials is being utilised by the current industries and on that basis suggest whether there is potential for new ones.

In summary certain issues emerge out of this discussion. First Machakos town has a problem of water shortage. This water shortage could form a disincentive to location of new industries as well as expansion of the existing ones. The water from the boreholes is saline and for specific industrial use, it has to be treated hence incurring higher operational costs.

Secondly, some areas which are important for fruit and maize production are steep and have few roads. Such areas include Iveti Hills and Mbooni hills areas. This poor road conditions make it difficult to take the farm produce to the markets as well as transporting bulky inputs. The railway line does not

pass through Machakos town and as a result heavy industries development is hampered. From table 2.2 (page 40), it is clear that some crops such as passion fruits, cabbages and bananas some of which are not absorbed in the present industries, These crops could if given effective demand, form the basis of other agro-based industries in Machakos township, such developments would however require requisite infrastructural facilities such as water and rail. If these services were provided, they could make Machakos town competitive in attracting industries.

CHAPTER THREE

3:0 This chapter focusses on the literature review, methodology assumptions and hypothesis.

3:1:0 LITERATURE REVIEW

Attainment of rapid economic development has been a major goal for all countries. Rapid economic development is even more crucial to the less developed countries (LDCs) which have lagged behind in terms of economic development, as compared to the More Developed Countries (MDCs). A major concern of the less developed countries has been to raise the level of economic development through raising their incomes and improving standards of living of the nationals. The LDCs have realised that the gap in economic development between them and the MDCs is wide and at worst widening. The challenge facing the LDCs has therefore been the one of reducing the existing inequality between them and within them. This has entailed choosing of the best strategy which could foster the higher rate of economic growth and development.

In their efforts to attain high rate of economic development, most LDCs have often looked back at history to find out the cause of their present state. The most LDCs attribute their low rate of economic development to the more emphasis on production of agricultural raw materials for domestic consumption and export market, as opposed to the MDCs whose economies had been characterized by high levels of industrialization. Thus they (LDCs)

see low levels of industrialization as a major contributor to the low economic development rates.

The reasons advanced in favour of industrial production as opposed to the agricultural production are varied. The most common ones being that

First it is argued that industrial products are not prone to many fluctuations in prices as is the case with agricultural products, and so their incomes are steady. Industrial products in addition are not conditioned by weather which makes their output ^{to be} ~~is~~ relatively stable. Their relative unperishability nature makes them to be stored for a long period.

Secondly, industry was seen to provide backward and forward linkages for development of the industrial sector. This is through the provision of agricultural inputs, employment and generation of incomes for the employees as well as providing ready market for the agricultural products. The incomes so earned are expected to boost the effective demand for the industrial products.

Due to these factors industrialization had been seen by many LDCs as their only solution to their economic ills. It has been particularly appealing to the LDCs since they consider that the MDCs have passed through

the same "Path" of industrialization and are now as a result more developed. This fact has been observed by a Unido report (1979 pg. 71) which stresses that; "for the newly emerging countries of post war period industrialization was seen as synonymus with development and development implied catching up with the advanced countries using basically the same means." The report further argues that, the importance the south (LDCs) attaches to the role of industrialization in furthering national development objectives stems in part from the identifications of the power and wealth of the North (MDCs) with its dominant role in manufacturing and the weakness and poverty of the south with its preoccupation with agriculture and other primary products.

From this argument it is seem that industrialization along the lines of the MDCs would yield similar results in terms of economic development, elimination of poverty, employment creation and higher standards of living. The LDCs failed to recognize the fact that they were developing in different economic, social and environmental conditions. For instance the MDCs had used capital intensive techniques since labour was scarce to them, while the appropriate one for LDCs would be labour intensive as capital is scarce. Secondly the capital intensive

technique would require high skilled manpower which the LDCs could ill afford. Thus the adaption of the same technology as the MDCs would be detrimental to the LDCs and would reap them less benefits.

Different scholars have seen the issue of industrialization differently. Byce (1960 pg 3) views industrial development of the underdeveloped countries as one of the great crusades of our times. He describes it as "an effort in which the underdeveloped countries place a major hope of finding a solution to their problems of poverty, insecurity and over-population and their ending newly realised backwardness in the modern world." Jhingan (1981) argues that for underdeveloped countries since natural resources are underdeveloped, or less developed, the establishment of key industries would help accelerate the rate of economic development.

Nehru, and Nyerere expressed their strong beliefs on industrialization. Speaking of India Nehru (1953 pg. 11) asserted that, "Real Progress must ultimately depend on industrialization". Nyerere in the 1964/69, contented that Tanganyika could not rely fully on agriculture for its development, because that would be subjecting Tanganyika to poverty. To

these two speakers, industrialization was a major vehicle to faster economic development.

Barrat, Collier, Glasser and Monning (1976) observed that one of the aims of the second Swaziland development plan was to increase wage and employment opportunities and industry was to play an important role in the achievement of the outlined objective.

From the above discussion it is evident that industrialization is viewed by many LDCs as the engine to economic growth and development. The Unido report (1979 pg. 71) cited earlier/above argue that, "this close identification with the means as well as the ends of development process achieved by the advanced countries was mainly responsible for shaping the form of industrialization in the third world which we now perceive". The problem is that some countries emulated wholesomely the strategy without considering the local conditions and needs, hence the industrial benefits have been limited. In countries where industries have been established with close integration within the economy, more benefits have been reaped.

To Jhingan, faster economic development would be achieved with establishment of key industries which

would spread the benefit to the whole economies. Jhingan's argument fails to stress that such key industries could however increase regional economic disparity unless their spread effects cover large areas. His study fails to give what comprises the key industries, and there is an implicit assumption that underexploitation of resources is largely due to lack of industries, which might not be necessarily true. Types of technology used and under capacity utilization would be some factors responsible for the under-exploitation of the resources. Nyerere's argument assumes that with industrialization development would be automatic. However, Nyerere and the other scholars cited failed to stress that, the rate of economic development would be faster if the industries to be established were tied to the utilization of local, available resources and that industrialization per se could not bring the desired development.

Nevertheless the role of industrialization in the economic development has been widely accepted and appreciated. Hirschman (1972) argues that the establishment of an industry in a particular area sets up a stimuli since it brings up new expanding market for its inputs consequently stimulating the growth of that area. This stimuli differs from industry to industry and also depends on the extent to which the

area can respond to the desired demand. Hirschman, also did not stress that most of the raw materials demanded by such an industry maybe supplied from external sources thereby limiting the growth of an area. He did not however discuss the extent to which specific area would respond to particular industry's demand patterns which often depend on the incentives given by industry such as prices, and transport.

Zuvekas (1979) argues that industrialization contributes to the psychological dimension of welfare by giving a nation and its citizen a feeling of greater control of their economic lives. Zuvekas does not however stress that this psychological satisfaction is often fulfilled if the industries are controlled by the nationals, and if the local people are given more employment opportunities and where industries depend on local resources, for production.

Kindleberger (1965) argues that the marginal product value of labour in industry is higher than of agriculture and that improvement of agriculture depends on the availability of manufactured inputs such as fertilizer and farm machinery. He further argues that to increase efficiency on the farm one must start in the factory. Kindleberger does not lay emphasis on the fact that the hinterland can be also fundamental in increasing

the industry's efficiency by providing it with cheap raw materials and in determining the location of the industries.

The Kenya Government's views on industrialization are clearly stated in the development plans. The physical planning department (1978), argues that industrial development plays a vital role in achieving the desired human settlements pattern by determining the location of employment opportunities thereby adjusting population distribution. On this basis it argues that both industrial development pattern and human settlement pattern are highly interdependent, and mutually reinforce each other. It further argues that, industrialization can be an instrument for achieving a balanced and nationally integrated economy capable of providing employment and higher standards of living for the majority of the population throughout the urban and rural areas. Industry is also seen to contribute to national development by earning the country foreign exchange through exports, by producing farm inputs, and by helping to equalize opportunities between urban and rural areas. However, the book stresses the need to have a planned industrial development policy which would help achieve the desired goals.

Research work on industrial development in Kenya has shown that industries can play a big role in developing the areas within which they are located. Khaguli (1979), Adolwa (1985) Awour (1979), Kutolie (1981), all observed that industries contributed to the provision of employment within the regions where they were located and provided market for the agricultural product thereby stimulating the raw materials production.

In her study of Mumias Sugar Factory Khaguli (1979) found out that in addition to provision of employment to many local people, the Mumias Sugar Company entered into contract arrangement with sugarcane outgrowers, an arrangement which enabled the Mumias Sugar Factory to inspect, survey, and prepare farmers land for sugarcane production. In addition, the company supplied farmers with treated seed-cane and gave advice on fertilizer application, harvested and transported the cane to the factory. These incentives made the farmers to respond to the demand of the industry by supplying the raw materials to this factory. The study also found out that the industry had some impact on the provision of basic infrastructure. This included installation of Mumias water supply, meeting substantial cost of bringing the installation of electricity to Mumias town. It was also noted

that following the establishment of the sugar factory, a substantial road network had been created in Mumias, some being constructed in places where none existed before, while others were upgraded to serve the factory. All these programmes had either direct or indirect bearing on the local economy and establishment of the industry. In addition the company had provided recreational facilities for its staff in the form of Golf course, swimming pool, social clubs and space for outdoor games. The company had contributed on the development of a health centre and participated directly in the expansion of the health facilities in the town which had come under pressure due to increased population. For the latter project, the company had donated a sum of Kshs. 50,000.

Adolwa (1985), found out that with the establishment of Webuye Pan African Paper Mills, employment in Webuye township rose by 167 per cent in just one year, making the factory to be the main employer in the town. In addition to employment generation the land use pattern changed with more utilization of the formerly deffered land for agricultural purposes and mainly commercial activity purposes. Thus employment and land productivity rose significantly, due to enhanced product demand. The development of this factory has however been associated with

industrial pollution around Webuye. Awour (1979) found out that Kicomi played an important role in absorbing surplus farm population from the hinterlands with high land pressure and relatively drier areas. However the study argues that this absorption of surplus labour had also negative impacts since it drew most productive manpower from the hinterland (about 62% of the operatives interviewed were aged between 15 and 34 years). Nevertheless, this industry did play an important role in the development of its hinterland in that it encouraged production of cotton by providing ready market. In addition complementary industries like furniture making industries utilising the cotton for cushions and informal sector activities like sale of cotton mattresses emerged. Although these benefits were identified Awour argued that the relationship between Kicomi and its resource hinterland was weak due to its small contribution to the regions economy in terms of incomes accruing to the various employees and by the fact that Kicomi still continued to import Cotton Lint from outside its immediate resource hinterland which was locally available and of the same quality.

Although the above studies made useful contribution, they also had their shortcomings. Awour's study did not show the percentage contribution of the local raw materials to the cost structure of Kicomi. This could make one understand the value added locally which could be compared to the total cost component. Secondly although Awour argued that Kicomi helped in absorbing the surplus off-farm employment thereby making the land and labour productivity to go up, the author argues in other parts of the study that Kicomi drew most of the able bodied persons from the hinterland and uses the argument as one of the basis of concluding that the industry was parasitic in nature, while in fact the argument is contradictory. The conclusion that Kicomi was parasitic in nature would suggest that the industry was "feeding" on the resource hinterland without reciprocating anything in return yet the study argues that Kicomi contributed in way of employment provision and income generation.

Khaguli (1979) and Adolwa's (1985) studies are urban based since they focus on, the impact of Mumias sugar factory on the growth of Mumias town and the impact of the Pan African Paper Mills on the growth of Webuye town. These studies, like Awour's focused on only one crop namely sugar cane and timber

(forests) respectively. Khaguli's study did not look into employment linkages between the industries and their hinterlands. For instance if the industries trained the employees the net effect of such training would be raising the manpower skills. These contributions were not studied. These observations can be made in respect of Adolwa's study.

Although the studies had these limitations they nevertheless provide some invaluable informations on what aspect of industrial development a researcher can focus attention on in assessing the contribution of industries to their resource hinterlands.

It is worthy noting that although the idea of industrialization seems so promising, there are always disadvantages for every set of advantages. Some of these disadvantages are minimal and have easy tradeoffs while others are of more significance. Such negative effects includes environmental pollution, noise pollution all which can be detrimental.

Kaindi (1984) found out that although the Kenya Meat Commission (KMC) and the Portland Cement Factories contributed much in terms of employment and incomes generation, they were also a health hazard as they pollute the neighbouring Athi River as well as the

surrounding areas. Such pollution unless checked would bring other socially and economically undesirable effects. Adolwa also confirmed the case of pollution around Webuye from Pan African Paper Mills. This shows that besides the positive contribution of industrial development such as job creation and use of raw materials industrialization has some negative contribution as well.

However industrialization per se may not bring about the desired economic growth and development unless integrated within the economy. This then calls for interdependence between the agricultural sector and the industrial sector. In the less developed countries where agriculture is the major sector and prime employer, the linkage between the two sectors is strongly stressed and their development advocated.

A Unido Report (1979 pg. 73) argues that industrial growth per se must always be counter-balanced by the growth of agriculture, services and basic infrastructures if social goals are to be met. It further argues that, since the major motive for industrialization is to achieve a balanced economic growth, there is the need to integrate the large scale subsistence economies of most developing countries with

the modern urban mining and plantation enclaves established by the colonial powers. It observes that the neglect of the agricultural sector has had the impact of reducing the domestic market for manufacturers and constraining the supply of agricultural raw materials to industry. The UNIDO report attributes the disappointing contribution of modern industrial technology towards raising productivity to the poor linkages between the sectors.

Byce (1960, pg. 5) states clearly that, "no advocacy of even the soundest industrial development as an answer to the problems of underdeveloped countries can be made honestly without admitting that industrialization alone and in itself is often overrated as a means to achieve economic progress." He further argues that in an underdeveloped country where resources may not be many it would be desirable to build what industry requires from the strength of agriculture. It is on this premises that Byce argues that in every industrial country, industry in its early stages was build on the backs of the farmers. Agriculture as a result form a base from which industrialization could be financed, while the agricultural population provides a market for new industrial goods.

Gunnar Myrdal agrees with Byce on the interdependence of Agriculture and Industry. He cites the examples of India and Japan whose population/land ratio is high, and has promising manufacturing industry, but nevertheless emphasize on improvement of agriculture.

Nurul Islam (1978) emphasized this interdependence by asserting that, agriculture must be integrated with the development of the non agricultural activities both in rural and the urban areas. He insists that agricultural progress provides the basis for successful industrialization not only through the supply of wage goods (food supply) and raw materials but also by providing a wide diversified demand or market for a large variety of industrial goods.

From the UNIDO Report (1979), Byce (1960) Gunnar Myrdal and Nurul Islam, it can be learned that agriculture cannot be neglected since it forms the basis for successful industrialization. Thus agriculture and industry are interdependent for each sectors growth depends on the contribution of the other.

The Kenya Government recognises the interdependence between Agriculture and Industry, and stresses it in the development plans. The 1984/88

Development Plan (pg. 58) stresses that "rural development depends critically on linkages between the rural areas and urban centres. This is because urban centres provides markets for rural production and are sources of inputs for rural activities and consumer goods for rural households". This development plan stresses that rural development requires ready access to urban markets because without access to such markets, rural people cannot aspire to more than subsistence livelihood. It explicitly asserts that (pg. 59) "there is simply no sense in producing more than a family requires without access to markets."

Similar views were expressed in the 1979/83 Development Plan. This particular development plan states explicitly that, "rural development cannot be a self contained process,"and stressed the fact that "rural areas must be knit closely to the urban markets for both supplies of farm inputs and consumer goods and outlets for farm produce, if they are to become an integral part of the monetary economy thus the inderdependence of rural and urban development suggests that a careful balance must be maintained between them " pg. 45.

The recent 1986, Sessional Paper No. I on economic management for renewed growth points out that, the cornerstone of rural-urban balance is a productive agriculture and livestock economy that provides growing incomes and employment for rural families. It however stresses, the fact that growth in agriculture also creates the potential for new industries and services in the small cities and towns of the rural areas. But then to ensure that the potential was realised a second component of the growth of very small scale manufacturing, commerce and other services in rural areas was stressed. The industries were expected to provide the bulk of the rural off-farm employment and to supply materials, services which are essential to the development of a prosperous agriculture while processing and marketing output.

From this discussion, it can be inferred that the close integration of the agricultural sector with the industrial sector can promote rapid development in the region under question. It is evident that the benefits industrialization would be reaped more if most of the raw materials are locally produced. Hirschman (1972 pg. 99) notes that domestic availability of the industrial inputs will trigger more development because of three main considerations namely:-

- (a) Importing requires special skills and therefore reduces the number of potential entrants.
- (b) Importing is subject to special balance of payments uncertainties and production largely based on imports is particularly risky if inflation is expected to proceed rapidly at home than abroad and adjustment of the exchange rate is held back.
- (c) The fact that a certain product is produced domestically is likely to result in efforts on the part of the producers to propagate its further uses and their financial participation in such ventures.

Hirschman further argues that by providing a reliable market, processing industries originally based on imported agricultural materials can stimulate domestic production of such raw materials. At a regional level it can be argued that the industry located at a particular place may induce its resource hinterland to produce the desired industrial raw materials. The case for domestic availability of raw materials and the benefits emanating from it is supported by Ogendo R.B. (1972) who in his study

on industry found out that the agricultural food processing industries were more profitable from the point of view of value added by manufacturing, than either agricultural non-food processing and fabricating industries or the non agricultural manufacturing service industries.

Thus industries which are based on the local raw materials are desirable.

In summary, from the literature review several things emerge;

Firstly it can be learned that, industries located in a certain area are expected to contribute to the development of that area by;

- (a) Generating employment mainly to the local people thereby earning them incomes which if invested productively can generate more employment and income. These incomes will also raise the effective demand for industrial and other related activities.
- (b) The industries would also provide ready market to the agricultural raw materials. where possible if the raw materials were previously

obtained from outside the area of location, the industries may provide the necessary incentives for such raw materials to be grown.

- (c) The factory may enter into agreements with the farmers assuring them ready market, giving them seeds and fertilizers as well as advice on how to plant and prepare land and use of the inputs. In some cases the industry may make arrangements for the transportation of the raw materials from the farmers' Farms. Where such agreements exist the productivity of the farmers were seen to rise.
- (d) The industries may also help in provision of infrastructures like the construction of roads which will ease the transportation problem, electricity, engage in other productive activities such as sponsoring sports, funds raising, and other development projects such as water projects, electricity and health facilities.
- (e) Industry may enhance productivity of its workers by providing them with recreational facilities within the factory's premises.

(f) Industrial development in a region may also attract complementary industries. The resource hinterland is often expected to respond positively by producing raw materials required by the industries and by demanding the industrial products.

(g) It can therefore be learned that there is need for close integration between the agricultural sector and the industrial sector if both are to develop rapidly.

3.2.0 ASSUMPTION:

In the light of the literature reviewed the assumption which will guide this study is:

1) That the development of a rural resource hinterland and expansion of the industries located in specific growth points depends on strengthening the relationship between the two.

3.2.1 HYPOTHESIS

1) H_0 : That there is a weak relationship between the Machakos Township Industrial sector and its resource hinterland.

H_1 : The alternative.

3.3.0 METHODOLOGY:

Sampling Frame for Industries

Machakos Township has few industries as shown in the following table.

Table 3: List of Industries in Machakos Township

Name of Industry	Type of Product	Reported No. of Employment
East Kenya Bottlers Ltd.	Soft drinks manufacturers	100
Kenya Orchards Ltd.(KOL)	Fruit and vegetable processors	90
Simba African Food Industries (SAFI)	Pre-packed consumer foodstuffs (Honey)	5
Luki Bakery	Bread & Cakes manufacturers	50
Makos millers	Maize flour manufacturers	90
Jala industries	Spices	35
Kathuli Saw Mills	Sawn Timber, doors	50
Rural Food Industries	Honey processing & Packing	3
Mafco Honey Packers	Honey Refining & Packing	3
Fifa Honey Packers	Honey Processing & Packaging	4
Eastern Printing Works	Printers - Books, Calenders, cards, General, printing	10
Ukamba Printers	Printed Materials	5
Moon Industries	Sweets	70

Source: MOCI - Machakos 1986.

Because of the expectation that agricultural industries were the types of industries most likely to have greater reliance on their hinterland for the supply of raw materials two agro-based industries were selected for detailed investigations. These industries are the Kenya Orchards Limited and the Makos Millers. KOL processes fruits to manufacture Jam as well as fruit juices while Makos Millers Produces maize flour known as Tausi. These industries constitute 15.4% of the industries in Mchakos Township. The two industries are among the leading industries in terms of employment. Besides factory like Kenya Orchards Limited (KOL) was established as early as 1948. In addition to the detailed investigation conducted on KOL and Makos, a general study was carried on five of other industries namely East Kenya Bottlers Ltd, Simba African Food Industries, Mafco Honey Packers and Eastern Printing Works. In addition the KIE sheds were visited and discussions held with the management.

DATA COLLECTION

Both primary and secondary data were of interest in this study. As a result three methods of data collection were employed, namely questionnaires, personal interviews and secondary data from published reports. The personal interviews were conducted with

particular relevant persons/officers from several Ministries. The secondary data sources included written reports, books, statistical abstracts, annual reports of several Ministries especially the Ministry of agriculture.

Three types of questionnaires were administered at different levels. These levels were; the farm level (for the farmers), at the industry level with the management (management questionnaire) and also at the industry level with the workers (workers' questionnaire). The management questionnaire was aimed at establishing the sources of the raw materials, origin of the workers, and their numbers, the link of the industry with the other industries, incomes of the workers, incentives given to those who supply the industry with the raw materials, marketing of the industrial products, the prices, the transportation of both the raw materials and the final (finished) products as well as the general problems faced by the industries.

The workers questionnaire was designed mainly to countercheck the information given by the management on incomes and benefits. But in addition, it was expected to bring to light the workers' origins, place of residence, their expenditure pattern and also to identify any other sources of income for the workers.

The household survey questionnaire which was carried out at the farm level to the farmers was designed to bring to light the incomes of those particular farmers, the raw materials produced, the amounts produced and supplied to the industries and other alternative markets, incentives from the industries and to establish the fraction of their farms which is utilised as well as potential for further exploitation.

At the industry level the management gave a list of the workers, their incomes and the departments in which they work. From the list of workers supplied, it was possible to draw up a sample frame. 33% of the workers were interviewed in each industry. A systematic random sampling was undertaken to select the workers to be interviewed depending on the number determined for each department. The management also gave a list of their industrial raw materials' suppliers. The Makos Millers gave a list of their agents (Distributors) as well as names of individual farmers who sold (at the time) directly to the factory. The agents gave names of individual farmers who sell maize to them. This list together with the list of individual farmers supplied by the factory formed the sample frame for the farmers.

For the Kenya Orchards Limited the list of farmers supplied by the factory showed the number of farmers sending their products to the factory. With the help of the agricultural extension officers it was possible to locate the farmers who grew and sold fruits to this factory.

Makos Millers Ltd. obtained maize from several parts of Machakos District. The sources included, Yatta division, Makueni, Mua Hills, Mutituni and Mitaboni Locations. Because of the distance factor, farmers from Makueni, Mutituni, Mua Hills and Mitaboni Locations were chosen for administration of the questionnaire. These areas were chosen since majority of the farmers who sold their maize to the factory were originating from the location. But even then it was not possible to administer questionnaires to the entire locations and stratified random sampling was done and Mua Hills, Mutituni Sublocations in Iveti were chosen while Katangini Sublocation in Makueni Location was selected. The farmers were then selected using systematic random sampling. Whenever a farmer was not present the next one in the list was interviewed. In total 60 questionnaires were administered to farmers selling maize to Makos Millers.

For Kenya Orchards Limited, Mutituni and Iveti Locations which are neighbouring locations to the factory had majority of the farmers and were therefore selected and questionnaires administered. In addition to these two locations, Kiteta and Mwala Locations were also selected. This is because there are many fruit growers from this areas. In Kiteta location Kiambua and Ngiluni sublocations were chosen while in Mwala Muthunthini sublocation was selected. These sublocations were selected because they produce much of the raw materials in question. Farmers were then selected using systematic random sampling. With the help of some farmers, farmers who formerly supplied the KOL but had stopped the supply, were identified and discussions were held with them so as to find out why they no longer sold their fruits to the industry. In total 80 questionnaires were administered to farmers selling to KOL.

In total then the farmers questionnaires was administered to 140 farmers.

Personal interviews were also held with the Government officers based in the district.

CHAPTER FOUR

4.0 DATA ANALYSIS AND DISCUSSION

This chapter will focus on field data analysis. At each stage the existing linkages between the industries studied and their hinterland will be discussed.

4.1.0 KENYA ORCHARDS LIMITED

Brief historical background

The Kenya Orchards Limited (KOL) was established in 1948. The industry was established with the objective of processing fruits and supplying the country with jam and related products. The surplus industrial product would be exported to earn the country foreign exchange and to the company's profits. In the course of achieving these objectives the industry was also intended to provide employment to the local people and offer market for fruits grown within Machakos District.

With the encouragement from the industry, the Farmers in the surrounding areas of Machakos and in particular from Mutituni, Kasinga, Mitaboni and Mua Hills started to grow fruits which would earn them incomes from their sales in the Industry. In the early stages, the factory used to fetch the produce from the farmers especially the bulky fruits such as peaches and guavas. The prices paid to farmers then were also relatively better than they are today.

Table 4.1 The industry manufactures the following products:

- (i) Jams and marmalades
- (ii) Canned fruit juices
- (iii) Canned fruits and- vegetables
- (iv) Chutneys and sauces

	Number	Percentage %
(iii) Canned fruits and- vegetables	70	77.78
(iv) Chutneys and sauces	20	22.22

*For complete list of the products, see Appendix I.

4.1.1. EMPLOYMENT

One of the ways of assessing the relationship between an industry and its hinterland is to establish the extent to which an industry offers jobs to people in its hinterland,

K.O.L. employs 90 permanent workers and between 5 to 150 casuals depending on the season, majority being employed during peak periods. The number of workers employed has remained fairly constant over the years.

4.1.1.0 ORIGIN OF THE WORKERS

A majority of the permanent workers come from Machakos District as evidenced by the following table:

Distance (km) from Machakos	Number	Percentage
0 - 1,500	40	70
1,501 - 3,000	15	20
Over 3,000	5	10

Table 4.1

Origin of workers

	Number	Percentage %
Machakos District	70	77.78
Other districts	20	22.22
Total	90	100

(b) All the casual workers come from Machakos Municipality especially the adjacent locations of Mutituni and Kasinga. This category of workers have a relative advantage in their search for jobs in that they are able to walk to the factory everyday to check whether their services would be needed by the factory any working day. The persons who are not successful in getting casual jobs return to their farms and perform farm related tasks without much wastage of their time.

4.1.1.2 Incomes (Salary) Structure

In 1986 casual workers were paid at a rate of Kshs, 20 a day. The permanent employees receive relatively higher remunerations as evidenced below:

Table 4.2

Permanent employees wage structure

Incomes (groups) Kshs./month	Numbers	% of workers
900 - 1,500	63	70
1501 - 3,000	18	20
Over 3,000	9	10

Source: Production Manager K O L 1986.

If the salary of Kshs. 900 - 1,500 is taken to represent employees within the low income group, then the majority of workers at K O L fall within low-income category. The most highly paid workers are those in the management team. All the staff in the management cadre come from outside the Machakos District. Without professional training, the salary structure for the workers was the same irrespective of the educational status. However promotion depended on experience and to some extent on the level of education.

Most of the workers had low levels of education and many lacked professional training. This class of workers could be considered to be greatly unskilled but a few of the semi-skilled had acquired work experience on the job. Of the permanent workers working at the factory about 20% had prior training before they were recruited to their current job undertakings while the rest have gained on job work experience. The following table shows the level of education for the workers.

Table 4.3

Level of Education

Level of Education	%
Primary school level	56.7
Secondary school level (with no professional training)	23.3
Secondary school level (with training) and/or college level	20.0

Source : Production manager - September, 1986.

4.1.2.0 CONTRIBUTION TOWARDS THE WORKERS WELFARE

The contribution of the factory towards the raising of the standards of living of the workers and of the rural population can be gauged from the way a factory caters for the welfare of its workers. The provision of some facilities which are geared at improving the living standards of the workers, saving of unnecessary expense thereby increasing the incomes accruing to the workers are worthy examining. These include provision of housing recreational facilities which may enhance the workers productivity, medical services and chances of further training.

4.1.2.1. HOUSING

The factory has constructed houses for its employees within its premises. The housing can be divided into 3 categories:

1. Senior staff members housing
2. Middle cadre group housing
3. Low income group (general workers) housing

The houses for the three groups of employees are built on different locations on the factory's farm. The size and amenities within the three types of housing are in line with the income levels of each category of workers. The general workers' housing comprise one room only and are referred to as "camps"

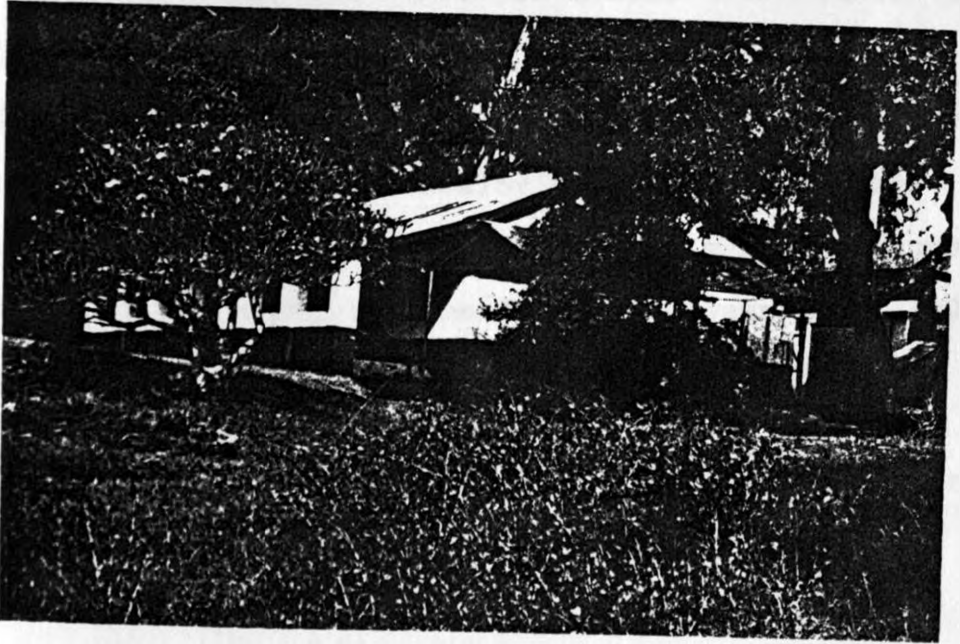


Plate 1: One of the houses given to the workers' in the Management Team.

Although there are 45 units for the low income workers, it is only 20 workers who stay in these houses. This can be attributed to the fact that majority of the workers reside at their homes. Those who reside in company houses forfeit a monthly house allowance which ranges from Kshs. 100 to Kshs. 250. The houses provided by the company are cheaper than the equivalent houses in the local market which are rented for Kshs. 150 - 300 per month. The houses for the middle cadre group would fetch Kshs. 600 in Machakos Town while the houses similar to those provided by the company for the senior staff are rented for Kshs. 2,500 in the local market. The senior employees who live in company houses forfeit between Kshs. 700 and Kshs. 1,500 per month as house allowance.

The proximity of company houses to the factory greatly reduces transportation cost to the factory for the employees who reside in them. On the other hand it can be argued that the employees who reside at home receive house allowance which they utilise for other activities.

4.1.2.2. TRAINING

The factory does not engage actively in sponsoring workers for long term training. The company insists on, on the job training and occasionally sends a few of its employees to some seminars. Upto

1986, the factory had managed to send only 4 workers for training in institutions such as Kenya Polytechnic and Egerton College.

Although the workers can acquire skills through long term exposure on their jobs without much formal training, they still remain disadvantaged as they are not given any formal certificates which can make them look for employment elsewhere. In the absence of such testimonials the bargaining power for such employees is limited. The result is that labour mobility becomes difficult. Without much commitment to further training industrial research upon which new products and quality improvements could be achieved is also limited.

4.1.2.3. HEALTH AND RECREATIONAL FACILITIES

Health facilities are essential for the maintenance of the health of the workers. A healthy person is, ceteris paribus, more productive. Similarly recreational facilities help refresh the body and mind and could lead to increased productivity. In addition the presence of these facilities often helps workers cut down on some unnecessary expenses for similar services or alternative ones provided elsewhere. The provision of such facilities in situ avoids time wastage.

The factory does not have any health facility such as a dispensary within its premises. Majority of the workers attend the general hospital upon falling sick. This hospital, because of its large catchment area is often congested and at times lacking necessary drugs. The result is that, the workers waste time and incurs more expenses. Although they contribute to the National Medical scheme, only a few workers utilise such benefits. This is because they consider the process of claiming the money as long and some avoid meeting the contributors fraction in the total bill. Field surveys also revealed that the factory does not provide any recreational facilities to the workers.

4.1, 2.4. PARTICIPATION IN LOCAL DEVELOPMENT PROJECTS

The company has participated only rarely in local development activities. However in 1985, the company:

- (a) financed a local football team by purchasing uniforms for them and by providing transport to a tournament all valued at Kshs. 6,000/-
- (b) sponsoring golf and snooker tournament at Machakos sports clubs which costed Kshs. 20,000/-.

Apart from these two activities the factory has been rather passive on developmental issues. It has

never been known to give any financial assistance or participate in development projects such as water projects, electricity installation among others. The industry does not provide or maintain infrastructures such as roads, even for the road leading to the factory which has been poor and difficult to pass through during the rainy seasons. The same case applies to some feeder roads in some key areas which form the source of raw materials to the industry. Although the factory could be seen to be trying to maximise profits by cutting down such expenses, accessibility to key raw material areas is important and assistance in connection with such developmental activities has been shown to contribute to enhanced production as is exemplified in the case of Mumias sugar factory which was discussed in chapter three.

4.1.2.5. IDENTIFIED LINKAGES

From the foregoing discussion several things emerge in the linkage structure. The workers who reside at factory houses benefit from the subsidized low rents. In the local market the workers would pay more than what they forfeit currently as house allowance. Looked from another angle, one would argue that the private sector does not benefit from the house rents from such workers. The rest of the workers to

commute daily to the factory. Majority just walk to the factory without any transportation cost incurred. The provision of houses by the industry is beneficial to the workers since the money that could be spent for extra housing rent in the local market is saved. The workers also cut down the expenses on transportation. This means the saved money accrues to the workers and could be spent to uplift the standard of living of the worker and his family. The workers who reside at their homes benefit from the house allowances. It is likely that this income (house allowance) is being spent in the rural hinterland where the workers live thereby raising the level of living of the rural population. By residing at their homes, the workers are able to organise and supervise their affairs at home. These activities would hopefully generate more incomes which would be spent in the rural area.

The second level of linkages in the linkage structure is the training of workers and participation in development projects. The study revealed that the factory does not participate actively in sponsoring workers for short and long term courses. This practice constrains the advancement of the workers. The workers competitiveness in the labour market is limited by the absence of certificates. Besides, experience shows that research work cannot advance

without committing funds for research and training. Expansion of the industrial range of products is limited which means that the farmers cannot sell a wider range of products to the industry. This constraint limits the money farmers could earn from sale of the raw materials.

4.1.3.0 RAW MATERIALS USED

The type, amount and origin of the raw materials, forms an important aspect in the forward and backward linkages. The higher the prices offered and the larger the amounts bought from a certain source, the more incomes are likely to accrue to farmers in those areas. Such incomes will go a long way in generating employment opportunities for other people, incomes which would help raise the standards of living of the people.

4.1.3.1, TYPES OF RAW MATERIALS

The raw materials used includes fruits of different types such as pineapples, guavas, carrots, Cape gooseberries, plums, strawberries, peaches, tomatoes, beans, mangoes, oranges, pears, grapes, apples among others;

The chemical ingredients include, food acids such as acetic acid, citric acid and sodium bicarbonate

and food colours. The quantities of each chemical ingredients and fruits varies with seasons and quantity of products to be produced which is determined by their demand.

4.1.3.1. DEMAND FOR THE RAW MATERIALS

Demand for the raw materials being a derived demand, is largely influenced by the demand for the final products. Since the fruits are seasonal while demand may be continuous, careful planning and adequate stock inventory during the peak season is essential. This must however take care of the expiry date of the final product. Timing is therefore essential for fruits which are seasonal. The demand for the raw materials vary from year to year but on average the following was found to be the demand for the raw materials.

Table 4.4

AVERAGE DEMAND FOR THE RAW MATERIALS

RAW MATERIALS	DEMAND IN TONNES/YR.	AVERAGE PRICE KSh./Kg
Seville oranges	70 - 100	1.50
Sweet oranges	200 - 400	1.35
Plums	200 - 400	0.80
Straw berries	60	4.00
White peaches	20	0.70
Grape fruits	100	-
Mangoes	20	0.75
Limes and lemons	10	-
Pawpaws	15 - 20	1.25
Guavas	20 - 30	0.50
Capectose Berries	5	0.90

Source: Production Manager - September, 1986.

4.1,3.2 SOURCES OF THE RAW MATERIALS

Table 4.5

	<u>Raw Material type</u>	<u>Sources</u>	<u>% from each source</u>
1,	Plums	Muranga, Limuru, Kinangop	95%
		Machakos District	5%
2,	Pineapples	Kenya Cannery	100%
3,	Mulberry, Straw- berry, Capegoose berry	Machakos	100%
4.	Guavas	Machakos	100%
5.	Mangoes	Machakos Mombasa	80% 20%
6.	Pears	Kikuyu(Limuru)	100%
7,	Peaches	Machakos Limuru	90% 10%
8.	Apples	Kikuyu Machakos	95% 5%
9.	Sweet oranges	Meru	100%
10.	Grape fruit	Mombasa/ (Kwale District)	100%
11.	Siville oranges	Mombasa (Kwale District)	100%
12,	Tomatoes	Machakos Naivasha	95% 5%
13.	Limes and lemons	Kilifi	100%
14.	Raspberries, Redcurrant Black currant Apricots	Imported	100%
15.	Sour cherry	Imported	100%

Chemical Ingredients

Acetic Acid)	
)	
Citric Acid)	
)	
Sodium Bicarbonate)	100% imported through agencies
)	
Food colours)	
)	

Other Inputs

1.	Tins (cans)	- Metal box (Thika)	100%
2.	Boxes	- East African Packaging	
		Nairobi	100%
3.	Labels and stationers	- Nairobi	95%
		Eastern Printing	
		Works (Machakos)	5%

Source: Production Manager, K.O.L., 1986

It was noted that although the Eastern Printing Works in Machakos have the capacity to produce all labels needed by K.O.L. in terms of quality and quantity and at the same price as the Nairobi source, only 5% of the orders are placed with Eastern Printing Works and this happens during emergency times, when the Nairobi firm might cause delay. This discrepancy in allocation of orders cannot be explained in any other way except that K.O.L. started placing their orders to the Nairobi Printers before the Eastern Printing Works which was established in 1978 began its operations. The pattern has not changed much,

The study noted that the demand for some fruits from Machakos district has greatly changed with time. This is demonstrated by the 1980 trend. The following table helps illustrate the percentage share of different suppliers.

Table 4.6

SOURCE OF RAW MATERIALS -
1980 AS COMPARED TO 1986

TYPE OF PRODUCT	SOURCE	% IN 1980	% IN 1986
1. Plums	Muranga and Limuru	85%	95%
	Machakos	15%	5%
2. Sliced mangoes	Machakos	95%	80%
	Mombasa	5%	20%
3. Peaches	Machakos	100%	90%
4. Tomatoes	Machakos	100%	95%

Source: Field data - K.O.L.

It was found that in 1960s the factory used to grow pineapples and some fruits such as guavas, tomatoes and lemons. There were also pineapple outgrowers from Mitaboni Location who used to sell to the factory.

By the time of the field study in 1986, the Kenya Cannery in Thika had taken over the whole supply of pineapples to the industry and this had resulted in outgrowers stopping growing pineapples. Although the other fruits such as guavas, lemons and oranges are still found within the factory farm, not much care is taken on them (See Plate 6).

Several reasons could be advanced as to why Kenya Orchards Limited had resorted to obtaining some raw materials from outside the district :

- (a) with the increasing demand for its products, the Machakos District might not have been able to meet all its demand.
- (b) The cost of raw materials might have been cheaper from other sources, even when transport costs were taken into account.
- (c) The raw materials from outside the district could be of better quality.
- (d) Raw materials might have been produced in adequate quantities in Machakos district but the factory management may not have been aware of that adequacy.

(e) It could also be that other suppliers outside Machakos district were producing the raw materials in such large quantities and management was so good that the factory found it very convenient to obtain raw materials from such sources.

These are possibilities which needs investigations it was found that the sellers from outside Machakos district are given price incentives for their raw materials For instance in 1985, mangoes from Mombasa were bought at Kshs. 1.00 per kg. by the factory while mangoes from Machakos were bought at Kshs. 0.50 per kg. If the mangoes from Mombasa and any other sources were superior this would make economic sense for the price discrimination. But, the production costs for the raw materials from all the sources was found to be similar. The final product quality was found to be uniform irrespective of the source of the raw materials. Thus the raw material source did not affect the taste preference of the consumer. This reasoning dispells assumption (b) and (c).

Adequacy of the source can be established by looking at the production of the fruits over certain period.

Table 4.7

PRODUCTION OF FRUITS IN MACHAKOS DISTRICT
(1983 - 85) AND THE SUBSEQUENT K.O.L. DEMAND

FRUITS	PRODUCTION (TONNES)			K.O.L. DEMAND IN TONNES
	1983	1984	1985	1985
Citrus*	8,193	11,050	8,675	*510
Guavas	112	712	-	20 - 30
Tomatoes	12,692	11,200	29,850	-
Onions	429	2,040	-	-
Passion fruits	720	952	178	-
Avocado	17	172	132	-
Apples	17	30	63	30
Peaches	-	48	76	20
Capegoes berries	-	12	-	5
Loquarts	-	154	113	-
Mangoes	1,316	1,195	6,066	20
Plums	-	42	76	200 - 400
Pawpaws	-	-	6,465	15 - 20

Source: M O A L D Report 1983, Production Manager K O L MIDP: 1986

*Includes sweet oranges, Limes and Lemons.

From the above table, it is evident that supply often exceeds demand for some fruits. The industry utilises only a small fraction of some fruits and none of others.

For instance in 1985 the 76 tonnes of plums produced could have supplied about 19% of the factory's demand for plums but only 5% was demanded from Machakos District. The result is that some incomes which could have accrued to the farmers was not realized.

The management revealed that there was no crop monitoring unit in the industry. However the management argued that Machakos district does not have enough raw materials to suffice the factory's demand. Table 4.7 above proves the contrary. The statistics show that Machakos district not only has excess supply of some raw materials but also there is potential for new products from fruits such as onions, passion fruits, avocado, pears and loquarts. This argument clearly portrays some ignorance on the part of the management as regards raw materials adequacy in the district. Assumption (d) is therefore valid.

In the absence of crop monitoring unit and marketing/sales manager cases of over supply and undersupply have been experienced. The uncoordinated supply and demand has resulted in loss of revenue for both the farmers and the factory.

Case I : Over-supply:

In 1985, eight tonnes of capegoose berries were supplied to the factory but only five tonnes were purchased. The remaining three tonnes were rejected and ended as waste. This affected the 1986 production since the farmers did not take good care of the fruit. During the same year, 25 tonnes of guavas were supplied by the farmers to the factory but only 20 tonnes were purchased.

Table 4.7 (b)

Case II :

EXCESS DEMAND

CROP	DEMAND	SUPPLY	SHORTAGE
Oranges	83 tonnes	20 tonnes	63 tonnes
Plums	300 tonnes	76 tonnes	224 tonnes

Source : K.O.L. and MOALD 1985

During this time of shortage, Machakos District alone had produced 8,675 tonnes of citrus (oranges included) and 76 tonnes of plums (see table 4.7). This further confirms the ignorance of the management.

The management insists that they cannot purchase more than the demand dictates. While this argument is valid, it is also noted that K O L does not advertise its products because the management believe their



Plate 2: A farmer (Right) with an Extension Officer at the farmers home.



Plate 3: The farmer in his Orchard



Plate 4: A farm planted with tomatoes notice the weeds. The opportunity cost of weeding is higher.

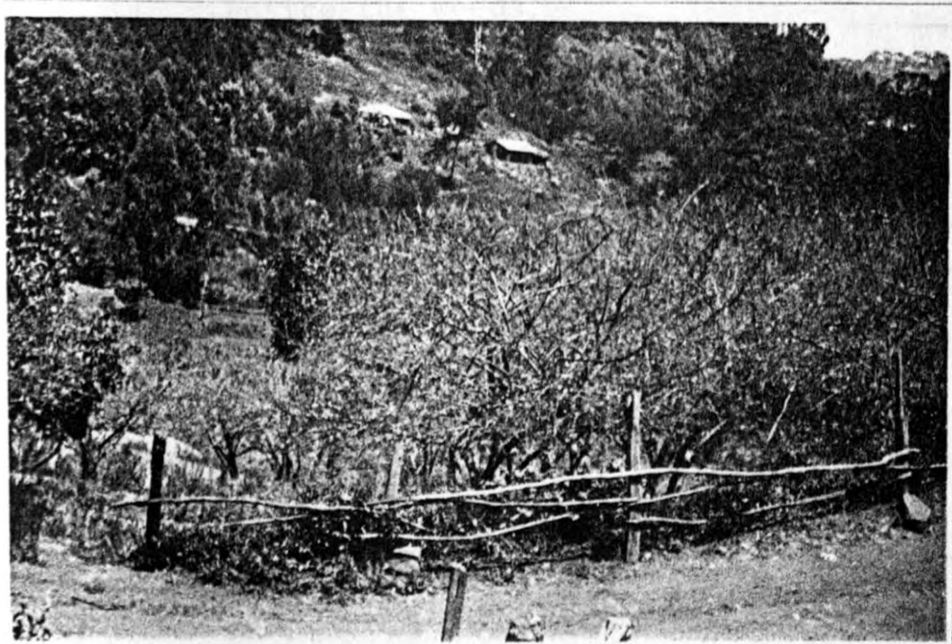


Plate 5: An orchard of plums. The farmers do not take good care of the fruits because of price disincentives.



Plate 6: A section of the Kenya orchards farm.
Notice the weeds.

products are of best quality. It may however be that with advertisement of its products some latent demand might be realized.

Quite often the factory demand the fruits during off peak season when many have been spoilt in the farms. For example, in 1986 the malberries were ready from July to September but by September the factory had not announced its desire to purchase the fruits. The result was that huge amounts were spoilt in the farms. In the same year, guavas matured during the month of July but the factory indicated the demand on September when only a few were remaining and large quantities spoilt in the farms,

The factory fails to capture the market for the raw materials during peak period when they are less expensive. As a result the farmers losses revenues as their farm produce gets spoilt. The factory also losses revenue from the cheap raw materials.

Assuming constant prices, it is possible to calculate and illustrate what accrues to Machakos and what would accrue to the district if all the raw materials produced were demanded.

Table 4,8

REVENUES REALISED FROM RAW MATERIAL SOURCES

PRODUCT	AVERAGE DEMAND/ YEAR IN Kg.	AVERAGE PRICE/KG (KShs.)	MACHAKOS (KShs.)	OTHERS (KShs.)
Sweet Oranges -	300,000	1.35	0	405,00
Seville oranges	85,000	1.50	0	127,600
Plums	300,000	0.80	12,000	228,000
Strawberries	60,000	4.00	24,000	0
White peaches	20,000	0.70	14,000	0
Grape fruits	100,000	*1.50	0	150,000
Mangoes	20,000	0.75	12,000	3,000
Limes and lemons	10,000	*1.20	0	12,000
Pawpaws	17,500	1.25	-	-
Guavas	25,000	.50	12,500	0
Capegoose berries	5,000	.90	4,500	0
			79,000	925,500
			7.86	92.14%

* Approximation.

It is evident that Machakos District gets a smaller share of incomes than would be the case if the factory were obtaining some of the raw materials from district.

This is also reflected in the costings of jam.

Table 4.8(b)

COST STRUCTURE OF JAM

Chemicals	% Cost composition to total cost per tin
Acetic acid, citric acid) Sodium Bicarbonate,)imported Food colours)	7%
Raspberries, black-)imported currant, Red currant,)fruits Sour cherry, apricots)6 tonnes each year	50%
Fruits (plums), labour costs and profit	43%

Source : Production Manager, K.O.L. 1986

Machakos District gets its share from the 43% of the value of each tin of jam. But then since only 5% of the plums are obtained from Machakos district plus the fact that the management team who get higher salaries are all from outside the district, the district's share of earnings from this factory is reduced.

4.1.3.3 Summary of Identified Linkages

The industry earns farmers in Machakos district incomes through the purchase of their farm produce. However this relationship is weakened by the fact that some

of the produce is not demanded and large quantities are spoilt on the farms. The prices offered for the raw materials from the district were found to be lower and the management does not appear to be organized to take advantage of products which can easily be produced in the district. Lack of fruit monitoring unit has led to wrong timing of demand of fruits while lack of advertisements has limited the sales and channels for new markets. Inadequate demand from the industry lowers the morale of the farmers. Because of the lower demand for fruit from Machakos District, other districts have ended getting a higher percentage share of the market and consequently the income from this factory which would have been expected to spearhead the development of the study area. The study also shows that the industry does not offer much incentives to the advancement of other industries, businesses within the town. This is because the factory has little ties with other industries in Machakos town. An illustration was the Eastern Printing Works which could supply the industry with all the labels it requires but supplies only 5% of the labels and only during emergencies.

This implies that the link between the industry and its immediate hinterland is weakened since not much income is available to be reinvested within the factory's hinterland.

4.1.4.0 FARM LEVEL ANALYSIS

At the farm level, linkages between the factory and its hinterland is intended to be studied through an examination of the incomes received from the sale of farm produce, and the activities in which farmers invest such incomes with a view to getting an idea as to the contribution of the factory to other sectors of the economy. The study will also examine employment generation by such activities at each level of the activities.

In order to put the discussion in this section in context, it is intended to discuss some aspects of the hinterland. The aspects to be discussed are farm sizes, investment, the market opportunities and incentives given. These matters have a bearing on the amount of land to be put under a particular crop.

4.1.4.1 FARM SIZES

Table 4.9

Plot sizes in Hectares

Size of Farm in Hectares	% of Respondents
0 - 5	70%
5.1 - 10	25%
10.1 - 15	5%
15.1 - 20	0%
20.1 - 25	0%

Source: Field data.

As seen above majority of the farms are small-scale in nature. This makes it difficult to mechanise the farms. Some of the land especially Iveti hills is hilly which further hinders mechanization. The prices offered for the farm produce was low and the purchase of advanced farm implements also hindered. As a result the majority of the farmers (75%) use jembes and pangas while only 10% of the farms use hired tractors. However, 55% of the respondents in the fruit growing areas, especially Iveti hills gave first priority to fruits and they occupied the largest fraction of the farmers' farm.

4.1.4.2. EMPLOYMENT LINKAGES

80% of the farmers used family labour while the rest of the farmers (20%) engaged either permanent or temporary labour. 5% of the farmers employed both permanent and casual labourers while 10% of the farmers employed temporary workers only. The highest number employed per individual farmer was 3 labourers. Majority of the workers were paid with proceedings from sale of farm produce and most of the labourers were found to originate from surrounding areas. Majority of those who used family labour claimed that they could not afford hired labour with their meagre incomes.

4.1.4.3 INVESTMENT LINKAGES

50% of the farmers invested either directly or indirectly part of the incomes earned from their farm produce. The investments took the form of educating dependents, purchase of livestock, direct savings in the bank or home and in business enterprises. Majority of the respondents invested in education and livestock (20%) while the rest invested as follows : 15% invested in the education of their dependents, 10% of the farmers invested in business enterprises while 5% of the farmers had direct savings in the banks. Without much direct savings from which more investment could be made, future development becomes constrained. Those who invested in business activities generated more employment opportunities. The highest number of employees per business was four. Those employed earned themselves incomes which they could use to develop themselves and the rural hinterland. Some of the farmers used some of the incomes derived from sale of the farm produce to construct their dwelling places (houses). However houses constructed using finance from salary comprised the highest percentage, 60% while 40% of the farmers obtained the finance from sale of their crops. 5% of the farmers had constructed their houses from proceeds from sale of fruits.

4.1.4.4. USE OF FARM INPUTS

60% of the farmers use manure and 90% of them obtained manure from their farms while 10% purchased manure from other neighbouring farmers. Only 20% of the respondents used fertilizers and all of them purchased it using the income from farm produce. Use of fertilizers and herbicides is limited because the farmers lack the necessary finances. Consequently the output is low. Indirectly the purchase of the fertilizers from KGGCU in Machakos helps create employment and income for the workers. But the employment is limited by virtue of the limited fertilizer used. K.O.L. could play a greater role in boosting the demand for the fertilizers if more produce was demanded.

4.1.5.0 MARKETING LINKAGES

4.1.5.1. TRANSPORT TO INDUSTRY

The farmers make their own transportation arrangements to the factory. The farmers do not get any transportation assistance from the industry at all. This shows that unlike other experiences elsewhere as shown in literature review, this factory does not offer similar services to farmers in the hinterland.

In transporting the produce to the industry several means are used. They include oxen driven carts and wheelbarrows, vehicles, backloads by mainly family labour.

The following table shows the type of transportation means used by the farmers:

Table 4.11

TRANSPORTATION MEANS

Type of transport used by farmer to take fruit to factory	% of farmers using particular type of transport
Oxen, driven carts and wheelbarrows	5%
Personal vehicles	5%
Backload/family labour	75%
Hired vehicles	15%

Source : Field data

It is evident that majority of the farmers use backload to transport their products to the industries. Inevitably this involves a loss of the farmers' time.

The channel used to announce the factory's demand for fruits is written advertisements which are displayed in public places and at times the farmers

themselves disseminate such information. Not all farmers may get such information in time and there may be delay in response to such a demand.

Although a majority of the farmers know of possible market outlets, they are often uncertain about the capacity which such markets could absorb and the prices offered. Field surveys showed that 80% of the farmers would be willing to produce more fruit if they knew the market situation in advance. The low prices offered and the inability of the factory to take up all their produce discourages the farmers. Some of the farmers have found other alternative markets which include the local market, some women traders, and agents for other industries. The prices offered by this category of buyers is higher than the prices offered by K.O.L. For instance in 1985, while the plums were sold at Kshs. 3 per Kg, in the local market, K.O.L. offered only Kshs. 1 per kg. The local traders come for the product from the farms, and offers higher prices than K.O.L. The other competing industries especially the agent for Trufoods in Nairobi offers twice the price offered by K.O.L. In Thinu sub-location farmers have diverted their strawberries and passion fruits to the Mombasa market where they get higher prices. The proportion being sold to local markets and agents has risen from 5% to 30% of the farmer produce over the years.

4.1.5.2. SALE OF THE FINAL PRODUCT

Within Machakos District, the factory distributes its products using its own vehicles. For sales outside the district it has appointed Apex distributors in Nairobi to market and distribute the products. Apex distributors have depots in Karatina, Kisumu and Mombasa.

Only a small fraction - 2% of the final product is sold within Machakos District, 88% of the products is sold in hotels and supermarkets in Nairobi and other districts. 10% of the products is exported to Uganda, Rwanda and Middle East.

4.1.6.0. CO-OPERATION BETWEEN THE FARMERS

Most of the farmers act independently but few farmers from Mbee and Thinu locations were found to be co-operating in hiring transportation services to take their fruit to the factory. One or two farmers accompany the produce to the market while the others are left engaged in other activities. This organisation helps the farmers to save on the time and transportation costs. These farmers also organise themselves to bargain for price increases. In 1982 the farmers bargained successfully for increase of the purchase price for straw-berries from Kshs, 3 per kg. to Kshs. 6 per kg. Because of their small number they have not been able to succeed in bargaining at other times.

4.2.0 MAKOS MILLERS LIMITED

Brief Historical Background

Makos millers Ltd. was established in February 1986 but started operations in May, 1986. The factory was established to take advantage of the availability of maize from Machakos District, create jobs and naturally earn its proprietors some profits. The millers manufacture maize flour known as TAUSI.

4.2.1. EMPLOYMENT AND ORIGIN OF THE WORKERS

The industry employs 14 permanent workers and between 51 and 76 casual employees depending on the season and demand. The minimum number of casual employees is 51 on any given day.

Majority of the workers come from Machakos District and particularly from within the Municipality. The following table illustrates this.

Table 4.12

ORIGIN OF THE WORKERS

	Casual employees(T)	Permanent employees(P)	Total	% of T & P
Within the Municipality	45	10	55	84.6
Within the District but outside the Municipality	4	3	7	10.8
Outside District	2	1	3	4.6
	51	14	65	100

Source: Field Surveys : September, 1986.

It is evident that 95.4% come from Machakos District.

4.2.1.1. INCOME (SALARY STRUCTURE)

76.9% of the workers get incomes below Kshs.900. These are mainly the casual workers who are taken on a daily basis. However these workers have become "permanent" casuals as they are almost assured of work daily. The following table illustrates this.

Table 4.13 Incomes

Monthly Salary(KShs.)	No. of workers	% of workers
400 - 899	50	76.9
900 - 1,500	10	15.4
1,501 - 3,000	4	6.2
Over 3,000	1	1.5
		100

Source: Factory Manager - 1986.

If low income category were to be taken to be those people earning less than Kshs. 1,500 then 92.3% of the employees lies in the low-income group.

90% of the respondents were of secondary school level and below. 45.7% of the workers were found to be of primary school level of education. Only 10% of the workers were categorized as skilled. The

incomes the workers get is small and consequently the use the workers can put it is also limited.

4.2.1.2. INVESTMENT LINKAGES

Although the incomes received were relatively low, the workers had invested some of their incomes in a number of activities. 30% of the workers made direct savings. The highest amount recorded per month was Kshs, 800 and the average savings per month was Kshs, 224 of those who made direct savings, 70% of them had incomes above Kshs. 1,000 per month while 30% had income of Kshs. 600 - 900.

50% of the respondents were found to have invested in agriculture. Of those who invested in agriculture 2/3 had employed labourers in their farms. The type of agricultural activities engaged in by most of the workers is not highly commercialised and only 33% of those who invested in agriculture reaped enough earnings from the sale of farm produce to enable them pay for the labourers salary, in addition to having a surplus.

13 1/3% of the workers used their incomes in constructing their dwelling places (houses). 6 2/3 of the workers in addition expressed their future plans of building more permanent houses with the incomes derived from their salaries from the industry.

The savings and investments from the workers can be seen as an effort to better the peoples standards of living. House construction is an attempt to achieve one of the necessities of life namely good shelter.

4.2.1.3. SUMMARY OF IDENTIFIED LINKAGES

Employment Linkages

The fact that a majority of workers come from within Machakos District can be seen as an indication of strong link between the industry and its hinterland as far as employment is concerned. As noted above, some of the income earned is spent and invested within the resource hinterland thereby creating more employment and incomes for the rural population.

The management revealed that plans were under way to construct an animal feeds plant besides the maize millers factory. The feeds plant is a composite industry which emerges due to the presence of the maize millers. It is expected that this new plant will utilise local raw materials and in addition create jobs for the people within its hinterland with the expenditure and investment of this incomes within the hinterland, it is expected that the standards of living of those people will rise. The fact that the Makos Millers is not highly mechanized

can be seen as an effort to create more employment opportunities for the rural hinterland population. Flour packaging is done by employees instead of using machines.

Although this is the case, the extent to which investment is made in the factory's hinterland is limited by the fact that majority of the employees get low salaries thereby weakening the multiplier effect of this factory within its hinterland.

4.2.2.0 CONTRIBUTION TOWARDS THE WORKERS WELFARE

4.2.2.1. HOUSING

The industry does not provide houses for its workers. However workers are given house allowance. Field surveys showed that 26.7% of the workers reside in their homes while 73.3% of the workers rent houses within the town. Those workers who rent houses within the town spend some of their incomes within the town thereby boosting the businesses within the town. Some of the incomes are spent on purchase of food stuffs thus encouraging the farming activities in the hinterland. Those who reside at home utilise the money for other activities.

4.2.2.2. WORKERS WELFARE

The factory has managed to join hands with another neighbouring bakery, Luki Bakery, to form a Football team for their workers.

Although nobody has been sent for further training as yet, the management is making plans to start sponsoring employees for further training. This move is not delayed considering that the industry is only a year old.

4.2.2.3. WORKERS PURCHASE OF INDUSTRIAL PRODUCTS

The purchase of industrial products by the workers can be seen as a motivation to the industry to produce more. It is an important backward linkage to the industry from the workers. It was found that 40% of the workers purchase maize flour from the factory. The workers gain through this purchase since the product is sold to them at the ex-factory price of Kshs. 94 per balle. The retail price for the same is Kshs. 117.

4.2.2.4. IDENTIFIED LINKAGES

The joint football club by the two industries can be seen as an effort to offer some services jointly while minimising the costs. The workers are able to

recreate themselves with these facilities thereby saving on money they would be spending elsewhere. The fact that the industry has long term plans for training and building a dispensary will minimise the cost and time wasted in acquiring the services elsewhere as well as improving the skills of the workers.

Makos demand on the empty paper bags from Luki bakery is an incentive to the bakery (Luki) since the bags would either be a waste or the bakery would incur costs selling them elsewhere. The Makos millers benefits by purchasing them at lower prices and saving on the transportation costs.

This linkages would be strengthened if Makos produced more as the demand for the bags would be higher.

4.2.3.0 RAW MATERIALS

The main raw materials used is maize which is obtained from Machakos District. The management revealed that it was the government's requirement that all the maize be obtained from Machakos District except during scarcity time when the millers could be authorised to get maize from other sources. At the time of the field study, the millers had been allowed to purchase directly from the farmers. But later on,

the decision was reversed and the millers were bound again to get their supplies of maize from National Cereals and Produce Board (NCPB).

The factory has a capacity of processing 3,500 bags per month working on average 10 hours per day. But the operational capacity now is 3,000 bags per month. Currently the factory works on one shift basis.

During the harvest time because of the excess supply, the farmers are paid Kshs. 240 per 90 Kg. bag. while during dry season the factory pays Kshs. 270 per 90 kg. bag according to the 1986 prices. However, when the farmers sell to the agents, they are given lower prices ranging from Kshs. 200 - 230 per bag.

Given the operational capacity then, it can be argued that the farmers receive between Kshs.720,000 (240 x 3,000) and Kshs. 810,000 from Makos millers every month. This is an important "injection" of potential developmental capital to the farmers.

OTHER INPUTS

1. (a) Paper bags: These are supplied by:
 - i) East African Packaging Industry
located in Mombasa.
 - ii) United Bags company in Kikuyu.

(b) The 90 kilogramme packets of flour are obtained from Luki Bakery in Machakos. These are the empty plastic paper bags from which wheat flour is removed. Thus the by-product of Luki Bakery (Plastic bag) forms an input to Makos. This is an important linkage which if extended to other industries would promote the industries.

4.2.3.1 PROBLEMS EXPERIENCED IN THE ACQUISITION OF RAW MATERIALS

Although the maize suppliers have been satisfying the demand for the industry, it appears there is a problem with the maize. The management claims that the maize from Machakos District is of poor quality as compared to maize of other areas such as Kisumu or Kitale. This is attributed to the climate of Machakos District. As a result the industry has to undergo higher production costs to maintain the flour to the required standard. This is done through high extraction rates which pushes the production costs by 5%.

Secondly, the free market price for maize is relatively higher in Machakos District than other

areas such as Kitale or Kisumu. The management gave an example of 1986, when in Kisumu a bag of 90 kg. maize costed Kshs. 210 while in Machakos the factory bought the 90 kg. bag of maize at Kshs. 240.

4.2.4. FARM LEVEL ANALYSIS

4.2.4.1. PLOT SIZES

The farms are of larger scale than that of the fruits.

Table 4.14

Hectares	% of farmers
5.1 - 10	8%
10.1 - 15	12%
15.1 - 20	16%
20.1 - 25	12%
25.1 - 30	12%
30.1	40%

Source : Field Survey, 1986.

The farmers with more than 30 hectares of land were mainly from Makueni and Mua hills. In these areas maize farming was being given first priority followed by beans. 84% of the farmers reported that maize was their most important farm crop while 16% reported that maize was their second most important crop.

The importance attached to maize production was also reflected in the composition of acreage devoted to maize out of the total land area of the farms. 20% of the respondents revealed that maize occupied between $\frac{1}{2}$ - $\frac{3}{4}$ of their farms while 28% of the respondents reported that maize occupied between $\frac{1}{4}$ - $\frac{1}{2}$ of their farm area. The area under maize only was as follows:

Table 4.14(b)

Area Under Maize

Area (Ha.)	% of farmers
0 - 5	24%
5.1 - 10	60%
10.1 - 15	8%
15.1 - 20	8%

Source : Field data.

From this statistics it is clear that maize is given a higher priority and the acreage devoted to its production is equally big. Because of the large sizes of the farms, mechanization is possible.

4.2.4.2 FARM IMPLEMENTS

The type of farm implements used can be taken to reflect the state of farm technology used.

Only a few farmers (8%) used pangas and jembes only, while 48% of the respondents used a combination of jembes and pangas, oxen and ploughs. 40% of the respondents in addition to using all the above implements used also tractors. Majority of those who used tractors had more than 8 hectares of land. Of those who used tractors, 40% of them owned the tractors while the rest 60% were hiring them from those who owned or from the co-operative societies around.

4.2.4.3. LINKAGES

Except for the tractors which were bought from Nairobi, the rest of the farm implements were bought from Machakos town and other local centres. It was also found that the demand for the farm implements had encouraged the growth of the informal sectors in the sense that small scale artisans (panel beaters) have emerged who join the used parts of jembes to make new ones. The charges for these implements are lower and the farmers save money from such purchase while the artisans get incomes and employment from such non-farm activities.

4.2.5.0 EMPLOYMENT ON THE FARM

The farmers were found to be employing some people on their farms. Only 16% of the respondents

used family labour only in their farms. 84% employed at least a waged labour. The waged labour was used in conjunction with family labour. The largest number of workers employed by an individual farmer was 5 and the majority employed one. The labour was from surrounding areas.

4.2.5.1. INVESTMENT LINKAGES

It was found that many of the farmers interviewed invested the incomes earned from the sale of their maize. The farmers invested in education for their dependants, purchase of livestock, business and savings. Majority of the farmers invested in several ventures. 52% of the farmers were found to invest in livestock and education while 32% invested in education and savings; and 8% invested in education and business.

In addition 5% of the farmers were found to have spent part of their incomes in building houses from the sale of maize to Makos factory. The houses were mainly temporary in nature.

4.2.6.0. MARKETING

84% of the farmers sell their maize to the distributors who are agents of NCPB while 16% of the farmers sold directly to the factory. The distributor during this period 1986, took the maize

directly to the industry. In addition to these two marketing channels, small amounts of maize were sold in the local market places.

4.2.6.1 BENEFITS ACCRUING TO THE FARMERS ONCE THEY TAKE THEIR MAIZE DIRECTLY TO THE FACTORY

1. The farmer avoids drying the maize to attain the 14% moisture content required by the NCPB. The millers take such 'wet' maize straight to the mill.
2. By taking the maize straight to the millers the farmers avoid the middlemen and their commission charges.
3. The farmers save on the time, they would otherwise spend selling in the local market.
4. The distributors save on the storage costs.

4.2.6.2. TRANSPORT LINKAGES

The distributors usually have lorries which collect the bulk from large scale individual farmers and other collection points usually the market centres. There is more interaction between the distributors and the farmers. As a result the farmers are told the day of collection of the maize by the distributor. Such information is disseminated quickly as the farmers inform those who might not be aware. While transporting

to the market places, several means are used which include oxen (carts), backload, matatu and donkeys.

4.2.6.3 EMPLOYMENT CREATION

Some farmers hire some women to transport the maize to the collection point. Such women earn incomes from such activities which they spend within the rural hinterland. The distributors own lorries and they employ at least three people; the driver and two helpers. Some distributors have as many as 4 lorries. The factory has 15 distributors. The people employed are normally from surrounding areas. In this respect, maize selling can be said to create employment. With the distributors selling directly to the factory there is a continuous demand in the factory and therefore market throughout the year. With the constant interaction with the factory the distributors know the demand situation and alert the farmers. The continuous demand encourages the farmers to produce more.

4.2.6.4 CO-OPERATION BETWEEN THE FARMERS

The farmers co-operate in transportation of their produce. Several farmers were found to combine forces to hire a common oxen drawn cart or matatu to transport their maize to the collection point or market.

Cooperation was also identified in farming where one farmer may help his neighbour in farming mainly with oxen drawn ploughs. Hiring of tractors from the farmers who possess them can be seen as an important cooperation between the farmers.

This co-operation makes the farmers minimise the high costs of services which they would otherwise incur.

4.2.7.5 FARMERS PURCHASE OF THE INDUSTRIAL PRODUCT

The farmers demand for the maize flour can be seen as an important backward linkage to the industry. If the sales are high, obviously the demand for the raw materials would increase. The study found out that 60% of the farmers purchase maize flour from the factory. This is either directly from the factory or indirectly from the shops. The flour is sold at Kshs. 117.00 while Pembe Brand is sold at Kshs. 117.60 per bale in the township.

4.2.8.0 MARKETING OF THE FINAL PRODUCT (MAIZE FLOUR)

The product is sold mainly in Machakos, Kitui, Kajiado and Nairobi Districts. The maize flour is sold in the various markets in the following proportions;

Table 4.14(c) Marketing of Maize Flour

Area	Proportion of sales %
Machakos Municipality	55%
Outside the Municipality but within the District	35%
Outside the district but within the country	10%

Source : Makos Millers, 1987

Machakos District therefore takes 90% of the sales. It can therefore be argued that the District provides some effective demand to the industrial products.

4.2.8.1 TRANSPORTATION OF THE MAIZE FLOUR

The maize flour is either bought from the factory or transported to the areas of sale. 25% of the maize flour is bought from the factory while 75% is transported to the place of sale by the company vehicles. The industry has 126 wholesalers many of whom have their own vehicles. They therefore provide employment for the businessmen and the people they employ.

4.3.1. SUMMARY OF EXISTING LINKAGES

The study found out that the industries contributed to the employment of the rural population in the areas within which they are located. Majority of the employees were coming from Machakos District. Field data revealed that a majority of the workers had low levels of education and that only a few had formal training, which is a characteristic of rural areas labour. Makos Millers was found to use manual labour in packaging instead of using machines thereby creating more employment opportunities for the local people.

The study also found out that some of the incomes received by the workers were invested in such ventures as educating their dependants, constructing houses and in agriculture. Such investments were found to generate employment opportunities and incomes for those employed.

However, these linkages were found to be weakened by the fact that majority of the employees in both industries were getting low incomes. In K O L for instance all members of the management team which was found to receive high salaries come from outside Machakos District. The study revealed a positive correlation between incomes and the level of savings and investments. A large proportion of the income

received by the high income earners is as a result, repatriated and invested in their areas of origin, which in the case of K O L happens to be outside the Machakos District. However despite their low incomes some of the workers had saved part of their incomes and invested such savings in different enterprises but this was limited by the low levels of incomes.

Secondly, the study found out that although an industry such as the K O L had been established a long time ago, this factory did not have a proper training scheme for its workers. Without further formal training the employees could not be competitive in the labour market. Labour mobility to areas of greater opportunities was therefore limited. Although the factory insists on job training, the employees are disadvantaged since they were not given certificates which they could use in other companies to show their work experience. With low training the productivity per worker is low and this subjects them to low wages.

Makos had however recognised the need for training and according to the management they will start sponsoring employees for further training.

Thirdly, although the K O L was found to cater for the welfare for the workers by providing them with houses, the industry did not provide any recreational

facilities to its workers in the nucleus estate. The workers were also left to look for services in the private hospitals and the Machakos General Hospital which are costly in terms of money and time spent.

Makos millers on the other hand had together with Luki Bakery formed a football team. The workers of both Makos Millers and Luki Bakery are able to recreate after work. However, Makos does not have a dispensary of its own.

The experience from Mumias sugar company as illustrated in the literature review showed that provision of recreational facilities and medical services within the industrial nucleus farm is desirable. Mumias was also able to give financial assistance for the general hospital, improvements in its hinterland and this participation helped reduce the expenditure on these services by the workers. In addition, the financial assistance strengthened the linkage between the industry and its hinterland as other people benefited from the medical services. This is one way of imparting development to the rural areas.

Participation of the above nature is lacking in these industries particularly the Kenya Orchards Limited. This has the result of increasing

expenditure on the part of the workers when acquiring similar services elsewhere. This has the net effect of reducing the incomes accruing to the workers which limits the amount of money they can save and invest. With little savings and investment rural development is hampered.

CHAPTER FIVE

5.0 SUMMARY CONCLUSION AND RECOMMENDATIONS

This chapter ties summary and conclusion of some aspects within the study upon which recommendations are given. This recommendations are geared at strengthening the weak relationship found between the industries and their resource hinterland.

5.1 The study revealed that majority of the workers are given low incomes which limit their contribution to rural development. The industries do not have proper training schemes for their workers. Those who are given job training are not given certificates or any testimonials to show that they are qualified in a particular aspect which as has been explained, limits their mobility.

Recommendations

To strengthen the above identified weak linkages several things are recommended; one, since some of the workers were found to invest in some activities which were income generating, despite the low incomes earned. This suggests that with higher incomes, the employees were likely to save larger amounts and invest. There is therefore need to increase the salaries of the workers in order to increase their

purchasing power, as well as enabling them to 'plough' more money to the rural hinterlands.

In this regard, the Ministry of Labour should make a follow-up to see whether the workers are really paid the stipulated minimum wages.

Second, since it is likely that if the industries are left on their own they might not send workers for further training, the Ministry of Commerce and Industry (M.O.C.I.) should intervene. The industrial promotion survey section in addition to insisting on allocation of funds for training of employees in the feasibility studies, should make a follow up to see that the workers are actually being trained. In addition a requirement should be made for annual returns to be sent to the Ministry at the end of the year showing the actual money spent on training. In order to improve the competitiveness of workers in the labour market, the industries should be encouraged to give certificates of experience to those who become fully qualified in some aspects of the job.

Thirdly it is recommended that the industries should be required to provide recreational facilities for their workers. This is especially so for the KOL

which has a nucleus estate. It is desirable to have a health facility within the factory's premises to cater for its workers. These efforts will reduce the workers expenditure on such services and the money thus saved can be expected to be spent within the rural areas to better the standards of living of the rural population. The factories will also save on the man hours wasted when workers attend the general hospital.

The study found out that the industries did not participate actively in local development projects such as water, electricity, and such like projects. The industries do not help in the provision or maintenance of the road leading to the factory. From the literature review, Mumias and Pan African Paper Mill were shown to have participated directly in the provision of these infrastructures thereby increasing the level of hinterland development. This has not been the case with KOL and Makos. This makes the relationship between these and their hinterland weak. There is therefore need for the industries to be more involved in local development projects.

In order to complement the contribution of those industries towards roads improvement, it is recommended that the Ministry of Transport and Communication (MOTCOM) should step up its efforts in as far as

construction of feeder roads is concerned. This is important so that the raw materials could reach the industries without much problems.

The study also found out that there was a strong linkage between Makos and its hinterland as far as raw material acquisition is concerned. This is because makos obtained all the maize it requires from Machakos district. This purchase of maize from within the district was found to earn the maize farmers incomes which they use to better their standards of living. With such incomes earned from the sale of maize, the farmers generated employment to the local people. It is however recognised that the linkage is strong since the industry is required by the Government to use the maize from Machakos District. The management had revealed the desire to get maize from Kitale, if the government had allowed it.

The study however established a weak relationship between the Kenya Orchards limited, and its resource hinterland as far as raw materials is concerned. This was demonstrated to be the case through an examination of the incomes which accrued to the farmers within the study areas. Field data showed that farmers earnings were low mainly because the industry (KOL)

continued to import fruits from outside the district including those which are grown within the district. Besides it was discovered that no incentives were given to farmers in terms of better prices advice through demonstration farms and credits. The farmers were largely left on their own to arrange the transport of their farm produce to the factory. Survey results showed that during good harvest seasons, the factory turns down some of the farmer's fruits, depending on the market demand at the time. The purchase of partial supplies of the fruits limits the farmers' revenues. The limited earnings from such sales have the effect of limiting the linkages between the factory and its hinterland in terms of generation of employment and consequently income to the farmers at the farm level. The disincentives limits the farmers attachment to fruit production.

The industry could purchase more of the farmers produce if it advertised its products and did proper marketing plus intensive research with a view of coming up with new products. Through such strategies, KOL could purchase more of the raw materials from the hinterland thereby providing resources for the development of its hinterland.

To strengthen these linkages, following recommendations are made:

Firstly, on the part of Makos Millers, since the industry has been playing a big role in purchasing the farmers produce, and as a result encouraging farmers to produce more, there is need to strengthen the link even more. As Makos incurs higher production costs through the use of 'poor quality' maize from Machakos district, it is recommended that the government subsidize the industry so that it becomes more competitive even in areas outside the current areas of sale. This subsidization may take the form of tax exemption or direct government subsidization. More advertisements of the 'Tausi' Brand of maize flour should be done by the industry to promote sales. With more sales the industry may operate on two shift basis which will increase employment. The demand for the farmers produce will also have been increased.

As per now the government has reversed its policy of millers purchasing maize directly from the farmers. It is recommended that due to the various advantages accruing to the farmer when he sells his produce to the industry; the government change its policy so that the farmers can deal directly with the millers.

To strengthen the relationship between KOL and its hinterland, it is recommended that the industry should set up a crop monitoring unit with its own field officers. The team will supply the management with the relevant information as regard what fruit is ready and forecast on the amount expected to be produced. This crop monitoring unit should work hand in hand with the Ministry of Agriculture field officers. In addition they will demonstrate good crop husbandry in their farms. The case of Mumias, (in the literature review) has shown that the farmers can even supply their outputs on contract basis. KOL might as well try to investigate possibilities of drawing a contract between it and the farmers. Another option would be assuring the farmers that the industry would be purchasing all their fruits and possibly indicate to them the price range. Such a demand would require the industry to find ways of promoting its sales and advertisements in the dailies as well as other strategic agencies like mass media is recommended.

In addition to KOL there is need for establishment of another fruit processing plant within Machakos District which would utilise the raw materials from the district. The industry will remove the monopoly

on fruit processing from KOL. In order to make this new industry and even KOL to utilise more of the districts resource (mainly fruits) it is recommended that the Government should set up a regulation requiring industries to use the available resources at their places of location so as to help develop those areas. Makos millers gives a very good example where the Government enforces a regulation which makes the people in the hinterland of the industry benefit. The Ministry of Agriculture and MOCI should take the key roles in enforcing these.

For the establishment of the new industry the Ministry of Commerce and Industry in collaboration with the Ministry of Finance and other financial institutions including the Co-operative Bank could give the local people financial assistance so that they can establish the industry. The KiE in addition to providing the financial and technical assistance should do the feasibility studies to show the appropriate place to locate the industry. The excess demand and supply phenomenon can be matched through the inventory (stock) building.

It is recommended that the farmers form some marketing co-operatives. This will enable them to bargain for the increase of the prices of their produce.

The local people should also be encouraged to purchase some shares from the KOL as it is owned by a multinational company: Philips Harrison and crossfield. Once the local people purchase the shares, they will have a say in the industry and when there is demand, they will influence the decision of the company, to purchase the raw materials from the local farmers. The relevant financial institution should advance to local people with the necessary credits. The Ministry of Commerce and Industry should ask the company to float shares.

The chemical ingredients continue to be imported. While they are not being produced within the country, they make the country lose foreign exchange. The Kenya Government should encourage the already established chemical industries in the country to expand their production so as to incorporate the production of the chemicals which are not currently produced within the country.

The farmers were found to be generating employment in their farms through the investment of some of their earnings and through direct employment thereby helping to solve the unemployment problems in the rural areas. The farmers were found to co-operate

in activities such as transportation of product to the factory, and farming whereby farmers hire some tractors from those who have, some smaller groups were found to exist among the fruit farmers which marketed their produce and bargained for higher prices.

However this linkages were found to be weakened by the fact that few people applied fertilizers and herbicides in their farms. lack of application of such farm inputs make the production to be low. Majority of the sellers to KOL argued that they could not afford the fertilizers as their earnings from sale of their fruits were low. A larger proportion of the maize producers were found to apply fertilizers than that of KOL, consequently their incomes were also higher and created more employment opportunities. KOL was found to leave all the transportaton arrangements of fruits to the industry upon the farmers. This limited the amount of time devoted to farming activities by the farmers especially harvest time. Only few farmers organized themselves in as far as marketing their produce is concerned. This particular farmers hired common transport thereby reducing transportation costs.

Kanara sugar company (see literature review) was found to undertake the transportation of the sugar cane from the farmers' farms. This encouraged the farmers and reduced their transportation costs (of the sugar cane) as well as saving them the time which would be wasted in taking the produce to the factories.

Recommendations

In order to strengthen the linkages between the industries and the hinterland, it is recommended that

KOL should increase prices for the farm produce. It has been shown that other competitors like ITC were paying higher prices for same produce through their agents inspite of the fact that such factories incur all the transportation cost to KOL which is not the case with KOL. This would enable the farmers to purchase more inputs like fertilizers which would increase their production. The industries should in addition advance some credits to the farmers to ensure recovery of their funds, the industries should enter into an agreement with the farmers making them to be the sole purchasers of the farm produce. The industries should on their part assure the farmers a fair price. The purchase of these inputs will

also help generate employment in Machakos district by supporting the businesses supplying different inputs.

Makos millers were found to have encouraged the formation of informal sector dealing with repair of farm implements. Since this activities provides employment and generates incomes for those engaged in it, the sector should be promoted. The government should advance credits to these artisans. This is because, the activities saves the farmers the high costs of purchasing new farm implements while it earns the people engaged in it incomes.

Kenya Orchards Limited should provide transport for the farmers' produce. While the factory may take a relatively Longer Period to arrange for transport of the fruits; it is recommended that meanwhile the farmers should organise themselves in larger groups and hire common vehicles to transport their produce. This has been done by farmers from Thinu sublocation. The farmers should in addition form a group which deals specifically with marketing their produce and bargaining for better price terms.

The study revealed that there is weak relationship between the industries in Machakos Township. This is because the industries depend mainly

on external markets for the purchase of some of the inputs even in cases where the inputs are produced by some other industries within the town. This is exemplified by the KOL and Eastern Printers case.

It is recommended that the industries should find ways of interacting more. They should take advantage of the external economies provided by the other industries. The case of Makos and Luki Bakery depicts a good example. Further, the co-operation between the two industries to provide common recreational facilities is a good example of achieving a necessary facility at a reduced cost.

However since these industries are few, to make the linkages strong, there is need for Establishment of more industries, within the township and the district as a whole. Such industries will not only offer more external economies of scale to one another but will also help utilize the districts potential.

If the industries could offer higher wages to the employees and incentives to the farmers through higher prices and provision of transport facilities, the impact of these industries to their hinterlands

could be greatly enhanced. The industries do not offer external economies of scale to one another which could have enhanced their performance and consequently their contribution to rural development what Machakos township requires is industries which would use most of the raw materials from within the district. This would have higher multiplier effects and accelerate the rural development process. Industries which would induce other complementary industries to locate in the township would be desirable. Such industries would be the like of Makos, which though established recently, 1986, was found to be planning to construct an animal feeds plant. This observation is made with the realization that the type of industries in a given urban centre or region together with demand (expenditure patterns) determines the rate and nature of development that takes place in the rural areas.

5.2 INDUSTRIAL DEVELOPMENT IN MACHAKOS

Before proceeding on to suggest industries which would do well in Machakos, it is necessary to show constraints to industrial development in Machakos.

Currently there are several problems which might deter the development of concentrated industrial development in Machakos town.

Firstly, water is a main problem experienced by the industries already located within the town. The current water supply is inadequate for both industrial use and domestic use within the town. As indicated earlier, the water has to be rationed. In addition the water is alkaline and require further treatment before use in some industrial production. Currently Development of industries requiring high amounts of water face problems, yet water is necessary for nearly all industrial development.

Secondly, large parts of Machakos District are arid and semi arid and as a result have low agricultural resource potential for some crops. This includes large parts of Kibwezi, Kambu, and Yatta. However some areas such as Mua Hills, Mbooni among others have high potential for some crops. Such areas are very productive. Most of the potential investors seem to generalise the district as ^{arid} and therefore lacking the base for industrial development. It would seem to such investors that the town does not have an economic base and demand for the product will be limited.

The above argument is reinforced by the fact that the present industries within the town offer little incentives for the establishment of complementary industries. The limited external economies of scale which the present industries offer, do not attract the establishment of other complementary industries. Lack of abundant natural resource in Machakos, which would give the town locational comparative advantage in attracting investments also limits the industrial development.

Fourthly, the isolation of the town from important Nairobi - Mombasa transportation network is also a constraint. The Railway Passes 30 km. from the town therefore the town does not benefit from the cheap and useful railway network. This is a constraint to the development of heavy industries in Machakos which would require rail services. The Nairobi-Mombasa road passes only 16 km. away from the town. Industries which would make use of the road network especially for distribution of their products and acquisition of the raw materials would be constrained. Without such an important transportation network the town cannot act as a 'stop-over' whereby some of the travellers would purchase the industrial goods. This transportation advantage makes industries prefer to locate in Athi

River which is in addition nearer to Nairobi. Some people prefer shopping in Nairobi which is only 65 km. away, thereby rendering the development of some industries difficult.

The private ownership of land around the town to some extent limits area for industrial expansion as compensation would be costly.

Solutions

The government has sought solutions of some of the problems. As far as water is concerned the Government has allocated Kshs. 590 million for a major water project to the town. This project is destined to start by July 1987 and it is estimated that the water will be more than sufficient for the towns demand. Meanwhile a short solution is has been sought. This is through the construction of an additional dam, namely; Miwongoni dam, with a capacity of 2,600 cubic metres a day. This will supplement the water from Maruba dam. Table 2.1 reveal that the Ministry of Water Development is trying to dig more borehole and dams to supply the hinterland with more water. Some of the water is used for irrigation and will increase the agricultural potential for the District.

According to the 1979/83 and the 1984-88 National Development Plans the government noted its intention of easing congestion of industries in Nairobi. Its intention was to redirect the establishment of some of the industries to Machakos. These industries are given incentives such as tax relieve. The new industries in Machakos, like Makos millers, and Jalas were found to be given one year tax free. With tax free incentives and the presence of active DDC, some industries would develop in Machakos Town. However there would be stiff competition from Athi River, and other towns such as Nairobi, Thika, Ruiru among others.

5.3 SUGGESTED INDUSTRIES

It is evident that without transportation advantages, especially the rail services, the development of many industries is limited at least in the short run (next 10 years). The future for Machakos therefore lies in medium and light industries. Some of the industries would base their establishment on the supply of the raw materials, while others on demand accruing due to agglomeration economies of scale.

From Table 2.2 it is evident that there is some potential which is not being utilised since the production of fruits is more than KOL requires. There is

potential for one other fruit processing industry in the short run. The factory could process new products from such fruits as Avocadoes, passion fruits, bananas among many others, which are not being utilised by KOL currently. For Example, from passion fruits, the industry could produce passion juice which could be sold in hotels

Secondly, there is potential for honey refinery and processing industries. The current honey refining industries are few and small in scale. The production of the honey could be stepped up by advising the Bee keepers to use Kenya Top Bars (KTB) hives whose production is higher than traditional hives. With the increased production and use of KTB hives, there would be the potential for establishment of a complementary industry dealing with the Bee Wax. This would include candle production and related products. For the KTB hives, local timber from the various government forests could be utilised.

Thirdly, there is potential for another maize milling industry. Although Makos produces and sells locally there is still the sale of other Brands such as Pembe, Jogoo and Ugali, in the market. Since the maize produced within the district is more and the

population is still increasing an establishment of a second milling industry is desirable. Because of the low quality maize, the government should give both industries more incentives and look for ways of improving the quality. Along with this maize millers there will be potential for animal feeds plant. This could call for establishment of chicken hatchery within the district which may provide market for sunflower grown in the district. In the long run an establishment of an industry dealing with manufacture of animal products could be justified.

Since the livestock is also kept within the district, there is potential for small scale leather tannery industry. There are hides and skins dealers but there is no tanning industry. This could create a demand for small scale leather products such as leather jackets, bags and shoes.

With the increased Agricultural Production within Machakos district, there could also be for potential for establishment of a chemical producing industry. This industry would produce and supply pesticides to the district.

With the emergence of all the above industries, there would be potential for establishment of a paper packaging industry to supply paper bags to other industries. Besides, with the expected high rate of construction activities there would be potential for the development of a building industry including block making industry. With time, this industry could start making clay bricks. The establishment of such industries among other investments would depend on the incentives the government gives the investors. A 'big push' from the government may be crucial to set a chain reaction. The industrial development also depends on how soon some of the problems like water, railway etc. are solved and on the availability of complementary services such as credits.

Areas for further research

This study concentrated on the relationship between the Machakos township and its resource hinterland. More researches needs to be done in the field of:

1. A study to assess the industrial potentials of the smaller urban areas within Machakos District to allow further spatial distribution of industries and rural balance. This suggestion is made

in the light of the observation that it is the light and medium scale industries which stand a better chance of success. The contribution of such industries to their hinterland would be higher when close to their resource hinterlands.

2. A comparative study between Machakos town and Athi River to show which urban area is suited to concentration of the industries is recommended in view of the fact that these two towns are within Machakos District. Machakos Town has the advantage of administration Headquarters, while Athi river had the advantages of the railway line and international trunk road.
3. A study on the informal sector activities within Machakos Township to assess their future growth and prospects is also recommended.

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APPENDIX I

DETAILED BREAKDOWN OF THE PRODUCTS

Jams

Pineapple Jam

Plum Jam

Capegoose berry Jam

Melon and Ginger Jam

Peach Jam

Strawberry and Plum Jam

Apricot Jam

Raspberry Jam

Black current Jam

Mixed fruit jam

Sour cherry jam

Mulberry jam

Marmalades:

Marmalade

Seville organge

Orange Jelly

Grape fruit

Vintage

Chunky cut

Jellies

Red currant

Guava

Fruits

Fruit salad in syrup
Red Plum in syrup
Pears in syrup
Mulberries in syrup
Cape Goose berries in syrup
Sliced mangoes in syrup
Grape fruit segments in syrup
White peaches in syrup
Apples-solid pack

Vegetables

Whole tomatoes
Large haricot beans
Sweet corn off the cob
Peeled tomatoes in tomato juice
whole carrots
Green beans
Mixed vegetables
Beans in tomato sauce

Pelishes

Pickled onions
Mango chutney
Pineapple chutney
Fruity sauce
Tomato ketchup

Source: K.O.L. List of products as per 1st November,
1982.