

THE ROLE OF SMALL SCALE
AGRO-BASED INDUSTRIES IN
RURAL DEVELOPMENT: A CASE
STUDY OF WEST KENYA SUGAR
FACTORY, KAKAMEGA DISTRICT.



BY

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DEDICATION

DEDICATED
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THE FAMILY OF SABATIA

ACKNOWLEDGEMENTS

The preparation, compilation and completion of this work could not have been successful without the assistance of many people.

I, am particularly indebted to my Supervisor Mr Zachariah Maleche whose guidance and challenging criticisms made this work successful. I also wish to acknowledge the efforts of Dr Ngau and Dr Ondiege in teaching "Research Methodology and Computer Application" that has contributed to the success of this work. I also wish to thank the entire staff of D.U.R.P and M.A II Students for their encouragement and cooperation throughout the course.

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To those I could not mention, but assisted me in this work I say thank you so much.

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ABSTRACT

This study set out to examine the role of small scale agro-based industries in rural development. Using a case study of West Kenya sugar factory, the study aimed at studying the sugar industry in terms of sugarcane farming and sugar processing in Kabras area. These two processes have had an effect on the economic and social well being of the people. It is against this background that the study was prompted by the economic and social changes that have taken place in the study area since the introduction of sugarcane as a cash crop and sugar processing.

In an effort to understand rural development dynamics, the study examined the extent to which the introduction of sugarcane farming and sugar processing in the study area has had an effect on employment, household income, education, infrastructure trade and commerce, agriculture and the general living standards of the people.

This study has revealed that with the introduction of sugarcane farming and sugar processing in the study area, both the sugarcane farmers and factory workers have had additional income due to the employment opportunities at the factory and the market there off created by the factory for the sale of sugarcane. These two processes have had multiplier and

(vi)

distributive effects in terms of the earned incomes being re-invested in other income generating activities that improve the general well being of the people. The study also revealed that the two processes have had an effect on education and business activities in the study area. In general the rural community in the study area has benefited from the introduction of the sugarcane farming and sugar processing. The benefits are mainly social and economic. The study concludes by recommending for the introduction of more small scale sugar factories given that the investment requirements of such factories are manageable by local entrepreneurs and therefore more appropriate to establish than large scale factories which need greater public sector funding.

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CHAPTER ONE

1.0 Statement of the Problem

Since independence Kenya's National Development Plans have consistently highlighted industrial growth and development. The emphasis has included the dispersion of industries away from Nairobi and to a lesser extent away from Mombasa and Kisumu. These three centres are considered to be traditional centres of industrial concentration. Therefore the dispersion policy is aimed at equitable distribution of industrial growth throughout the country and more so to reduce rural urban migration by generating employment opportunities in the rural areas.

Notwithstanding the desires and goals of national development plans and related sessional papers, there has been limited dispersion of industries to the rural areas. The assumption behind the dispersion of industries has been that the establishment of industrial activities in the rural areas will stimulate development of the adjoining hinterland through spread effects. This assumption has been disapproved somehow because what has been observed is that most programmes adopted to stimulate industrial growth have not led to envisaged equitable development. What has emerged is that development in rural areas has lagged behind and has not kept pace with urban industrial activities. Some factors that

have been used to explain this situation are scarcity of entrepreneurial talent in the rural areas, lack of financial resources, inadequate infrastructure and underdeveloped markets. The Government has been working toward finding solutions to these factors by developing institutions and organisations such as Kenya Industrial Estates, Kenya Industrial Training Institute, Industrial Research and Development Institute, Industrial and Commercial Development Corporation, and District Development Fund. In advocating for industrial development in rural areas the emphasis has been on generation of employment, increased rural incomes and improvement of the standards of living of the rural people. Industrialization has been looked at as one way by which rural areas can realise added economic activity to provide employment and family incomes. The assumed role of rural industries has been therefore that they create employment opportunities in the rural areas and therefore reduce rural -urban migration. Also they help develop essential rural infrastructure such as electricity, roads, water supply and social services and that they contribute considerably to improved rural incomes. It should be understood that industries cannot be attracted to these areas unless they are provided with basic technical infrastructure they need. Infrastructure plays a very important role

in the location of industries, therefore in any event building up a transport and communication network is an essential prerequisite to any kind of development. Labour of a new industrial development should be adequately housed and supplied with medical and educational facilities at points close to their work place. The situation could be a bit different for small scale agro-based industries because they draw most of their labour from the surrounding hinterland. Therefore they depend mostly on the general infrastructural facilities provided within the area.

Scholars such as Myrdal (1957) argue that with the establishment of industries like sugar mills in an area, there would be generated development in the particular area. This would be because of the employment opportunities that would be generated as a result of the industry. This would facilitate the whole region to benefit from the increased economic activity. Other studies done on sugar industries have revealed that where such projects have been established other socio-economic services have sprung up for example better housing, schools, health services, postal and telecommunication facilities, sports and recreational facilities, quasi markets and shopping centres.

Rural industrialization is closely related to rural development, which is a strategy designed to

improve the economic and social life of those who stay in rural areas. National development objective stress rural development as a strategy that would lead to increased rural agricultural productivity, increased incomes, increased equity in the distribution of incomes generated and increased access to services and participation in decision making at the District level. Uma Lele defines rural development as improving standards of the mass of the low income population residing in rural areas and making the process of their development self sustaining. Rural development therefore in its broader perspective can be viewed as improved welfare and increased agricultural productivity. Improved welfare here is taken to mean improved standards of living, improved incomes and employment opportunities, which partly can be achieved through rural industrialization. Therefore in this study Rural Development is defined as improving living standards of the rural population and making the process self sustaining.

In considering the role of small scale agro-based industries, this study wishes to look at the West Kenya Sugar Factory in South Kabras Location, Kabras Division of Kakamega District and how it has affected development in the area. West Kenya Sugar Factory has been in existence for the last ten years and therefore there are trends of change in the area that

are worth studying. In this area farmers had initially succeeded to establish Jaggery Factories to process their sugarcane. The Jaggery Factories had limitations in both scale of operation and technology. The first attempt for white sugar processing in the area was by the establishment of the Kabras Investment Company. This factory was established as a joint effort of farmers and the Kenya Industrial Estates having found out that Kabras area had a potential in sugarcane farming. Its technology and scale of operation was advanced than that of the Jaggery Factories. Unfortunately the Kabras Investment factory got burned down in 1980 and it became difficult to restart it. In 1981 West Kenya Sugar Factory was developed in Kabras area again mainly based on the technology of Kabras Investment Company. West Kenya Sugar Factory is run as a joint venture by local farmers and local industrialists from within the region. Within the same region of Western Province the Government has established two large scale sugar factories, that is, Mumias Sugar Factory in Kakamega District and Nzoia Sugar Factory in Bungoma District. Much has been written and said about the overriding impact that these two factories have had on the development of the associated regions. However no specific study has been done on the likely impact that the use of the small-scale sugar processing plants could have on the

rural economies as seen from the experience of the development of sugar industry in Kabras Division. It can be observed that the small scale sugarcane processing plants are not totally without positive impact on rural development. This study therefore wishes to examine the role played by West Kenya Sugar Factory in the development of Kabras Division as an example of the role that small scale agro-based industries can play in rural development.

Before the West Kenya Sugar Factory was established in Kabras Division most sugarcane farmers depended on Jaggery Factories for the processing of their cane. This normally led to the production of crude sugar unlike West Kenya sugar factory which produces white sugar for commercial consumption. These jaggery factories normally operated on a very small scale and suffered obvious diseconomies of scale. As a result their impact on the development of the area was highly limited. The study of West Kenya factory will focus on examining employment opportunities, household incomes, changes in agriculture, trade and commercial activities and the living standards of the people. Some of the questions to be answered by this study are

- (i) What are the general economic changes associated with sugarcane farming as a cash crop.

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concerns the general situation
of the country and the
state of the economy. It
is followed by a detailed
analysis of the various
sectors of the economy.
The report concludes with
a number of recommendations
for the government and
the private sector.

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(ii) What changes have taken place in the development of the area since the introduction of sugar processing and especially since the establishment of the West Kenya sugar factory.

This will generate useful information to guide future policy for the development of the sugar industry in Kabras area and the general role of similar agro-based industries in rural development.

1.1 Objectives of the Study

The objectives of this study are;

1. To examine the background of sugarcane farming and the establishment of the factory in Kabras area. This objective examines the factors that led to the growth of the factory in this area.
2. To examine the choice of technology used by the factory.
3. To examine the impact of the factory and sugarcane farming in the area.
4. To assess the role of the factory in rural development, problems associated with it and implications for future development and planning.

1.2 Study Assumption

This study makes an assumption that farmers in the study area are likely to continue growing sugarcane because it is more profitable than the other crops presently grown.

1.3 Hypothesis

1. H_0 -- The establishment of the factory has not been accompanied by a significant improvement in the level of household income.
 H_i -- The establishment of the factory has been accompanied by a significant improvement in the level of household income.
2. H_0 -- There is no significant difference between the amount of land devoted to sugarcane farming and that devoted to the growing of maize.
 H_i -- There is a significant difference between the amount of land devoted to sugarcane farming and that devoted to the growing of maize.
3. H_0 -- There is no significant difference between mean acreage under maize now and mean acreage under maize before farmers started sugarcane farming.
 H_i -- There is a significant difference

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2.2 Hypotheses

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between mean acreage under maize now and mean acreage under maize before farmers started sugarcane farming.

1.4 Scope of the Study

The scope of the study was limited to West Kenya sugar factory, which is located in South Kabras Location of Kabras Division Kakamega District. Firstly the study considered the introduction of sugarcane farming in the area and the development of sugar processing. Secondly the study considered the interrelationship between the factory and sugar farmers in the area given that it has been in existence since 1981. Issues concerning its establishment, choice of technology and socio-economic impacts were considered. The study also considered the large number of Jaggery Factories in the area in as far as they act as alternative market for sugarcane produce in the area. Besides these the study also covered the impact of the factory on local markets with regard to the development of business enterprises within the Location and the benefits to Kakamega county council.

This study is organized in five chapters. Chapter one focuses on introduction which includes the statement of the problem, objectives and scope of the study, literature review and methodology. Chapter two focuses on the study area. Chapter three focuses on

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the development of the sugar industry specifically sugarcane farming and sugar processing. Chapter four examines the impact of sugarcane farming and sugar processing on the development of the study area. Chapter five covers the findings and implications for future development plus recommendations and conclusions.

1.5 Literature Review

Much literature has been written about rural industrialization and in particular agro-based industries, which use agricultural products as raw materials. Awuor R.O (1979) argues that the establishment of industries in rural areas has helped promote regional development. This is considered so because an industrial strategy is a prerequisite for development of the economies especially of third world countries considering generation of new economic employment and income opportunities, which stimulate greater productivity and bigger domestic market.

She goes on to argue that an industry's linkage to other productive activities is seen as important in illustrating its role in the development of the area. She notes forward linkages involving further processing towards a finished product or expanding an existing production process so that a broad array of outputs are produced from the same kinds of materials

presently used as inputs.

For the sugar industries a major forward linkage is the utilization of sugar molasses and bagasse in the production of confectionaries, alcohol and paper respectively. Socially undesirable forward linkage is the use of jaggery to make illegal alcohol. Backward linkages involve moving closer to the basic inputs to a production process or even to indirect inputs. Mwandishi (1985) noted that sugar industry is one of the agricultural activities traditionally looked at in Kenya as being capable of providing gainful employment to the country's fast growing population. The largest secondary effect on employment of setting a sugar industry is through the backward linkage to the suppliers of sugarcane, the main raw material input, which must be supplied locally because it is bulky and highly perishable.

Livingstone (1981) noted that the ILO mission of 1972 attached considerable importance to small industries. Particularly rural industries because of their greater labour intensity and their position within a strategy emphasising rural development. Rural industrialization is viewed as a strategy aimed at improving the living conditions and social welfare of the people who live in rural areas. Lonsdale and Seyler (1979) also agree with the above. He notes that industrialization is one means by which rural areas

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In the second section, the author details the various methods used to collect and analyze the data. This includes both manual and automated processes. The goal is to ensure that the data is as accurate and reliable as possible.

The third part of the document focuses on the results of the analysis. It shows that there is a clear trend in the data, which is consistent with the initial hypothesis. This finding is significant as it provides strong evidence for the proposed model.

Finally, the document concludes with a summary of the findings and a list of recommendations for future research. It suggests that further studies should be conducted to explore the underlying causes of the observed trends.

can realize added economic activity to provide greater employment and family incomes.

Omoto J.C.A and Barclay A.H (1977) revealed in their study of Mumias sugar factory that the establishment of the factory had tremendous impact on the improvement of communication network of the area. Both feeder and major roads had been constructed or upgraded to better levels. Other positive effects included the introduction of agricultural innovations and a cash earning crop for an area, which had been largely subsistence. They however noted the negative effect of the project to the general reliance on cane production (monoculture) at the expense of food crops thus causing food shortages in the area.

Khaguli (1981) in her study noted that the establishment of Mumias sugar factory had attracted other employment generating activities in Mumias Town. These include basic activities which were commercial and residential in nature. She also noted that the establishment of the factory was followed by a sharp increase of urban population especially those who had come looking for employment in the factory. The increased population, put considerable pressure on the existing infrastructural services and facilities. Adolwa (1985) also found out similar results when he studied the impact of pan paper industry on the growth of Webuye Town.

Muller J (1976) argued that many developing countries in the recent years emphasised the need to support small industries. However policies designed to this effect seldom explain specific guidelines on how they should be implemented. The intention is to contribute to development through more employment and better use of local resources, but the planners and practitioners dealing with small industries are generally left to formulate their own strategies.

Myrdal (1957) contended that with the establishment of industries like the sugar factories in an area, there would be generated development in the particular area due to the employment opportunities that would be generated as a result.

Odada J.E.O (1979) on the same line with Myrdal notes that sugar industry provides significant wage employment opportunities to Kenya's fast growing labour force. About 20000 people find regular wage employment in the industry and a much larger number earn regular incomes from sugarcane production activities and small business and informal activities, which have sprung up as spill over effects of the industry.

During the Kericho Conference of 1966, Harbison F.H in his work 'The generation of employment in newly developing countries' argued that rural modernization involves much more than improvement in agriculture.

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5. The fifth part of the document discusses the importance of training and education in ensuring the accuracy and reliability of financial records. It emphasizes that all personnel involved in the financial system should receive appropriate training and education to ensure that they are able to perform their duties accurately and reliably.

Other requirements include modernization of rural communities, the development of small scale industries and crafts, the improvement of communication and the extension of education and health services to the rural areas. It requires massive investment, extensive training of human resources and determination by the Government to give priority to rural development.

Sant M. (1975) notes that the creation of an industry creates jobs in the reception areas. The employment so created is referred to as direct impact by Yeates and Lloyd (1969). Moseley (1973) argues that it is not only employment that ensues from the new establishment. In a region with surplus labour supply additional employment would be brought through the demand for intermediate goods and services consequent upon the net gain to the household incomes. The former has been labelled 'indirect' effects and the latter 'induced' effects. Moseley (1973) conducting a survey of the indirect and direct effects of industrial development in two East Anglian expanding towns found the indirect effects to be small initially. Only about 8% of materials used by new firms was produced within the region. But about a third of the new firms were increasing their dependence on local sources, although these were mainly smaller producers. The induced effects estimated from a survey of household expenditure showed less linkage from the region. This

is because the towns studied were somewhat small (below 15000 people) the higher order consumer goods had to be purchased in larger regional centres.

A manual on industrial projects analysis in developing countries (1968) has shown that establishment of a sugar industry entails considerable upheaval in the region concerned. For example there would transfer and regrouping of population, temporary and permanent importation of manpower, establishment of lines of communication, construction of houses and the development of other related activities.

Frank (1964) noted that whether or not the sugar industry is to be expanded should be determined by the relationship between the social benefits and social costs. He contended that although the expansion of large scale plantations benefits as well, provided that there is simultaneously an expansion in the implied or explicitly stated objectives of current development plans, a low capital/labour ratio ought to be one of the criteria in determining the desirability of expanding any industry of which the sugar industry qualifies.

Ndegwa P (1966) in his paper 'Rural Development strategy' noted that the strategy of the Development Plan 1966/70 contended that planners in Kenya must work under the constraint that incomes and employment must be created in the agricultural sector of the

economy if the benefits of development are to reach majority of the people directly through their earned incomes. He further noted that since the rural areas must absorb the bulk of the increase of labour force, major efforts have to be made to expand opportunities for work in the rural areas. Much emphasis has to be put on expanding and transforming agriculture.

Chapman K and Walker D.F (1991) argue that the impact of any factory extends beyond its boundary fence. On the positive side, income generated by employment in the factory will have a multiplier effect upon the local areas as money circulates through the economic system boosting the trade of shops and other business. They continue to note that the location of any industry in a place has numerous economic affects through its purchasing pattern of services and materials, its direct and indirect impact on local wealth, and its demand for infrastructure, it can set in motion a whole sequence of circular and cumulative processes. The operation of this mechanism clearly has implications for the spatial distribution of economic development, implications, which have prompted governments in most countries to formulate policies designed to influence the location of industry as part of wider strategies aimed at reducing regional economic inequalities. The cumulative causation process has four main aspects.

1. The effect of increased income, via new wages on local opportunities in business and on community wealth. The rising local markets encourage more service firms, shops and other activities making it possible to create new jobs in those sectors too. Thus there is a so-called multiplier effect - one job in the original sector creates others elsewhere- and this new wealth provides more income in the community for the public provision of infrastructure and community services. The process can be guaranteed to take place to some degree, but it is possible that nearly all the created income actually leaks a way from the area(leakage results when people spent their incomes elsewhere and thus provide no encouragement to local business). The new income provides opportunities, but it must be remembered that businesses have thresholds below which they cannot operate profitably, and the demand for some goods and services must be quite high before it can sustain a business.
2. New jobs in the industry usually increase the pull of trained labour. Local people are trained or others are brought in from

elsewhere, either way the community benefits with time and the job turnover of the number of qualified workers increases and educational institutions may do their part to provide even more.

3. Some industries require many raw or semi-finished material, components and or a variety of business services. Thus a market is created.
4. External economies derived from the build-up of ancillary industries are also strengthened by the general improvement of business services in the area, thus localization economies increase.

Jobando (1989) and Obiero (1980) found out that sugar factories had had major contribution to development in terms of employment, improvement of business services, improvement of infrastructure and influence on the growth of the towns around them.

Chapman K and Walker D.F (1991) have also noted that industrial development have negative effects, which are often of greater concern from a welfare point of view because they are frequently neglected in evaluating the costs and benefits of industrial development. Air and water pollution fall into this category as do the various economic and social problems associated with the introduction of

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industrial facilities. The wider impact of industrial development are embraced within the concept of externalities. An externality is a side-effect, which is not reflected in costs and prices. Thus a factory, which discharges large quantities of unpleasant fumes to the atmosphere, despite the availability of technology capable of controlling the problem, is reducing its own cost of production and presumably, the expense of the health and welfare of others. The costs are not necessarily limited in their geographical extent to the immediate vicinity of a factory. Many externalities are much more local and their effects are attenuated by distance from their source, making it meaningful to think in terms of an externalities gradient relating impact to distance. Several less desirable impacts of industrial activity such effects as noise, smell and certain types of atmospheric pollution are somewhat localized. Such effects as job creation and income generation represent the inverse side of the coin and it is possible to visualize separate gradients reflecting positive and negative effects. The figure below illustrates the situation in which the adverse effects of development are most strongly felt in the immediate neighbourhood, whilst its beneficial effects extend over a wider area.

Perceived Impact of Externalities

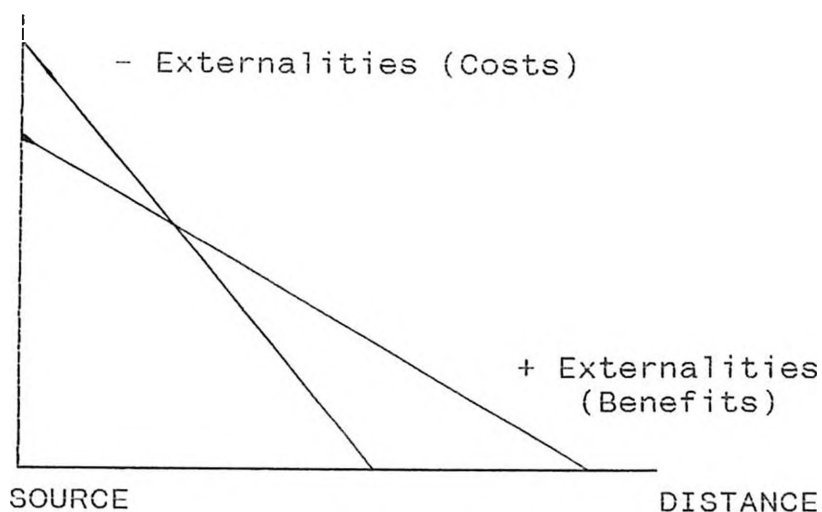


Fig1.0-- Hypothetical externality gradients
(Source: Chapman K and Walker D.F 1991)

Myrdal G.M (1957) and Hirschman A.O (1958) formulated the core periphery model and brought out the idea that core areas have parasitic relations in nature on the surrounding areas. For example Hirschman in his model of the growing "north" and the lagging "south" noted that migration of labour force from the south to the north is a negative effect. These negative effects have been referred to as "Backwash" effects by Myrdal and "polarized" effects by Hirschman. Alternative growth inducing effects relate to a set of processes where by the absolute level of development of a peripheral area is increased due to spatial interaction with a core area. According to Myrdal, growth inducing effects neutralize the

backwash effects only at a higher level of development. The growth inducing effects will be stronger if a country has attained a higher level of development. High level of development is usually accompanied by improved transportation and communication, higher levels of education and a more dynamic communication of ideas and values all of which tend to strengthen the forces for centrifugal economic expansion or remove the obstacle of its operation. Hirschman (1958) also identified two categories of production linkages- backward linkage from a particular industry to its suppliers and forward linkages from an industry to its users.

1.6 Review of industrialization in Kenya.

Pre-independence period in Kenya was characterized by subsistence agriculture with only white settlers practising commercial agriculture. After independence there was a general expansion of the market for industrial products because of emergence of Africans in the consumer market. Also the Government emphasised economic diversification through promotion of industrial and agricultural growth simultaneously.

The importance of industrialization in Kenya was under scored by the Government through sessional paper

number 10 of 1965 on "African socialism and its application to planning in Kenya". The government encouraged industrial development with the private sector playing a major role in its development subject to guidance and explicit control by the Government. However as noted by the Kenya Association of Manufactures, the government's strategy for industrial development did not and has not differentiated between urban and rural industrialization. The Government wished "to develop industry as rapidly as opportunities are created first by processing of agricultural, livestock and forestry products and natural resources for domestic use and export, and second, production for domestic demand in a progressive and more fully integrated manner."

Sessional paper number 10 of 1965 was followed by the 1966--1970 Development Plan, which stated that "Government policy towards investment and industrialization is basically positive and non restrictive, characterized by encouragement and support where needed, in order to secure a maximum rate of economic growth and the structure and location of industry, which will benefit the country most." Benefits were envisaged to be in the form of employment, improved standards of living, training opportunities, income, consumer goods, natural resources and saved foreign exchange. The Plan lacked

major emphasis to disperse industries to the rural areas inspite of the fact that the industrial sector was becoming increasingly important.

The 1970/1974 Development Plan had emphasis on economic growth and Rural development as a means of increasing incomes. It had the following as its industria goals,

1. Accelerated rate of manufacturing development.
2. Active and steady growth of participation of Kenyan citizens in the management and ownership of industry.
3. Processing raw material produced in the country.
4. Import substitution.
5. Government participation.
6. Wider geographical dispersion of industries to other urban areas outside Nairobi and Mombasa and to rural areas.

The 1974/78 planning period was a continuation of the country's effort to achieve the objectives set out in sessional paper number 10 of 1965. The main objectives were, import substitution, manufacturing for export, provision of employment, diversification and Kenyanization of industry. There was no major policy shift concerning rural industrialization from the previous planning period.

In the Development Plan of 1979/83 emphasis was on

alleviation of poverty, which would be achieved through activities designed to increase incomes. The Government proposed to pursue a policy of industrial dispersion through promotion of resource-based and footloose industries depending on each area's comparative advantages, confining investment allowance to enterprises located in semi-urban and rural areas, and provision of infrastructural facilities (For example roads, water supply, electricity and housing) and other assistance. Thus industrial dispersion to intermediate towns and rural areas would be facilitated by the provision of infrastructure, essential services and other concessions individually tailored to the needs of particular firms. The ministry of industry was to expand industrial development extension services to cover provinces and districts to promote rural industrialization. This was followed by the posting of Industrial Development Officers at the district level. Also massive expansion programme through Kenya industrial Estates was proposed. It is therefore evident that during this plan period the government intended to pursue more vigorously a policy and programme designed to enhance rural industrialization. The thrust of the policy was centred on the provision of infrastructure facilities in rural areas and intermediate Towns.

In the 1984--1988 plan, the main industrial

objective was "dispersion of industry and equitable distribution of the fruits of industrialization." The Government emphasised the encouragement of investors and promoters to locate new industrial projects outside Nairobi and Mombasa with particular reference to export-oriented, resource-based and labour-intensive industries. This contributes to the achievement of the national goal of "regional balance" in development. Midway through the plan period the government reemphasised the need for regional balance in the country's development sessional paper number 1 of 1986. The sessional paper endorsed the recommendations of the 1982 working party on Government Expenditure that the private sector must be encouraged to invest in industries located in rural areas with access to low cost agricultural raw material, private sector should act on price and other incentives, investors must have the potential to earn substantial profits and a return to capital at least as great as in other sectors or other countries and direct government investment should be discouraged.

In the 1989-1993 Plan there is emphasis on measures that will encourage rural industrialization, for instance reduction in protection of those industries in urban areas, elimination of quantitative restrictions and export incentives. The approach outlined in sessional paper number one of 1986 will be

continued during this plan period. "Incentives will continue to be provided to attract location of new industries outside large towns while small scale enterprises will have to receive special encouragement. "The encouragement will be supported by other sectors such as road infrastructure, water supply and rural electrification. Market based incentives and regulatory statutes will continue to be used to encourage three types of industries namely, Export-oriented manufacturing, efficient import substitution and small scale labour intensive industries.

In general, Government policy since independence and the emphasis now on District Focus For Rural Development has increasingly emphasised the need for rural industrialization and some entrepreneurs have responded to the incentives given and located their enterprises outside the major urban areas and in rural areas.

1.7 Conceptual Framework

This study takes into consideration theories related to the problem of unemployment and how the establishment of small scale industries can be used to help solve the problem. The study also takes into consideration theories related to regional development.

During the Kericho Conference on Education,

Employment and Rural Development of 1966, it was stated that unemployment is associated with unbalanced economic progress. Some of the causes of unemployment emerge from the dual economy. Thus the modern sector is a market economy with wage earners, entrepreneurs and salaried government personnel. On the other hand the traditional sector includes subsistence agriculture, petty trade as well as some family sized craft and cottage industries. Unemployment exists in both sectors. In the traditional sector labour surpluses take the form of disguised unemployment or presumed- underemployment. Of all economic activities, agriculture is perhaps the most labour intensive and therefore transformation of rural life must be the central objective of any programme to effectively use growing labour surpluses. This can possibly be done through,

- a) An increase of both quality and quantity of cash crops.
- b) Improvement of communication system, especially access roads.
- c) Improvement in rural communities and villages, through better housing, sanitation, water and community services.
- d) Encouragement of local trade and industries to process agricultural produce and supply the demands of rural population by way of

increased incomes.

The central purpose of the rural transformation is to raise incomes and create more employment opportunities in the rural areas. This can be achieved by establishing small scale agro-based industries in rural areas, which are largely labour intensive and hence create employment opportunities.

The theoretical framework underlying the theories of regional development are those discussed by Perroux (1955) Myrdal (1957) Hirschman (1958) and Friedman (1966). Perroux in considering the concept of space-defined as a field of forces - observed that growth does not appear every where at the same time, but it manifests itself in points or poles of growth with variable intensities. The theory of regional development was clarified by Hirschman and Myrdal in their discussion on economic development and balanced growth. Following the argument that rapid development in one economic sector will create demand for the products of another, Hirschman advocated development through a chain of disequilibria. The expansion of industry "A" will create external economies for industry "B" where the two industries will thus be induced as a result of increase in output of existing industries so that a multiplier effect operates through backward and forward linkages.

Myrdal (1957) was mainly concerned with the

problem of inequality rather than treating it in the context of a general theory of development. He mainly concentrated on the growing differentiation between rich and poor countries and people. He suggested that the principal of interlocking circular interdependence within a process of cumulative causation, has wide validity and should be the main hypothesis in studying underdevelopment. Free market forces work towards inequality between regions and such inequality is reinforced by the forces, which are almost identical with those perceived by Hirschman he called "backwash effects" contrary to these are spread effects of expansionary momentum. The works of Myrdal and Hirschman are considered as the starting point of more elaborate theorizing. It was only after these two that the fact of disequalization in the development process became firmly established.

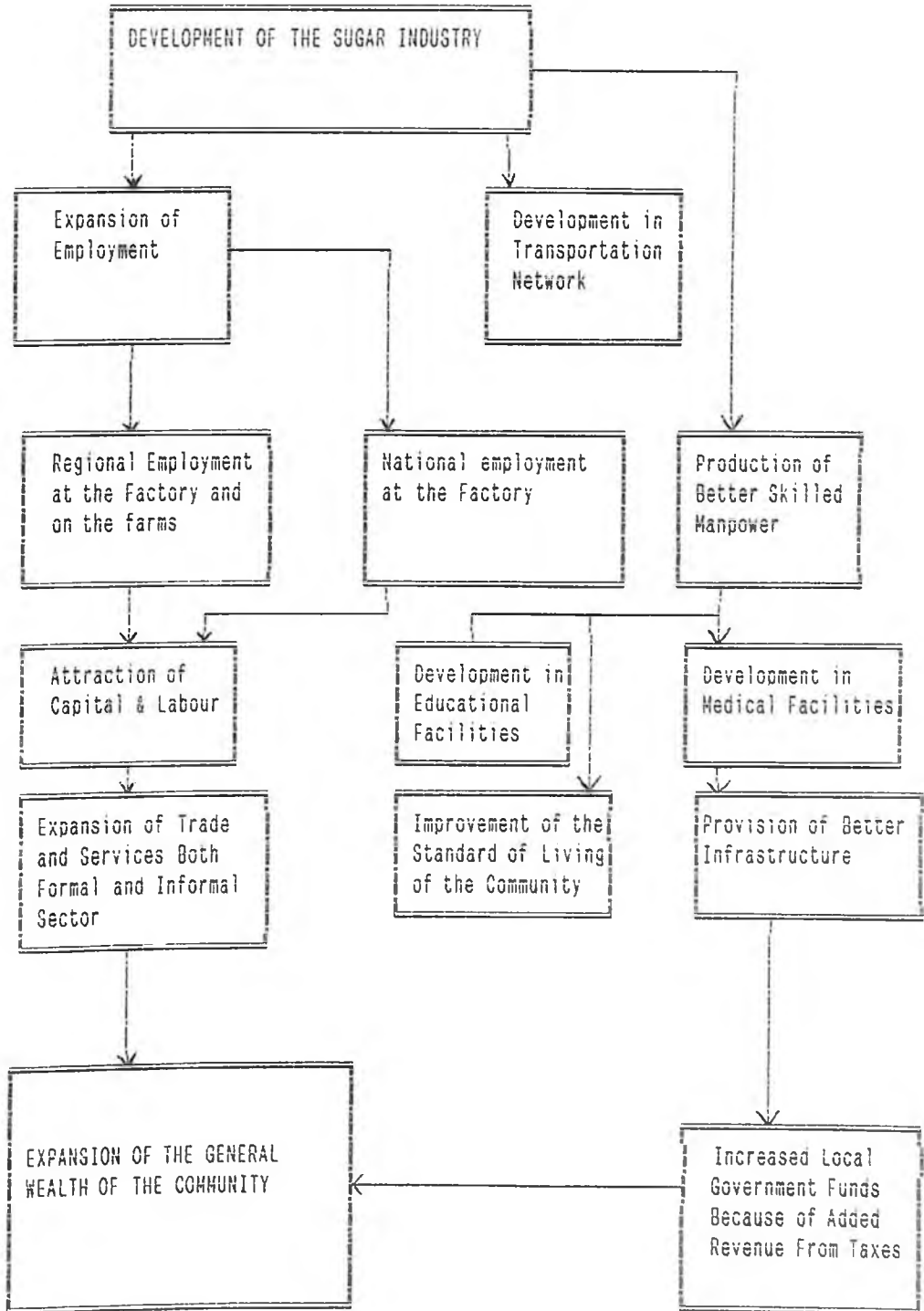
John Friedman is outstanding among those who created the core-periphery concept during the 1960s. In one of his statements on regional development jointly with Alonso W.W (1964) he noted that spatial patterns usually change with demand and production. Besides changes in the level of technology and in the social and political organisation of the nation also would cause a different spatial pattern. He also noted that in the early periods of development, marginal returns to the factors of production differ

greatly with regions economic advancement. While at an advanced stage of development, the national economy would appear as a fully integrated hierarchy of functional areas with most of the population activities polarized in the metropolitan areas. Centre periphery model further elaborates these ideas in relation to the rapid expansion of the development centres. These in the course of time act as suction pumps, pulling in the more dynamic elements from the more static regions. As a result of these, the rest of the country remains in a peripheral position experiencing net outflows of people, capital and resource to the centre where economic growth will tend to be rapid, sustained and cumulative.

A regional growth pole has been seen by Siebart (1969) as a set of interdependent expanding industries in an area. The complex of industries is supposed to consist of a key industry and a set of activities, which are linked to the key sector. This key industry is expected to expand at a high rate to have a high rate of output and strong linkages with other activities of the region. Sample et al. (1972) interpreted a growth pole as an urban growth centre that transmits growth impulses to surrounding region and also identified the presence of a growth pole in geographical space as a means through which the growth of a regional economy can be understood. The concept

of regional development provides a very important planning base because an industry established in a particular place can be considered to a development point from which growth takes place. The major development inducing effects likely to originate from a sugar factories can be illustrated by a model (see next page). If the sugar industries can be looked at as development points then the major policy underlying the establishment of these development points in their localities is to help start and then accelerate the development of these areas. Thus the development of these points and the hinterland is expected to be mutually beneficial. The growth of a centre or point in time is aimed at stimulating development in the surrounding area by facilitating among other things the development of the physical and social infrastructure. These development points are also expected to be the basis of rural industrialization, since the small scale industries such as shoe repair, bicycle repair and flour milling are easier to establish at these points.

Fig 1.2 A Model Illustrating the Development of Inducing Effects From Sugar industry



Source: Obiero, J.C (1980)

From the hinterland comes the agricultural products such as sugarcane and foodstuffs, which are sold in the produce market at these points. The money thus obtained by farmers is spent on industrial goods such as flour meal, cloths, soap, detergents, cooking oil etc. In other words a monetary economy is encouraged in the rural areas. The type of development expected from a sugar zone can be illustrated by Friedman's (1966) model, which described a sequence of regions with common prospects and problems emanating from the various centre periphery processes. These are,

1. The core region equivalent to the sugar plant
2. Upward transitional areas whose natural endowment and location relative to the core regions suggest the possibility of greatly intensified use of resources. They are typified by increasing investment, net migration and increasing capitalization of agriculture. These areas are equivalent to out growers.
3. Downward transitional areas equivalent to areas surrounding outgrower regions.

To some extent these theories can be applied to West Kenya sugar factory because its sphere of influence is not only limited to its boundary fence

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but spreads outwards to other areas.

1.8 Methodology

In carrying out this study several methods of collecting data were used for both primary and secondary data. The source of secondary data was mainly from libraries and Government departments. For primary data, a reconnaissance survey was done for the purpose of acquaintance and orientation to the study area. Field surveys were used to establish the number of centres around the factory and business enterprises in these centres were counted. Interviews were carried out with relevant government officers and the factory officials.

The study used five sets of questionnaires, these were household questionnaires, business questionnaires, factory officials questionnaire, elders questionnaire and county council officials questionnaire. The questionnaires were designed to collect information closely following the model illustrating the development of inducing effects from a sugar industry. Therefore the questionnaires were used to collect information on the background of the factory, employment at the factory, household incomes, infrastructure, standards of living of the people and trade and services in the area. Elders' questionnaires were administered to the chief, subchiefs and village

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elders. The study was limited to one location in which the factory is situated, with the assumption that this is the area where the impact of the factory is most felt.

The household sample was from a population of farmers who had supplied their sugarcane to the factory in 1990. The year 1990 was chosen to give farmers an easy time to remember facts about the supply of sugarcane to the factory. Due to the difficulty of getting a list of farmers by sublocation from the factory, subchiefs were requested through the chief to prepare a list of farmers from their respective sublocations who had supplied sugarcane to the factory in 1990. From the five sublocations lists, Shamberere had 41 names, Shianda 35, Mahira 38, Chemuche 32, and Chesero 34 names, forming a total of 180 names. Since the difference between the sublocations was not so great the researcher decided to administer a uniform number of questionnaires. Therefore in each sublocation 16 questionnaires were administered to farmers who had been selected from the lists using random numbers. A total of 80 questionnaires were administered forming a sample size of 80 households (44.4 percent). The methodology used in selecting areas of study was stratified random sampling based on sublocations.

After the data was collected it was coded and

entered on a computer. It was cleaned cross checked and analyzed using the statistical package for social scientists (SPSS/PC+ The Statistical Package for IBM PC). The analysis was undertaken using descriptive statistics, inferential statistics and significance tests. Graphical representation of the data was done using Harvard Graphics (computer package)

1.9 Limitations of the study

This study was faced with a number of limitations. Firstly it was difficult to get information on incomes earned by workers at the factory. The factory's Managing Director only gave information on the number of people the factory has employed but not their income. Secondly most respondents were not willing to divulge information on some specific aspects of the study. For example it was difficult for them to explain how they spent their sugarcane incomes. Thirdly some Government officers could not be found. Particularly it was not possible to get the Kakamega District Industrial Development Officer.

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1. Introduction

2. Methodology

3. Results

4. Discussion

5. Conclusion

6. References

7. Appendix

8. Acknowledgements

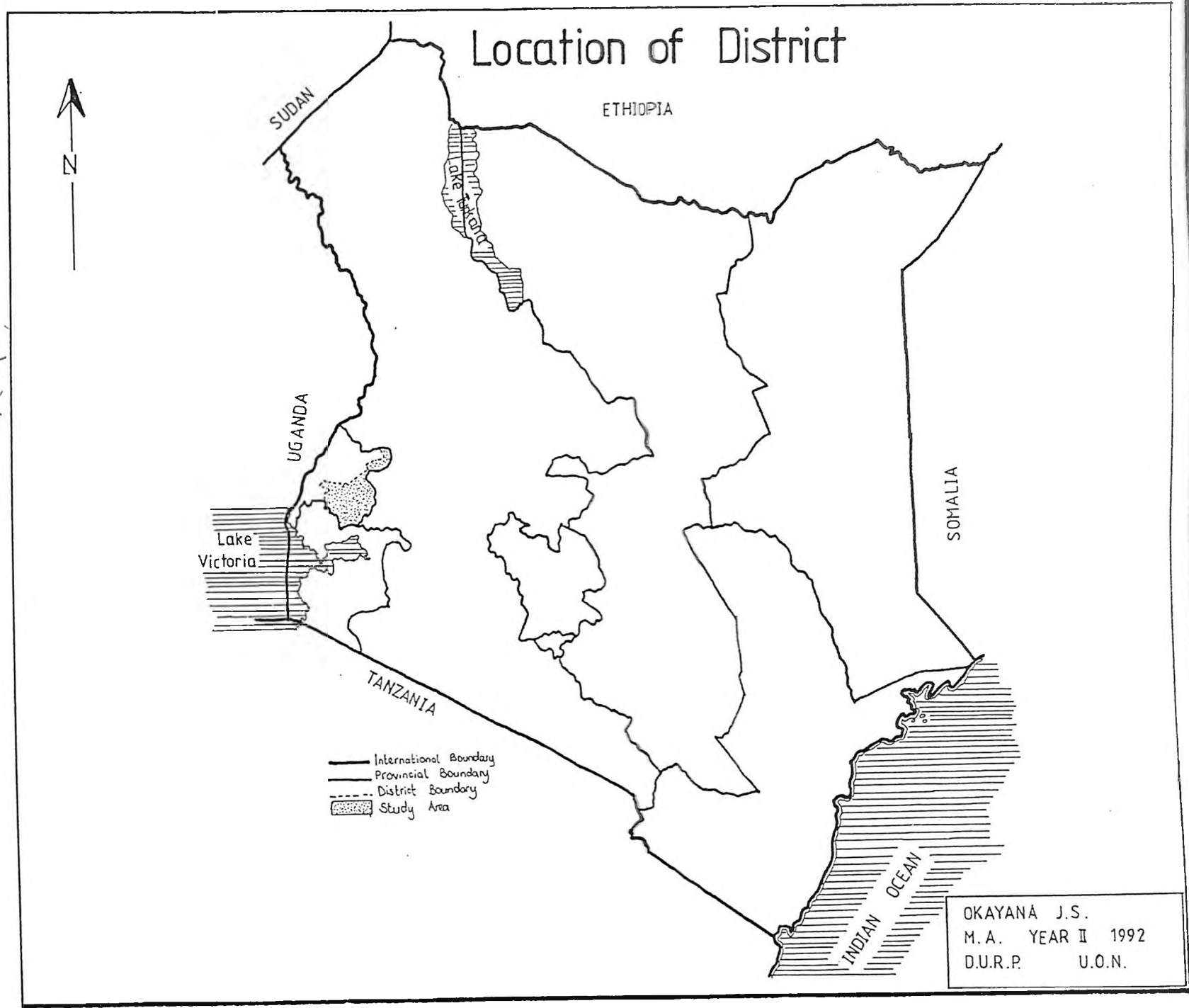
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Map 2.1

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CHAPTER TWO.

2.1 STUDY AREA

2.1.0 Physical characteristics.

The study area is Kabras Division in Kakamega District. Kakamega District is among the four districts that form Western province. It lies within the lake victoria basin with the Equator crossing its southern tip. The District is approximately 3,520 square kilometres in area. Its altitude falls from about 1500 meters above sea level in the eastern to about 1250 meters in the west.

Kabras is one of the largest Divisions of Kakamega District with an area of 452 square Kilometres. the Division occupies 13 percent of the total area of the District. The Division administratively is divided into 4 Locations. These are South, West, Central and North Kabras.

The Division receives on average 2085mm of rainfall in a year. As seen from the rainfall figures below, the rainfall is reliable and adequately distributed. Rainfall is highest between March and October, having maxima in April/May and July/August with no dry season. December, January and February are characterized by low rainfall.

Table 2.1 Rainfall figures For Kabras Division Up To 1976

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Average Monthly Rainfall in mm	55	78	164	244	294	204	212	257	205	173	115	83

Name of Station----- Malava Dispensary

Altitude----- 1595

Years of record----- 29

Average annual rainfall-----2085

Source: Farm Management Hand Book Part A 1982

The Divisions temperatures vary between a mean maximum of 26⁰c and 32⁰c and a mean minimum of 14⁰c and 18⁰c.

The relief of the Division is generally slightly undulating peneplain which has been denuded to leave an area like Kakunga to a height of 1700m above sea level. The Division's altitude is between 1250m and 1700m above sea level.

In terms of drainage the Division falls in the eastern boundary of the District which is characterized by the Nandi escarpment. The Nandi escarpment and the adjacent Uasin Gishu plateau form the main catchment area of the Divisions drainage system. The Division is dissected by a number of streams running from North-East to South- West forming

a generally slightly undulating peneplain.

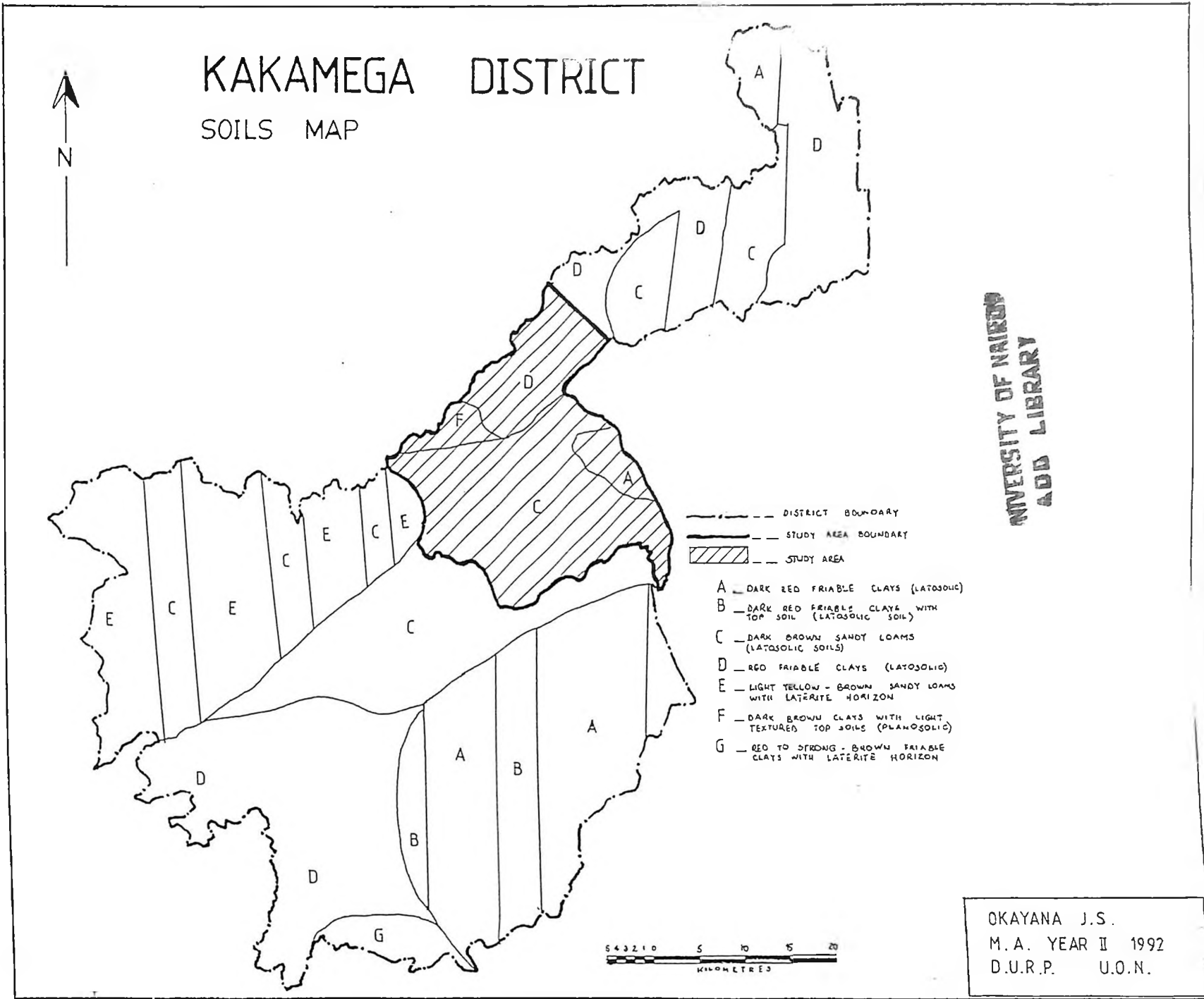
Most of the soils in the Division are developed on granite and are well drained. Much of the West and South Kabras is covered with dark brown sandy loams (Latosolic soils). North Kabras is mostly covered with red friable clays (Latosolic soils) and dark brown clays with light textured top soils (planosolic soils).

The soil and rainfall characteristics make the area very suitable for Sorghum, Sunflower, Soya beans, Sweet Potatoes, Chillies, Onions and Sweet paper. Maize, Pigeon Peas and most horticultural crops also do well. Sugarcane, coffee and citrus fruits have a fair yield potential in this area.

Ecologically Kabras Division lies within the star grass zone. This zone is found at an altitude of 1350m to 1800m. It is a zone of high agricultural potential and very suitable for maize, coffee, sugarcane and exotic cattle. From the table below showing the agro-ecological zones by division, it can be observed that much of Kabras Division, 217 square kilometres (48 percent) of the Division's area, lies in the lower midland (LM2) zone. This zone is a marginal sugarcane zone. In the whole District the marginal sugarcane zone occupies an area of 273 square kilometres. Much of this 79 percent is in Kabras Division. The other remaining area of the Division has 40 square

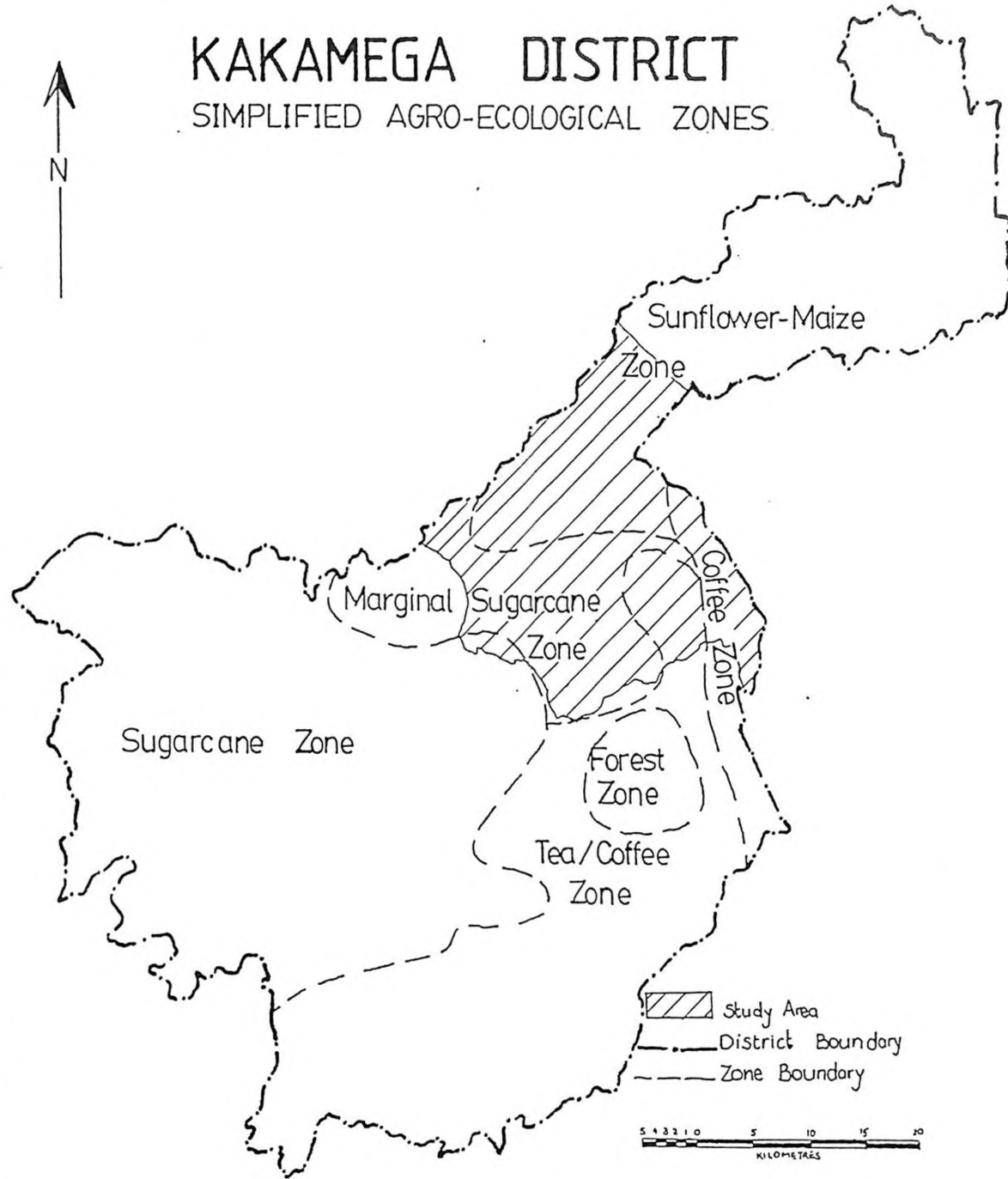
kilometres (9 percent) in the upper midland zone (UM2-3) which is a coffee zone, 113 square kilometres (25 percent) lies in the upper midland zone (UM4) which is a sunflower maize zone, 20 square kilometres (4.4 percent) lies in the lower midland sugarcane zone LM1 and 62 square kilometres lie in the lower midland zone (LM3-4) which is a cotton and marginal cotton zone. Therefore in terms of agro-ecological zones the Division has a potential in coffee, sunflower maize, sugarcane and cotton.

Map 2.2



KAKAMEGA DISTRICT

SIMPLIFIED AGRO-ECOLOGICAL ZONES



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Map 2.3

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Table 2.2 Agro-Ecological zones of Kakamega District by Division (sq. Km.)

DIVISION	UM0	UM1	UM2-3	UM4	LH1	LM2	LM3-4
IKOLONANI	-	-	-	-	133	7	-
SHINYALU	135	295	44	-	24	40	-
LURAHBI	-	-	-	-	345	7	-
MUNICIPALITY	-	30	-	-	15	2	-
KABRAS	-	-	40	113	20	217	62
LUGARI	-	-	-	575	-	-	-
KHWISERO	-	20	-	-	123	-	-
BUTERE	-	-	-	-	201	-	-
MUMIAS	-	-	-	-	568	-	-
VIHIGA	-	80	-	-	9	-	-
SABATIA	-	105	-	-	6	-	-
TIRIKI	-	139	-	-	15	-	-
EMUHAYA	-	105	-	-	64	-	-
TOTAL	135	774	84	688	1523	273	62

UM0 is a forest zone

UM1 is a coffee-tea zone

UM2-3 is coffee zone

UM4 is a sunflower maize zone

LH1 is a sugarcane zone

LM2 is a marginal sugarcane zone

LM3-4 is a cotton and marginal cotton zone

Source: Calculated from Farm Management Hand Book MOA (1983)

2.1.1 Land-use patterns

The Division has a total farm acreage of about 50389 hectares. Its distribution by sublocation is as shown below

<u>Area</u>	<u>Hectares</u>
Chimucho	5266
Chesero	4688
Samitsi	3741
Bushu	5480
Lukume	4476
Shamberere/Shianda	4130
Malava	6638
Matsakha	3541
Kivayua	2069
Kiliboti	3093
Surungai	2898
Luandeti	4369

Total hectares 50389

Source: Ministry of Agriculture.

The total land available for agriculture is 367 square kilometres. This means that 81 percent of the whole Division has good agricultural potential. The current utilization of the agricultural land indicates that 7000 hectares of land are under sugarcane, 16000 hectares are under maize (which is for local consumption plus 60 percent for sale), 7000 hectares are under other crops like bananas, cassava, millet, and horticultural crops, 20389 hectares are under grazing and forest. Out of the total area under sugarcane cultivation 80 percent is in South Kabras Location where West Kenya Sugar Factory is located. It is also evident that maize occupies much of the land in the Division. The Division has an average

agricultural land per household of 2.19 hectares and average agricultural land per person of 0.36 hectares.

The Division is mainly composed of small scale farmers growing food crops for household consumption and for the local market. These crops include maize, beans, sorghum, cassava and millet. Other crops grown are bananas, vegetables and fruits. Livestock such as cattle, poultry, sheep, goats and pigs are also kept. The main cash crops grown by farmers are sugarcane(which is processed by the Jaggery factories and the white sugar factory), maize and beans which are sold locally and sometimes to the National Cereal and Produce Board. Maize, beans, sorghum, cassava and millet form the staple foods produced in the area.

2.1.2 Demographic profile

According to the 1988 population projections the Division's population was 141714 persons. This population is projected to be 195153 at a growth rate of 2.98 by the year 2000. The percentage distribution of the population by specific age group show that, currently over half of the Divisions population consists of people below 20 years of age. This youthful population together with those in Secondary schools and those over 60 years imply that about 65 percent of the Division's population are dependants under the care of about 35 percent of the

population. This poses a serious problem on the provision of basic facilities especially food, health and education.

Nearly every part of the Division is settled save for the forest areas. From the table below showing the population density by Division it can be observed that Kabras Division is one of the Divisions with fewer persons per square kilometre compared with densely populated Divisions like Sabatia, Vihiga, Emuhaya and Tiriki. It is projected that the Division, by the year 2000 will have a population density of 432 persons per square kilometre.

Table 2.3 Population Density By Division Per (sq. Km)

DIVISION	1979	1988	1993
Vihiga	696	937	1093
Sabatia	772	1038	1212
Emuhaya	686	923	1078
Tiriki	632	850	992
Lugari	123	166	193
Butere	335	451	526
Mumias	241	324	378
Khwisero	430	578	674
Lurambi	222	299	349
Ikolomani	441	593	692
Shinyalu	418	562	657
Kabras	233	314	366
Municipality	698	406	474
Average	302	406	474

Source: District Development Plan 1989/93.

2.1.3 Socio-Economic Profile

As a basis for improvement in the agricultural, Industrial and tertiary sectors, accessibility of the Division is important. Kabras Division with its greater agricultural potential requires good roads to facilitate development in agriculture. From the District's roads network map it can be observed that Kabras Division is dissected by a major trunk road

POPULATION DATA BY DIVISION 1947-1954

DIVISION	1947	1948	1949	1950	1951	1952	1953	1954
1	100	105	110	115	120	125	130	135
2	200	210	220	230	240	250	260	270
3	300	310	320	330	340	350	360	370
4	400	410	420	430	440	450	460	470
5	500	510	520	530	540	550	560	570
6	600	610	620	630	640	650	660	670
7	700	710	720	730	740	750	760	770
8	800	810	820	830	840	850	860	870
9	900	910	920	930	940	950	960	970
10	1000	1010	1020	1030	1040	1050	1060	1070
11	1100	1110	1120	1130	1140	1150	1160	1170
12	1200	1210	1220	1230	1240	1250	1260	1270
13	1300	1310	1320	1330	1340	1350	1360	1370
14	1400	1410	1420	1430	1440	1450	1460	1470
15	1500	1510	1520	1530	1540	1550	1560	1570
16	1600	1610	1620	1630	1640	1650	1660	1670
17	1700	1710	1720	1730	1740	1750	1760	1770
18	1800	1810	1820	1830	1840	1850	1860	1870
19	1900	1910	1920	1930	1940	1950	1960	1970
20	2000	2010	2020	2030	2040	2050	2060	2070

Handwritten notes and signatures at the bottom of the page, including a signature that appears to read "J. Edgar Hoover" and some illegible text.

(A1) Kakamega Webuye road. Apart from this major trunk road there are other two class D Secondary roads. One runs from Kakunga through Lukume to Ingotse (D267) and the other runs from Malava through Samitsi to Navokholo (D266).

The table below shows the distribution of roads in the District.

Table 2.4 Distribution of roads

DIVISION	CLASSIFIED (KM)	UNCLASSIFIED (KM)
IKOLOMANI	176.36	30.3
SHINYALU	42.98	-
KHWISERO	69.18	4.52
BUTERE	115.20	10.30
MUMIAS	199.70	-
LURAMBI/MUNICIPALITY	234.06	54.55
KABRAS	274.18	93.26
LUGARI	250.20	51.83
VIHIGA	176.40	24.67
SABATIA	31.70	-
TIRIKI	205.46	11.13
EMUHAYA	106.60	12.94
TOTAL	1882.02	293.50

SOURCE: 1987 Inventory of Infrastructure.

From the above figures it can be observed that Kabras Division, which is the study area is leading in both classified and unclassified roads in terms of kilometres. It accounts for 14.6 percent of the classified and 31.7 percent of the unclassified roads in the District. Though this is the case, it is

The following table shows the distribution of roads in the District.

The table below shows the distribution of roads in the District.

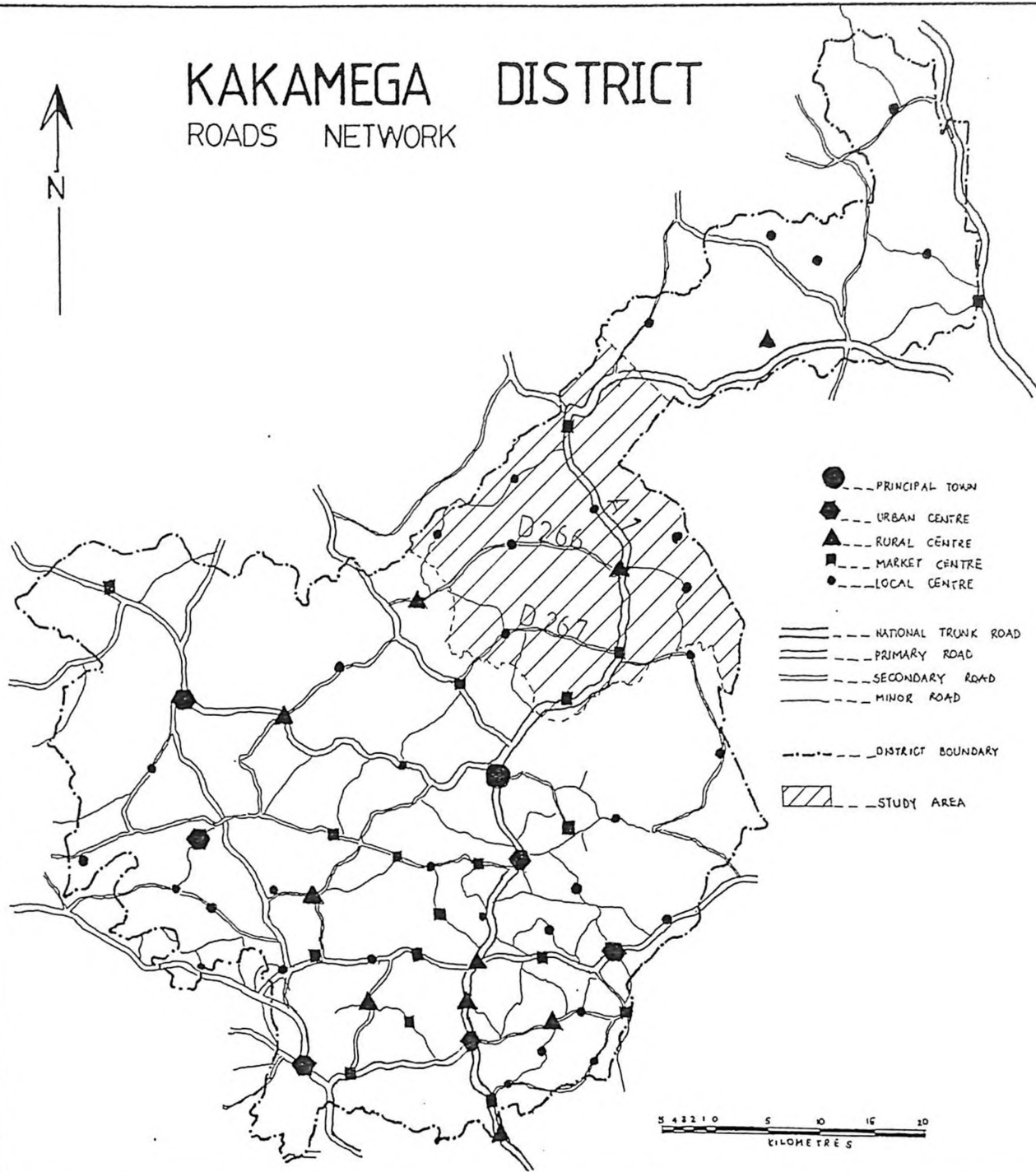
Table 1: Distribution of roads

Category	Number of roads	Percentage
Highway	10	10.00
Main road	20	20.00
Feeder road	30	30.00
Unimproved road	40	40.00
Total	100	100.00

important to note that it is the conditions of the roads that matter than the class. The roads in this Division are poor in terms of quality because they become impassable during rain seasons. The feeder roads that serve the farming hinterland are also in very poor conditions and particularly during the long rains farmers have difficulties in marketing their produce. Some sugarcane farmers are forced to move their produce using ox-carts to the major roads for collection by factory tractors. These poor condition of the roads make the rich agricultural hinterland inaccessible. The situation is exacerbated by the fact that the Division receives rainfall throughout the year.

KAKAMEGA DISTRICT

ROADS NETWORK



54

Map 2.4

0 5 10 15 20
KILOMETRES

OKAYANA J.S.
M.A. YEAR I 1992
D.U.R.P. U.O.N.

Commercial activities within the Division are carried out in the various centres of the Division. The table below shows the hierarchy of centres within the Division.

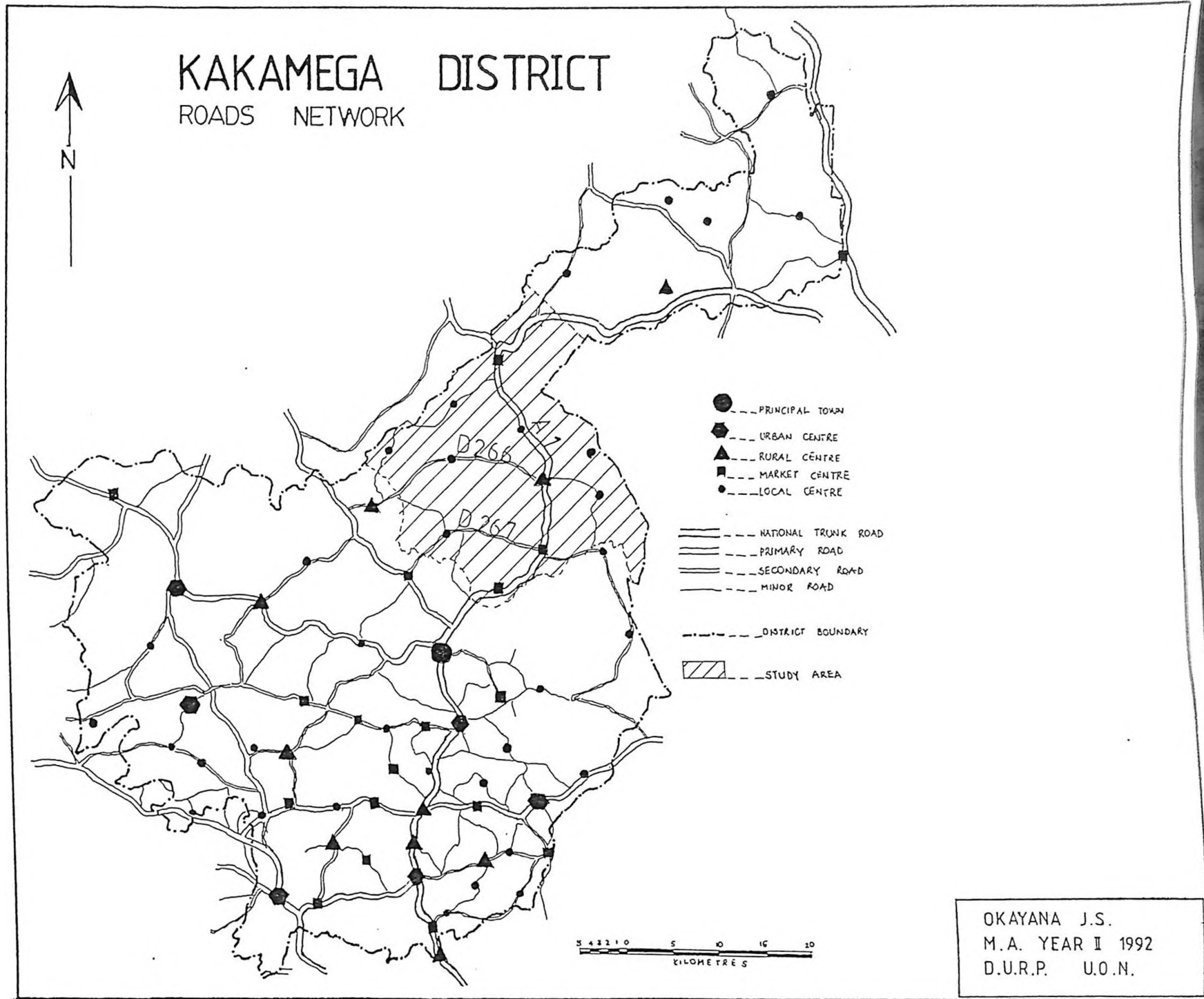
Table 2.5 Hierarchy of centres in Kabras Division

RURAL CENTRES	MARKET CENTRES	LOCAL CENTRES
MALAVA	LUBAO KAKUNGA MATETE	LUKUME CHIHANGETI CHEMUCHE BUTALI LUANDETI SAMITSI NAMBIRIMA

Source: Kakamega District Development Plan 1984/1988

From the above table it can be observed that the Division has 1 Rural centre 3 Market canters and 7 Local canters. These centres serve as the focus of trade and commerce within the Division. They serve the rich agricultural hinterland. Malava as a rural centre plays a major role in the development of the Division's rural economy. It serves as the Divisional Headquarters with ancillary administrative offices. It has Shops, Open Market, Post Office, Telephone service, a Health centre and other supportive services like the Police Station and Petrol service station.

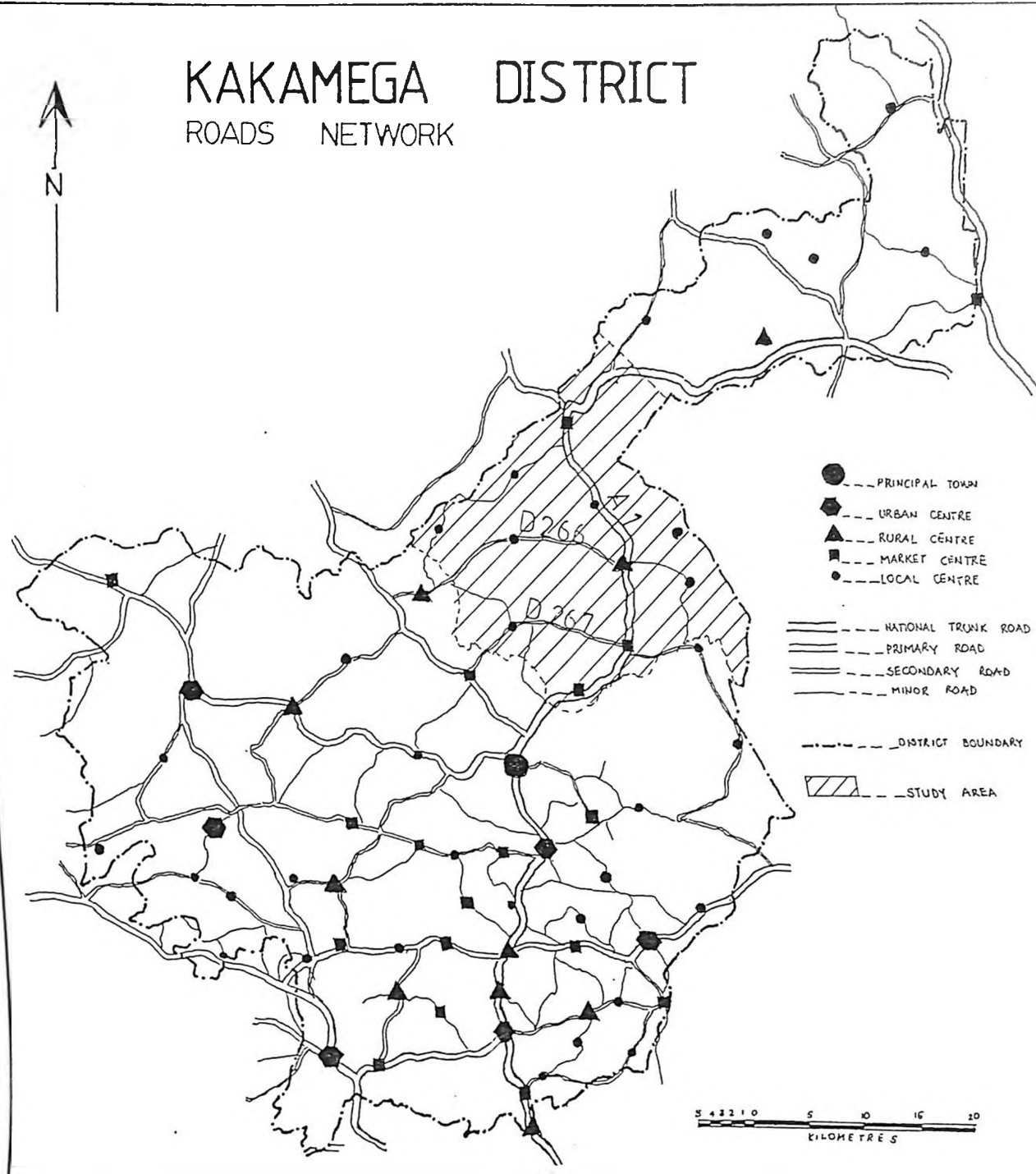
Map 2.4



OKAYANA J.S.
M.A. YEAR I 1992
D.U.R.P. U.O.N.

KAKAMEGA DISTRICT

ROADS NETWORK



54

Map 2.4

0 5 10 15 20
KILOMETRES

OKAYANA J.S.
M.A. YEAR II 19
D.U.R.P. U.O.N.

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Source: Kakamega District Development Plan 1984/1988

From the above table it can be observed that the Division has 1 Rural centre 3 Market centers and 7 Local centers. These centres serve as the focus of trade and commerce within the Division. They serve the rich agricultural hinterland. Malava as a rural centre plays a major role in the development of the Division's rural economy. It serves as the Divisional Headquarters with ancillary administrative offices. It has Shops, Open Market, Post Office, Telephone service, a Health centre and other supportive services like the Police Station and Petrol service station.

Table 1.2. History of sales in Kansas Division

Year	Sales (in thousands)	Change (%)
1950	1,000	-
1951	1,100	10%
1952	1,200	9%
1953	1,300	8%
1954	1,400	8%
1955	1,500	7%
1956	1,600	7%
1957	1,700	6%
1958	1,800	6%
1959	1,900	6%
1960	2,000	5%

Its location along the national trunk road links it with the northern parts of the District which also have rich agricultural potential. Its location also makes it very accessible to the other parts of the Division because the secondary roads connect to the national trunk road along which Malava Rural centre is situated. The three Market centres are also along the national trunk road and enjoy the same advantages as those of Malava Rural centre. The Local centres serve people within walking distance of the centres and most of them are along major roads. For example, Butali and Luandeti are along major trunk roads. Butali in particular serves a very important function as a judicial centre for the Division. Samitsi and Lukume centres are along class D secondary roads while Nambirima and Chimangeti are along minor roads. Each of these centres has educational institutions such as Primary schools and in some cases Secondary schools.

The whole Division has 25 Primary schools and 8 Secondary schools. Education facilities are evenly distributed within the District. At least each Location has Primary and Secondary schools within walking distance.

The Division is not well favoured in terms of Health facilities. The available health facilities are 2 Health Centres 1 Sub-Health Centre and 1 Dispensary. Their distribution is not even, because all of them

are along the main tarmac road (Kakamega-Webuye road).

The manufacturing sector in the Division is to a large extent characterized by sugar processing plants. The Division has 17 Jaggery Factories some of which are not functional and one small scale white sugar factory. Plans are also under way to establish another white sugar factory (Kamulamba sugar factory). Before the introduction of white sugar processing in the early eighties, the area relied more on Jaggery factories.

Given the adequate rainfall, fertile soils and favourable climate in most parts of the Division there is a potential for more agro-based industries. In fact there is a recommendation by the Kakamega District Development Committee to convert most Jaggery factories found within the Division into small scale white sugar factories. Their conversion is envisaged to contribute greatly to the process of rural industrialization.

Within the centres discussed above there are also small scale enterprises such as carpentry workshops, textile cottage industries, bicycle repair, shoe repair posho milling and watch repair.

References

1. Kakamega District Development Plan 1984/1988 and 1989/1993
2. Western Province ,Regional Physical Development plan, Town Planning Department Ministry of Lands and Settlement Kenya May 1970.
3. Farm Management Hand book of Kenya, part A West Kenya (Nyanza and Western provinces) 1982.

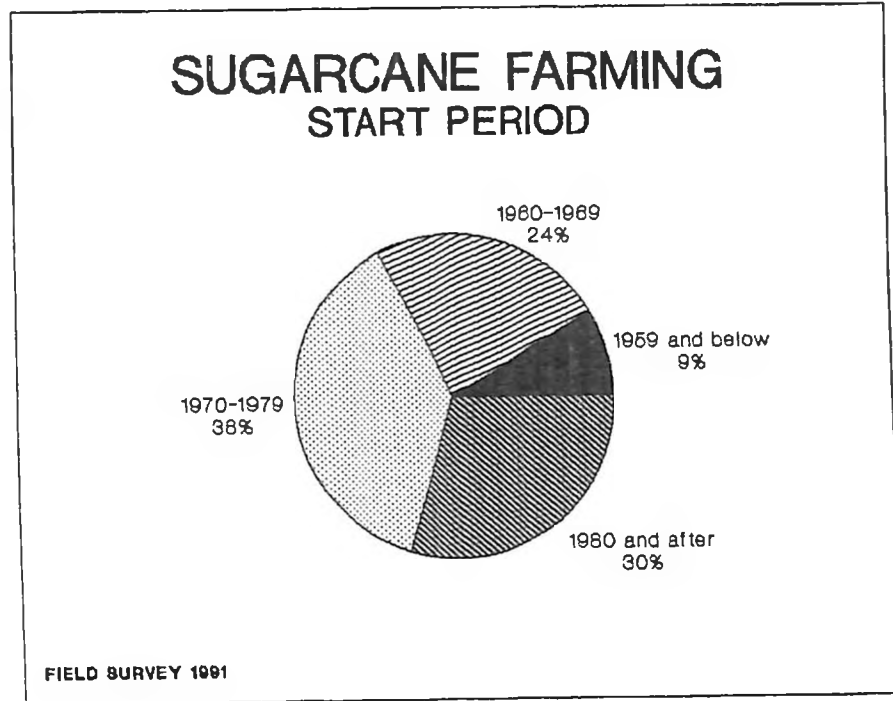
CHAPTER THREE

3.1 THE DEVELOPMENT OF SUGAR INDUSTRY IN KABRAS.

3.1.0 Sugarcane Farming and Processing

Kabras Division is an area in the District where sugarcane farming is oldest compared to other parts of the District where sugarcane farming is carried out. Historically the first signs of sugarcane farming in Kabras area were seen in 1946. During this time a few farmers planted sugarcane on a very small scale for the purpose of chewing. The farm sizes under sugarcane during that time were insignificantly small because there were no factories to process the cane. It was in the sixties that most farmers realized the importance of sugarcane farming, particularly with the introduction of Jaggery factories. It was at this time that most farmers in the area started commercial sugarcane farming for sale at the Jaggery factories. From the field survey it was established that 9 percent of the respondents started sugarcane farming in the late nineteen forties and during the nineteen fifties, 24 percent started sugarcane farming in the nineteen sixties, 38 percent during the seventies and 30 percent during the eighties. From the above it is

GRAPH 3.1

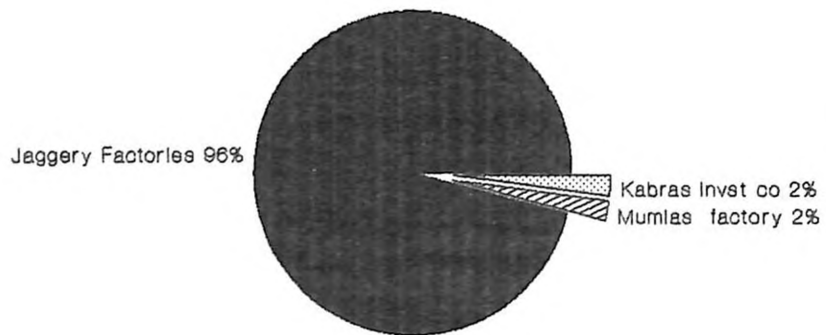


evident that most farmers started sugarcane farming from the seventies which happens to be the period when more jaggery factories had been established to process sugarcane into jaggery.

In the late seventies the whole Division had over 12 Jaggery Factories serving between 15 and 20 percent of the surrounding population of farmers. The jaggery produced by these factories was and is sold as far as Kitale, Eldoret and Kisumu. Payment to farmers by the owners of the Jaggery factories is on the basis of how many tractor trailers a farmer delivers at the factories and it differs from factory to factory. Collection of cut cane is done by factory owned tractors whose tonnage range from seven to nine tonnes. Since the 1960s up to now sugarcane production for jaggery making is highly concentrated in Kabras Division.

Also during the 1970s Kabras area was well known for its sugarcane cooperative societies some of which owned Jaggery Factories. The cooperatives were made up of sugarcane farmers from various sugarcane growing areas within the Division. The societies used to buy sugarcane from members, process it into jaggery, sell it and pay its members. In cases where cooperative societies had no Jaggery Factories they could sell

SUGARCANE MARKET BEFORE 1981



FIELD SURVEY 1991

their sugarcane to privately owned Jaggery Factories and pay members their dues.

During the time of research it was revealed that no respondent among those interviewed belonged to a cooperative society for the purpose of marketing their cane. It was established that poor management of the cooperatives led to their failure though farmers acknowledged their advantage in marketing their sugarcane produce.

At present most Jaggery factories are privately owned. Some are owned by prominent sugarcane farmers while others are owned by Asians. To emphasize the importance of Jaggery factories in this area the study revealed that 96 percent of the farmers in the area depended on Jaggery factories as markets for their sugarcane before the introduction of white sugar processing.

Though Jaggery factories have certain advantages to farmers, they have limitations both in scale of operation and technology used. The Jaggery Factories capacity in terms of tonnes crushed per day varies between 40 and 60 tonnes in a day. The technology used by these factories in processing jaggery, is open boiling pans. The process involves juice extraction from sugarcane, which is mixed with water and emptied in open pans for boiling. The water is boiled off to

reduce the juice to a syrup. The syrup is then left to cool and settle to form jaggery sugar blocks. The bagasse that remains after juice extraction is dried and used as a source of energy for the boilers. In terms of employment and income generation to farmers, Jaggery Factories on average employ between 15 and 30 people on permanent basis and also use casual labourers. As a source of income to farmers, Jaggery Factories differ in payments. Their payments are not subject to any controls, but rather they are set by the owners of the Jaggery Factories. However due to competition their payments vary between Ksh 1000 and Ksh 1200 per tractor trailer load of sugarcane. The trailers also differ in tonnage from factory to factory. The most common in Kabras area are 7 tonne trailers with a few factories having 9 tonnes trailers. The sphere of influence of the Jaggery Factories on average is 4 kilometre radius from the factories. Because of their scale of operation and limited sphere of influence their impact on development of the area is also limited.

The development of white sugar processing in Kabras Division started in the mid seventies with the introduction of a small scale white sugar factory called Kabras Investment Company. This factory was started in 1976 as joint venture between sugarcane farmers and the Kenya Industrial Estates. This

factory's running technology was that of open boiling pans or what is known as the "Open Pan Sulphitation" technology of sugar production. Its crushing capacity was 200 tonnes per day (200 tcd). Unfortunately the Kabras Investment Company only operated for four years and got burned down in 1980 for reasons that could not be established by the researcher. It has been difficult to restart this sugar factory.

In the wake of the burning of the Kabras Investment Company, a group of prominent sugarcane farmers invited Indian industrialists for the purpose of starting a sugar factory. They jointly formed another small scale sugar factory (West Kenya Sugar Factory) just about 10 kilometres from Kabras Investment Company. It was started as a private company to manufacture white sugar and was based on the same technology as that used by Kabras Investment Company.

West Kenya Sugar factory started operation in August 1981 under the encouragement of the Provincial Agricultural Board. It is a small scale open pan factory of 200 tonnes per day crushing capacity. In terms of output the factory bags 15 tonnes of sugar daily. This sugar is then sold to the Kenya National Trading Corporation which controls the distribution of sugar in the country.

The factory was set up with five major objectives;

1. To run profitably.
2. To create a source of cash income for farmers.
3. To create rural wage-earning employment.
4. To contribute toward national self sufficiency in sugar.
5. To transfer open pan technology to suit Kenyan environment

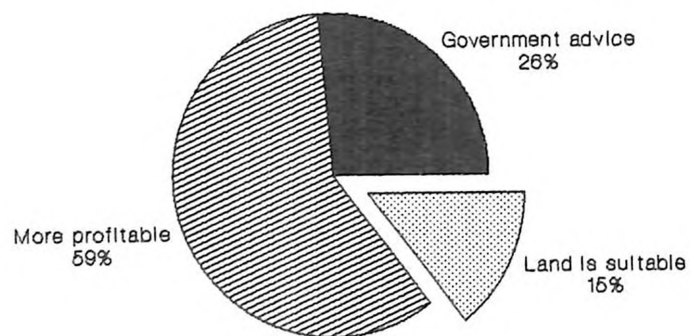
Objectives 2,3 and 4 are in line with the objectives of rural development because they are aimed at improving the standards of living of the rural poor.

In July 1982 just a year after the factory had started operation a survey done by Ministry of Agriculture showed that the Division had only 2000 acres of land under sugarcane. Based on the factory's crushing capacity of 200 tonnes per day the 2000 acres were not able to meet the minimum requirement of 60000 tonnes of mature cane yearly (ie 200 tonnes of cane multiply by 300 days or equivalent of 3000 acres of sugarcane plantation on eighteen month rotation basis). Following this the factory in conjunction with the Kakamega District Development Committee and Western Provincial Administration started encouraging farmers to grow additional sugarcane. This had a major impact that by late 1990 the Division had 7000 hectares under sugarcane of which 80 percent was in South Kabras. The factory's policy since it began operation has been that all cane supply to the factory

should come from small scale out grower farmers in the area. This is so because it does not operate a nucleus estate nor does it contract farmers. This makes the factory a bit unique from the large scale factories, which have nucleus estates and also contract farmers, hence limiting their choice when it comes to the sale of their produce. By 1987 West Kenya sugar factory was drawing sugarcane from about 780 small scale farmers within a radius of sixteen kilometres. Currently the field survey revealed that the factory is serving a proximately 2000 small scale farmers with an average of 8 acres of land under sugarcane.

It was established from the field that the most outstanding reason for engaging in sugarcane farming is that sugarcane is more profitable than the other crops. Out of the 80 farmers interviewed, 59 percent said they grow sugarcane because it is more profitable than the other crops grown in the area, 26 percent grow sugarcane because of Government advice and 15 percent said they grow sugar cane because the land in Kabras is suitable for sugarcane cultivation. Using the 1990 prices the following were the gross margins (after subtracting variable costs) of sugarcane, beans and maize for an average farmer in the Division, calculated by the Divisional Agricultural Office.

Reasons for growing sugarcane



Field survey 1991.

GRAPH 3.3



100-10000-10000

Table 3.1 Variable costs for sugarcane

	<u>Ksh per acre</u>
Rent	2000
First ploughing	300
Second ploughing	250
Planting material	600
Fertilizer	1840
Planting	140
Weeding	40
Top dressing	120
Cutting	120
Loading	180
Transport	150
 Total variable cost per acre	 5740

Average yields per acre = 30 tonnes within 18 months

Price per tonne = Ksh 368
 Gross income (368*30) = Ksh 11040
 Gross margin (11040 - 5740) = Ksh 5300

Table 3.2 Variable cost for Beans

	<u>Ksh per acre</u>
Rent	300
First ploughing	300
Second ploughing	250
Seeds	300
Fertilizer	282
Planting	60
Weeding	80
Harvesting	20
Transport	50
Gunny bags	60

Total Variable cost 1702

Yields per acre = 5 bags of 90kg. each.
 Price per bag = Ksh 520.
 Gross Income (520 * 5) = Ksh 2600.
 Gross margin (2600 - 1702) = Ksh 898.

Table 3.3 Variable costs for maize.

	<u>Ksh per acre.</u>
Rent	390
First ploughing	300
Second Ploughing	250
Certified seed	140
Fertilizer (DAP + CAN) (Ksh 382+ 221)	603
Planting	60
Weeding	150
Top dressing	30
Harvesting	120
Shelling	36
Transport	120
Gunny bags	144
 Total variable cost	 2343

Yields per acre each.	= 12 bags of 90 kg.
Price per bag	= Ksh 231.
Gross income (231 * 12)	= Ksh 2772.
Gross margin (2772 -2343)	= Ksh 429.

The above gross margins show that sugarcane is more profitable than the other crops grown in the area. Also from the field survey 71.3 percent of the respondents agreed that sugarcane, in terms of returns, is more profitable than either maize or beans which are grown both for domestic consumption and for sale.

West Kenya sugar company runs a successful interest free advance system and has set up a Ksh 300000 rotating fund where by needy farmers with 14 months old cane qualify for an advance, which is refunded after four to six months on delivery of mature sugarcane. This scheme was set up to help

farmers to (1) Achieve higher yields by cutting mature sugarcane (2) Meet cash flow problems and thus to ensure a regular and adequate supply of sugarcane to the factory. Each farmer with 14 month old sugarcane is entitled to an advance of Ksh 1000. Interviews with farmers revealed that this amount is too small to meet farmers needs. Most farmers go for advance in order to pay school fees for their children. As a form of extension the factory has employed 2 Field Officers who inspect mature sugarcane for delivery at the factory. In conjunction with Government Agricultural Officers they also educate farmers on sugarcane husbandry.

From the field interviews and discussions it was found out that farmers in Kabras have not formed any organisation in form of cooperatives for the purpose of marketing their sugarcane to West Kenya Sugar Factory. Instead each farmer grows sugarcane independently. When the sugarcane is ready for harvesting farmers independently seek permits from the factory to deliver a specific amount of cane. In cases where a farmer has more sugarcane than the factory would require, he can sell it to any of the Jaggery Factories. After delivering sugarcane farmers are paid regularly on a two weekly basis. The factory pays on

average Ksh 2 million per month to farmers and worker at the factory. Due to the presence of West Kenya Sugar Factory and the sugarcane pricing policy, many small scale farmers have been attracted to sugarcane growing thus at present there is more than adequate supply of sugarcane around the factory.

Since the introduction of West Kenya Sugar factory for the last ten years, emphasis is slowly shifting from jaggery production to white sugar production. The District Development Committee has endorsed the Divisional development Committee recommendation of converting Jaggery factories in Kabras area into small scale white sugar factories.

Considering the development of sugar industry from Jaggery Factories to Small Scale White Sugar factories, there are marked difference between Jaggery factories and small scale sugar factories. The following were established as the major operational differences between Jaggery Factories and West Kenya Sugar Factory in Kabras area.

1. West Kenya sugar factory has a weigh bridge and farmers witness the recording of their sugarcane tonnes. Payment is made on the basis of the tonnes delivered. Jaggery Factories dont have weigh bridges and therefore farmers do not know the exact tonnes of the sugarcane supplied. Payment by Jaggery Factories is based on how many

tractor loads are supplied to the factory.

2. West Kenya sugar factory pays more than the Jaggery Factories, because it pays the official Government price. Jaggery rates of payment vary from factory to factory and are not controlled. During the time of research (August 1991), West Kenya Sugar Factory was paying farmers the official Government price of Ksh 524 per ton delivered. In comparison Jaggery Factory payment varied between Ksh 1000 and Ksh 1200 per tractor of cane delivered. The tractors from the Jaggery Factories differ in tonnes. Some factories have 9 tonnes tractor trailers while others have 7 tonnes tractors trailers.
3. As compared to West Kenya, Jaggery Factories pay farmers on delivery and therefore suitable during emergencies. For example during January when parents have to pay school fees they normally opt to take their sugarcane to Jaggery Factories for faster payment. West Kenya Sugar Factory takes a maximum of two weeks to pay the farmers.
4. Jaggery Factories do not restrict delivery permits, therefore there is an assurance of taking all mature cane agreed upon between the farmers and the Jaggery Factories. The West Kenya Sugar Factory restricts permits to a maximum of 2 to 3 tractors particularly when many farmers

have mature cane to be cut. Some farmers recalled of cases where sugarcane is left to dry after being cut for delivery at West Kenya Sugar factory.

Asked to comment on the advantages of West Kenya sugar factory, farmers indicated that:

- (i) West Kenya sugar factory is nearer to them compared to the other white sugar factories.
- (ii) It harvests mature cane unlike Jaggery Factories which sometimes harvest immature cane.
- (iii) It does not contract farmers hence giving them a free choice of where to sell their sugarcane.
- (iv) West Kenya Sugar Factory ,compared to Jaggery factories pay more per tonne of sugarcane delivered.

Despite the advantage of West Kenya Sugar Factory, farmers expressed the following problems.

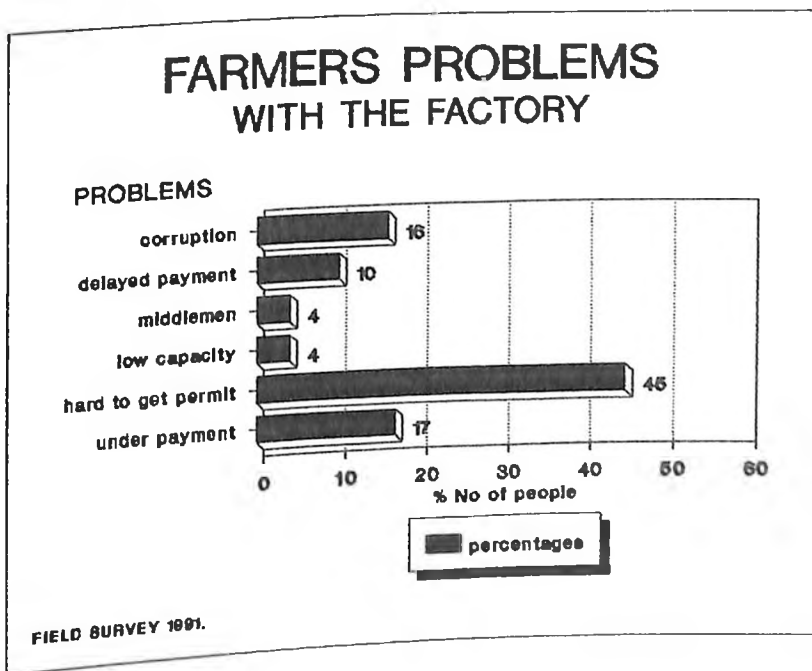
1. Difficulties of getting permits to supply sugarcane. 56 percent of the respondents said that they were having problems with getting permits from the factory. When given a permit they were limited to only two or two tractors. The factory officials said they only do this to benefit majority of farmers especially when there is overproduction of sugarcane.
2. The problem of issuing of permits is closely

related to the factory's ability to cope with the sugarcane grown in this area. Given its scale of operation the factory needs a minimum of 60000 tonnes of mature sugarcane yearly which is an equivalent of 3000 acres of sugarcane on eighteen month rotation basis. Given that the whole Division has 7000 hectares (17290 acres) of land and assuming that sugarcane harvesting is carried through out the year the Division can produce approximately 518000 tonnes of sugarcane based on an average yield of 30 tonnes per acre. This leaves a deficit of 458000 tonnes of sugarcane that can not be handled by West Kenya sugar factory. This deficit would need about 7 other small scale factories of the scale of West Kenya.

3. Farmers expressed the problem of middlemen, who buy farmers sugarcane and later supply it to the factory. It was established from farmers that these middlemen are people who are in good terms with the factory where they are given permits to supply the sugarcane bought from the farmers. In most cases these are farmers who are unable to get permits from the factory. Farmers complained that some of these activities were organised by some of the factory officials particularly the field officers.

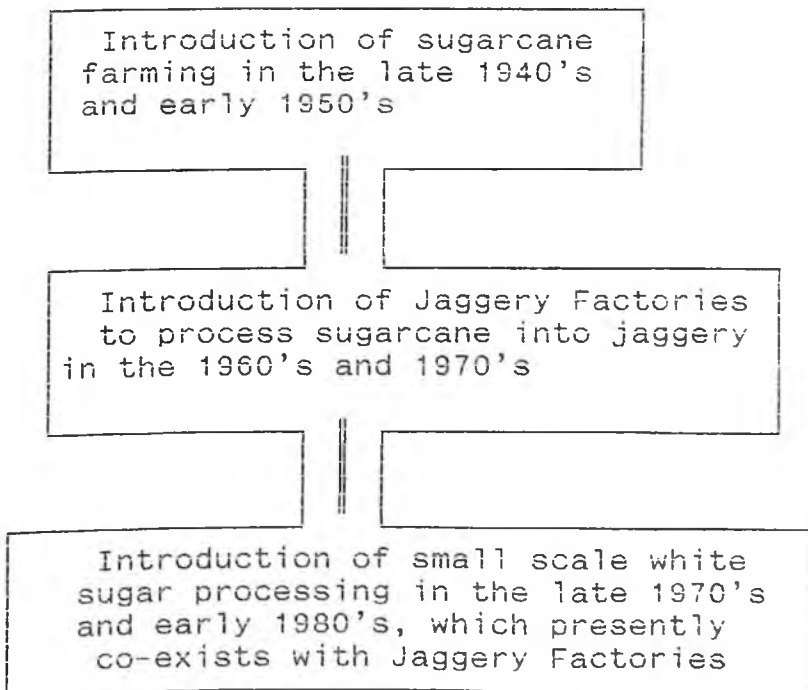
4. Some farmers complained of delayed payments and corruption among factory officials. Particularly they complained of not being given slips showing the details of the deductions made on their due from sugarcane. The practice as observed in large scale sugar factories is that farmers are given pay slips showing the deductions made on their money owing to services given by the factories.

Graph 3.4



In summary the development of the sugar industry in Kabras area can be traced way back to the 1960s when Jaggery factories were introduced in this area. Their coming was due to the potential of the area in sugarcane farming and the efforts and interest shown by farmers. White sugar processing in the area started in 1976 with the introduction of Kabras Investment Sugar company. Four years later West Kenya Sugar Factory was introduced. This historical development of the sugar industry can be illustrated by a model.

Figure 3.1, Historical Development of the Sugar Industry in Kabras Division



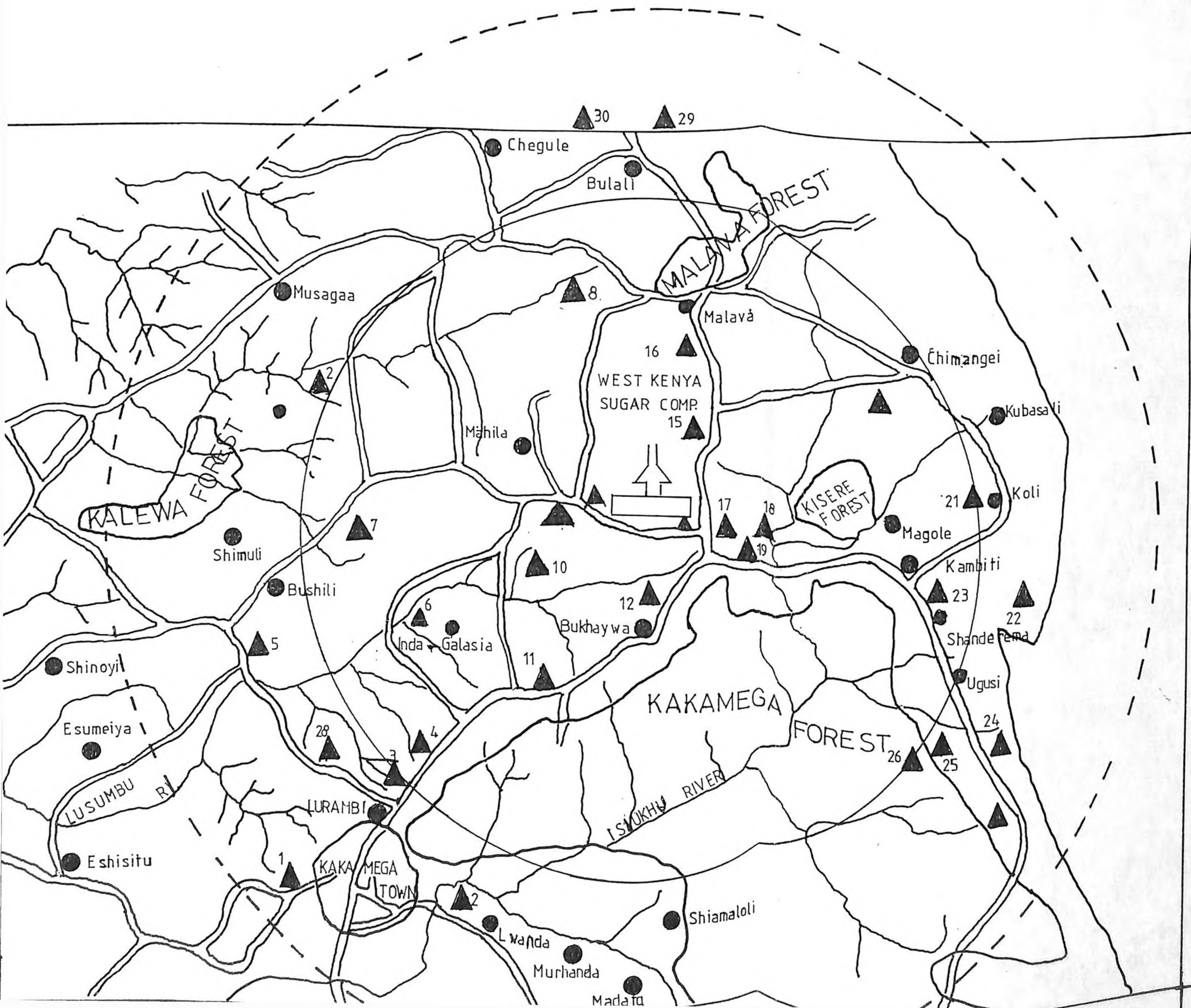
The map on the next page shows the catchment area of West Kenya Sugar Factory and the distribution of Jaggery Factories within 20 kilometre radius.

WEST KENYA SUGAR COMPANY CATCHMENT AREA

MAP 3.1

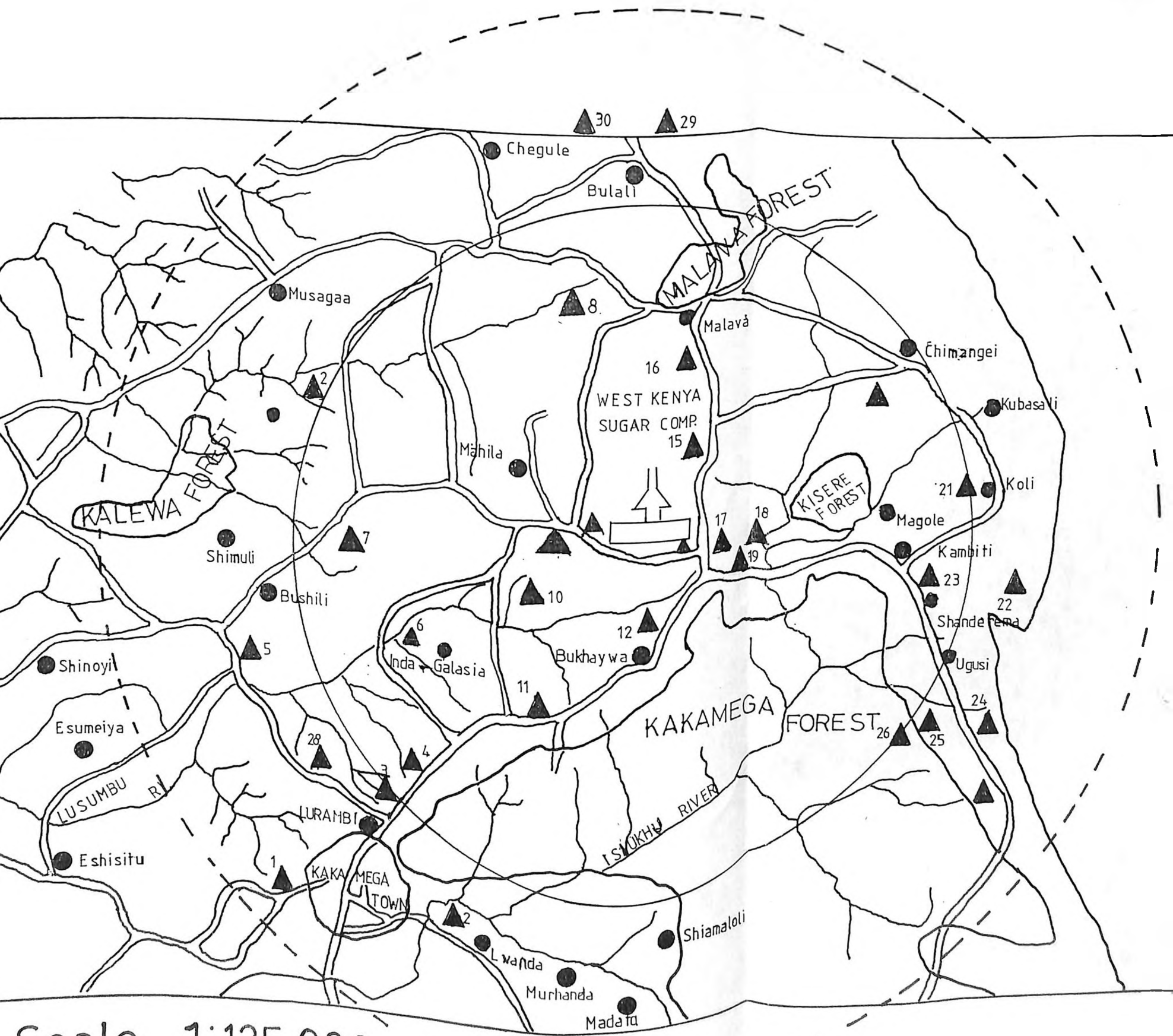
LEGEND

-  Roads
-  Rivers
-  Jaggery factories
-  Small trading centres
-  20 Kilometre radius
-  The company



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WEST KENYA SUGAR COMPANY CATCHMENT AREA



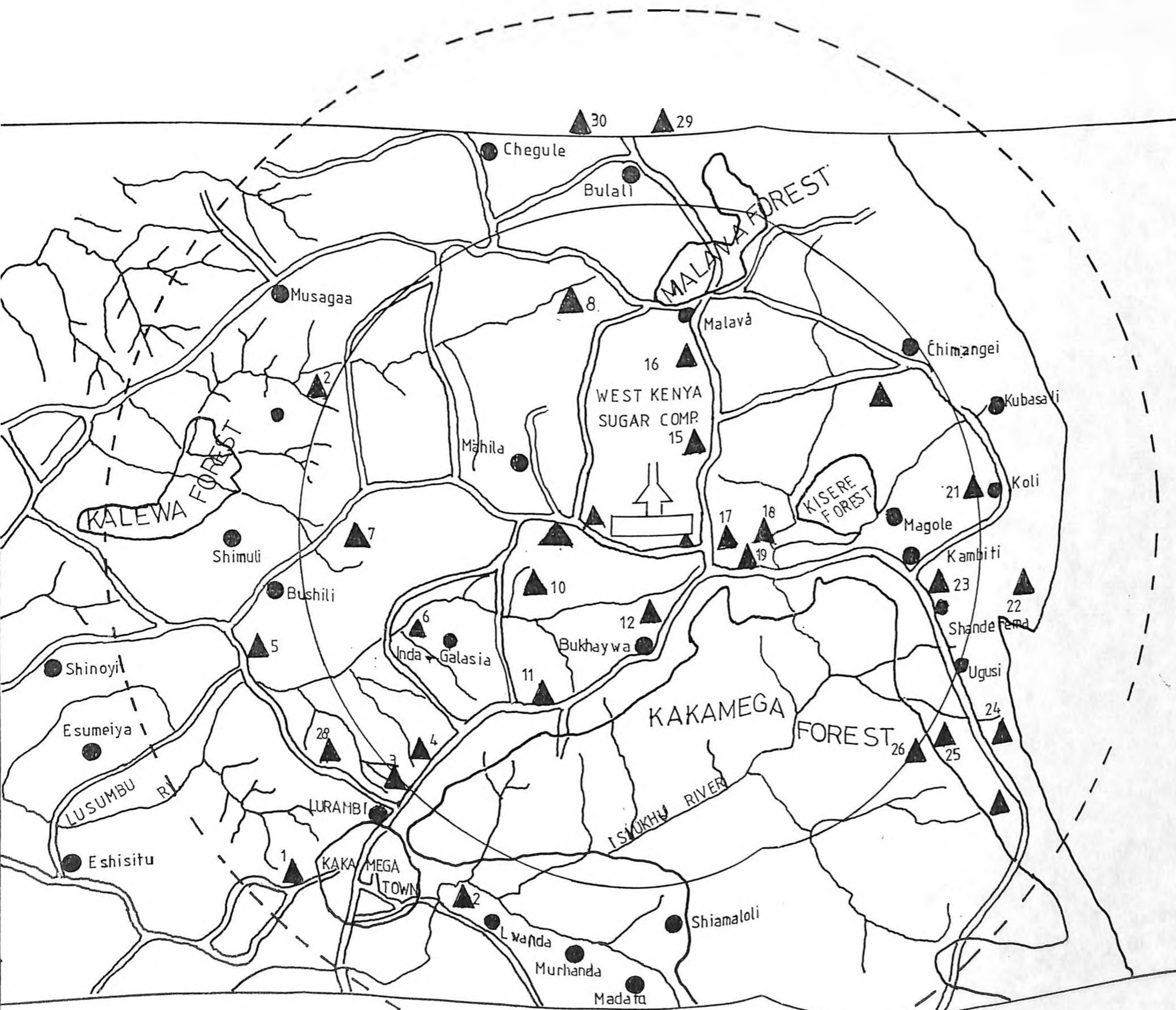
Scale 1:125 000

WEST KENYA SUGAR COMPANY CATCHMENT AREA

MAP 3.1

LEGEND

-  Roads
-  Rivers
-  Jaggery factories
-  Small trading centres
-  20 Kilometre radius
-  The company



Scale 1:125 000

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 M.A PLANNING 1992
 DURP UNIVERSITY OF NAIROBI

3.1.1 Technology Used by The West Kenya Sugar Factory

The technology of production employed by the West Kenya Sugar Factory is a development of that used by the Jaggery plants. The only difference is that the technology used at West Kenya Sugar Factory is much more sophisticated since it involves juice sulphitation and the use of crystallizers and centrifuges. To produce free-running granulated sugar from sugarcane, juice is extracted from the stalks by crushing and pressing, leaving a fibrous residue known as bagasse, impurities are then removed from the juice, water is boiled off to reduce the juice to a syrup in which the dissolved sucrose crystallizes and the sugar crystals are separated from the surrounding syrup by centrifuging, leaving uncrystallizable sugar and remaining impurities in the final molasses.

Its major difference compared with large scale factories like Mumias sugar factory, is the use of open boiling pans instead of evaporators operating under reduced pressure. Open Pan Sulphitation technology has its origin in India where it traditionally operates for 4 to 5 months a year during the dry season to accommodate bagasse drying.

The development of the technology in Kenya has been minimal with three open pan sulphitation installation all in Western province. The first unit

was put up by Kenya Industrial Estates at Kabras (Kabras Investment Company), The second unit was at Yala (Ulumbi sugar factory) and the third installation was that of West Kenya Sugar Factory again in Kabras Division. The first two plants have long ceased operation.

A study done by Mallorie, E. (1986) established that Open Pan Sulphitation technology of sugar production is labour intensive rather than capital intensive and therefore has a smaller foreign exchange requirement per tonne of sugar produced than capital intensive vacuum pan skills. The absolute capital cost of a small open pan sulphitation plant is low compared to that of a vacuum pan plant and therefore brings the possibility of investment much closer to the indigenous businessmen in rural areas. West Kenya sugar factory was established with an initial cost of Ksh 14 million in 1981 and currently the capital investment is 45 million Kenyan shillings. This suggests that it is much easier to establish an Open Pan sugar factory than a vacuum pan given the initial costs required for establishment. A vacuum plant of the scale of Mumias Sugar Factory would need over Ksh 1 billion to start.

With a rapid rate of population increase, creation of employment is an important objective of the Government policy. Mallorie's study found out that

a small scale open pan sugar factory with a crushing capacity of 100 tonnes per day , together with its cane transport can directly employ 222 people. Out of these 222 persons 188 would be classified as unskilled workers. Since the majority would be unskilled, the objective of creating jobs for disadvantaged people in rural areas would be partly met. In comparison he found out that a vacuum pan plant employs a total of about 984 people or 0.01 persons per tonne of sugar produced compared with 0.116 persons per tonne of sugar produced for the open pan plant.

From Mallorie's findings it can be argued that Open Pan Sulphitation technology is appropriate in terms of being labour intensive and therefore likely to have impact on employment generation in areas where they are established. This technology is also advanced in scale of operation compared to the Jaggery Factories.

Reference

Mallorie, E. (1986) Appraisal of Small Scale Sugar
Production in Kenya.

CHAPTER FOUR

4.1 IMPACT OF THE FACTORY AND SUGARCANE FARMING IN THE AREA

Industrial activities in a particular area have been known to have impacts ranging from economic to social impacts. However economic impacts have received much attention by researchers perhaps because industrial development has been pursued as a policy to induce economic changes in the rural areas. This analysis attempts to look at both economic and social impact of sugarcane farming and the factory.

West Kenya sugar factory has been in existence for the last ten years and therefore it is possible to look at the impacts it has had on the area in terms of employment, trade and commerce, agriculture and generally the social wellbeing and the standards of living of the people.

4.1.0 Impact on employment and incomes.

Arguments that have been advanced in favour of sugar industry in Western Kenya are creation of rural employment and generation of rural income through rural industrialization. West Kenya sugar factory offers employment to 300 people who are permanent. It also uses the services of casual workers. Workers' job

categories at the factory are as shown in the table below;

Table 4.1 . Workers job categories

<u>post</u>	<u>number of workers</u>
Managing director	1
Accountant	1
General manager	1
Chief Engineer	1
Electrician	1
Mechanics	6
Clerks	6
Supervisors	16
Drivers	15
Turnboys	15
Manual workers	237
TOTAL	300

(SOURCE:Field survey 1991).

It can be observed from the table that most of the jobs offered by the factory 79 percent are manual, therefore meeting the objective of creating jobs for the disadvantaged people. The rest of the jobs offered by the factory, 14 percent require educated labour and 7 percent skilled labour. About 98% of the staff come from around the factory and some of them are also farmers. It can be argued therefore that the employment of a larger percentage of workers from the local area can contribute to rural development in terms of job creation to the local people. This is also a unique characteristic of West Kenya because in large factories like Mumias and Nzoia labour is drawn from all over Kenya.

The factory pays an average of Ksh 2 million to

farmers and workers every month. Farmers are paid regularly on a two week basis. Payment is through the banks, which demand that a farmer must have an account, therefore encouraging savings. In testing the hypothesis that the factory has been accompanied by a significant improvement in household income, a T-test of the mean income before the establishment of the factory and income after the establishment of the factory for the farmers interviewed was carried out. The income before the establishment of the factory was inflated using 1980 as a base year and subsequent inflation rates of the years that followed. The following results were obtained.

Paired samples t-test: INCOME2 income now
INCO1 adjusted income before

Variable	Number of Cases	Mean	Standard Deviation	Standard Error
INCOME2	66	2742.4242	2432.777	299.454
INCO1	66	1964.9091	1780.725	219.192

(Difference) Mean	Standard Deviation	Standard Error	2-Tail Corr. Prob.	t Value	Degrees of Freedom	2-Tail Prob.
777.5152	2733.237	336.438	.187 .133	2.31	65	.024

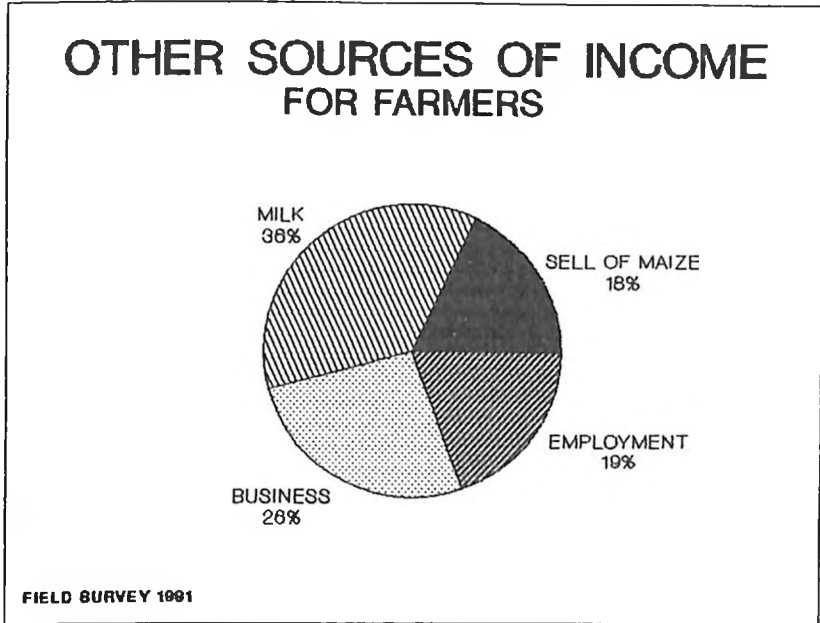
From the above t Observed = 2.31
t Expected at 0.05
confidence level = 2.00

Therefore t observed is greater than t expected hence the null hypothesis is rejected, proving that there is

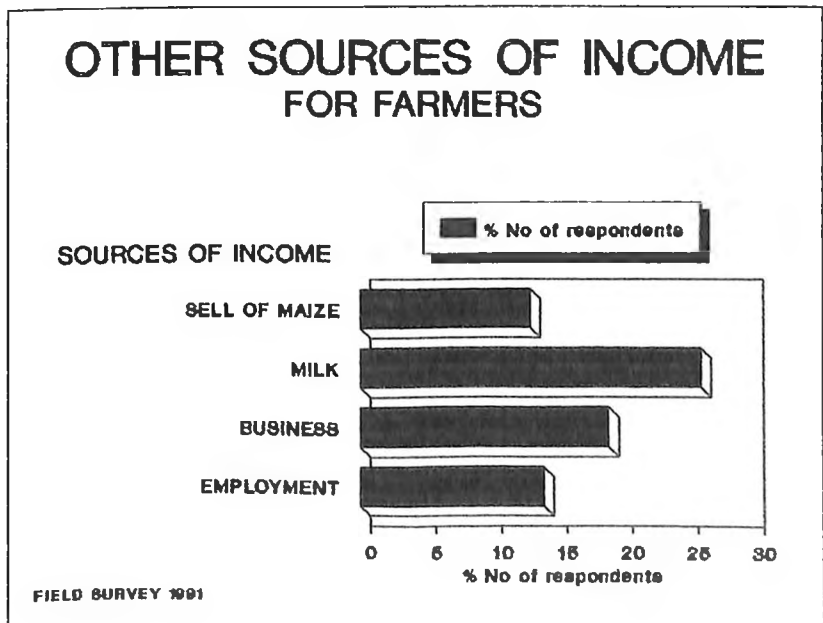
a significant difference between the mean income before and mean income now. This also suggests that farmers in the area have had increased incomes, which can be associated with sugarcane farming as an activity and the presence of the white sugar factory.

Also it can be argued that most farmers have had improved household incomes by selling sugarcane to the West Kenya Sugar Factory than to the Jaggery Factories. Given that Jaggery Factories, during the time of research were paying between Ksh 1000 and Ksh 1200 per trailer (estimated to be 7 tonnes) load of sugarcane, on the lower limit of Ksh 1000 a tonne of sugarcane was going at Ksh 142 and on the upper limit of Ksh 1200 a tonne of sugar was going at Ksh 171 per tonne. Compared to the West Kenya Sugar Factory which at the time of research was paying Ksh 524 per tonne, one would argue that the introduction of white sugar processing has been accompanied by improved incomes for the farmers. Other sources of income to the farmers in the area are, sell of milk and business. 80 percent of the farmers interviewed keep between 1 and 4 milk cows. The milk is for both domestic consumption and for sell. On average farmers get 9 litres of milk and sell between 6 and 8 litres of milk daily. During the time of research a litre of milk was going at Ksh 6. Therefore farmers on average get between Ksh 36 and Ksh 48 from the sell of milk. From the field survey 36

GRAPH 4.1



GRAPH 4.2



percent of the respondents said that they get extra income from the sell of milk while 26 percent get extra income from business they have opened using income from sugarcane. From the sample considered 43.5% get an income of Ksh 1000 and above. The table below shows the distribution of income in the study area;

Table 4.2 Income groups

Income group	Frequency	Percentage
Ksh 500 and below	12	17.4%
Ksh 501-- 1000	27	39%
Ksh 1001 and above	37	43.5%

Cross tabulation of the sublocations considered and income earned showed an insignificant relationship between the sublocations farmers come from and the incomes they get per month. Using a chi-square test the results obtained revealed that the chi-square observed (11.024) was less than chi-square expected (15.507) at 0.05 significant level. This suggests that at 95 percent confidence level there is no close relationship between the sublocations and the incomes earned. The table below shows the cross tabulations and the chi-square results.

Table 4.3 Cross tabulation of Income groups by Sublocation

SUBLOCATION	INCOME GROUP			Row Total	
	Row Pct	Ksh 1999	Ksh 2000		Ksh 5000
	Col Pct	&below	--4999		--12000
	Tot Pct				
Mahira	41.7	33.3	25.0	12	
	12.8	25.0	21.4	17.4	
	7.2	5.8	4.3		
Shamberere	68.8	6.3	25.0	16	
	28.2	6.3	28.6	23.2	
	15.9	1.4	5.8		
Shianda	81.3	12.5	6.3	16	
	33.3	12.5	7.1	23.2	
	18.8	2.9	1.4		
Chesero	38.5	38.5	23.1	13	
	12.8	31.3	21.4	18.8	
	7.2	7.2	4.3		
Chemuche	41.7	33.3	25.0	12	
	12.8	25.0	21.4	17.4	
	7.2	5.8	4.3		
Column Total	39	16	14	69	
	56.5	23.2	20.3	100.0	

Chi-Square	Value	DF	Significance
Pearson	11.02395	6	.20035

Source: Field Survey 1991

From the above table it can be observed that only 20.3 percent of the respondents earn between Ksh 5000 to 12000 which is the highest income group considered. The distribution of this 20.3 percent within the sublocations is as follows; Mahira sublocation 4.3 percent, Shamberere 5.8 percent, Shianda 1.4 percent, Chesero 4.3 percent, and Chemuche 4.3 percent

From the table it can be observed that Shamberere

has majority of those who earn between Ksh 5000 and 12000. This could be explained by the fact that the sugar factory is in that particular sublocation. The incomes could have increased through payment of wages to factory workers and payment of farmers dues of sugarcane supplied.

Majority of those considered, 56.5 percent earn between Ksh 1999 and below. Shianda sublocation has majority of those who earn Ksh 1000 to Ksh 1999. This could be because all farmers considered in Shianda sublocation had 3 acres and above under sugarcane while the other sublocations had people with 2 acres and below under sugarcane hence the difference.

Impact on employment also can be considered in terms of forward and backward linkages. Backward linkage effect on employment is through the supply of sugarcane to the factory. At all levels of sugarcane production there is some degree of employment which some people benefit from. Starting from land preparation for sugarcane planting, the farmer can either hire a tractor or ox plough, this earns income to some people involved in the land preparation activity. During planting the farmer can either use family labour or hire casual workers for that job. The same applies to weeding and cane cutting periods. From the field survey it was revealed that farmers pay the people who load sugarcane on tractors to be

transported to the factory. This kind of process can be seen as a chain reaction whereby at each stage of operation some form of employment is generated. During the field survey it was found out that on average to plant one acre of sugarcane, a farmer needs the help of about 4 people if he is not using family labour. During weeding he needs about 6 people, about 5 people during cutting and about 7 people for loading the cut cane. Therefore on average an acre of land under sugarcane until maturity can create approximately 22 jobs. A forward linkage effect on employment has been through the utilization of sugar and molasses in the production of confectioneries and production of animal feeds. Employment opportunities are created in the industries producing confectioneries and animal feeds. This is an impact of the sugar factory which extends beyond its immediate hinterland. Currently the owners of the sugar factory under study, are planning to build a 30 million Kenya shillings Biscuit Factory in Kakamega town this year (1992). This will be considered a major forward linkage because the sugar produced at the factory will be used as a raw material for making biscuits. Also employment opportunities will be generated to the benefit of the whole District. The Biscuits Factory is envisaged to start operation at the end of the year (1992).

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Therefore it can be argued that the employment in the area under study has been improved by the establishment of the factory, particularly because of its labour intensive production technology and the subsequent employment opportunities generated at the farm level. All these culminate into improved level of incomes for the households in the study area. It is also important to note that the impact of the factory in terms of income generation to farmers is not only limited to South Kabras but includes the neighbouring areas of Butsotso and Isukha where some farmers depend on West Kenya sugar factory for the sell of their sugarcane.

For the factory per se, the improvement in employment cannot be over-estimated because majority of the jobs offered are simple and require little or no skills and education.

4.1.1 Impact on education.

Impact on education is both at the factory and household level. At the factory level workers receive on the job training supplemented by some outside courses organised by the Federation of Kenya Employers. This in away makes the worker gain some skills that can be used elsewhere on the job market.

In terms of contribution to educational infrastructure, the factory has helped the local community by putting up pre-unit blocks at Shamberere,

Kakoi and Kakunga Primary schools and an 8.4.4 workshop at Kakunga Primary school. Some educational facilities in the area have been built on harambee basis. Interviews with the farmers and administrators in the area revealed that income from sugarcane has considerably contributed to the funds raised on harambee basis for building the schools. Good examples of where the community has raised funds to build educational facilities are among others, Shamberere Secondary school, Shamberere Rural Development Educational centre (Shamberere youth Polytechnic) and Shiamoni Secondary school.

The indirect impact on education in the area has been through the payment of school fees from incomes earned from the sell of sugarcane at the factory. It was revealed from the field survey that January is a crisis month when every parent wants to deliver his or her sugarcane to be able to raise money for school fees. This has made many children participate in formal education. Ninety per cent of the farmers interviewed said they grow sugarcane so that they can get money to pay school fees. For example from the sugarcane income earned in 1990, the highest percentage (17 percent) of that money was spent on school fees as revealed by the expenditure patterns of the farmers interviewed. Asked about what sugarcane income has helped them (farmers) to do, 53.8 percent

said that sugarcane income has helped them in paying school fees for their children. This also suggests that payment of school fees is one of the reasons that has made most farmers move into sugar cane farming because they can raise enough money for school fees.

4.1.2 Impact on infrastructure.

The influence of a relatively small factory on infrastructure cannot be ascertained easily. Therefore it becomes incomparable with the influence of a large scale industry. Often what happens is that small scale industries only try to fit into the already existing infrastructure. Most of the infrastructure in the area under study was established by the Government and the local community. The table below shows the mean distance travelled to most of the infrastructural facilities in the area.

Table 4.4 Mean distances to facilities.

<u>Facility</u>	<u>Mean distance (in km.)</u>
Shopping	2
Nursery school	1.2
Primary school	1.9
Secondary school	3.1
Recreation/entertainment	2.8
Health Centre	6.2
Hospital	16.6
Farm inputs	9.3
Market-place	4.9
Credit	14.8
Matatu/Bus stage	3.3
Post office	4.2
Improved source of water	1.3

(Source: field survey 1991).

From the above table it can be observed that mean distances to most of the infrastructural facilities in south Kabras are fair, except for distances to health facilities. People either go to Malava Health center, Butali or Kakamega Hospital. For farm inputs and credit facilities they go to Malava or Kakamega Town. The classified roads within the area are maintained by the Ministry of Public Works and the Kakamega County Council. At the moment the West Kenya Sugar Factory helps in maintaining 70 to 80 kilometres of the classified roads. Some of the classified roads which are supposed to be maintained were observed to be in bad conditions that tractors from the factory could some times get stack. Feeder roads from the farms to the classified roads were also observed to be in bad condition. The conditions of the roads is as

shown in the photographs below



Plate:4.1 Conditions of classified roads

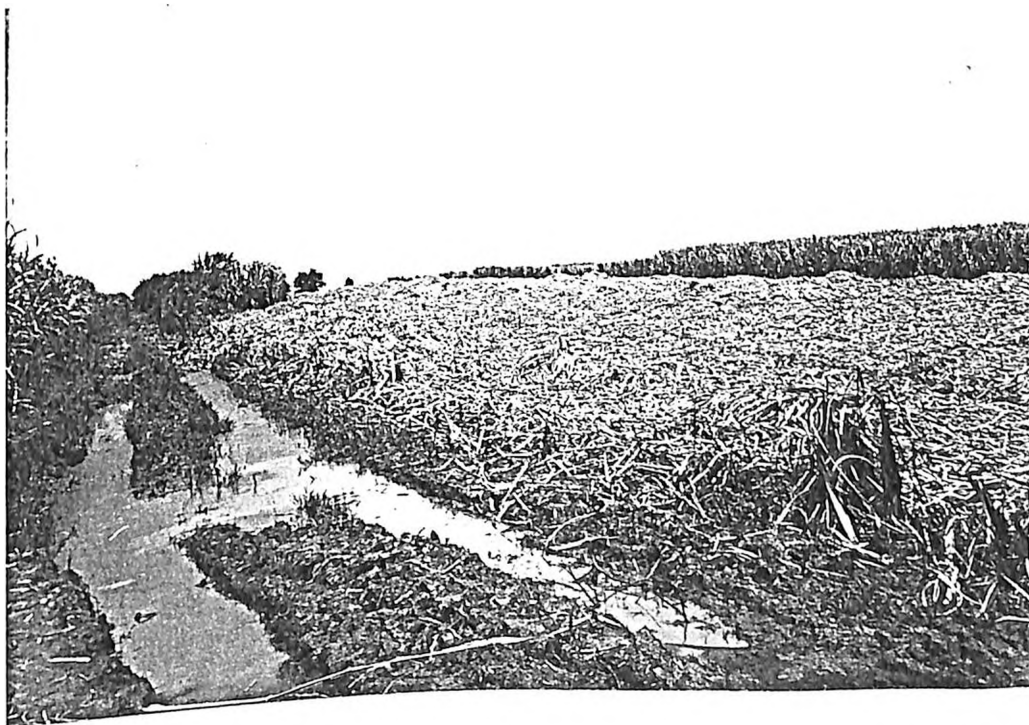


plate 4.2: Conditions of feeder roads

Other infrastructural facilities that the factory has direct helped to build are, one church and one eye camp for eye treatment.

It can be therefore argued that West Kenya Sugar Factory has had very little impact on the physical infrastructure of the area. Instead it has fitted within the existing infrastructure of the area. Due to this one can argue that small scale factories such as West Kenya sugar factory do not need enormous infrastructural facilities to operate unlike large scale sugar factories like Mumias.

4.1.3 Impact on trade and commerce

With the introduction of an industrial activity in a given place, other related activities tend to be attracted near the industrial plant to capture the market created. Notable of these are trade activities in form of open air markets, shops, butcheries repair works etc. Over time since West Kenya sugar factory was established there has been a gradual development of a market centre called "West." This centre has attracted both formal and informal trade activities that benefit both the factory worker and the people who live around. This centre currently has 4 shops , 2 posho mills, 2 butcheries, 1 Bar 3 Hotels and single roomed semi permanent rental houses. This has led to

increase in income to the owners of the premises and to the day to day traders who come to sell their farm produce at the market. Some of the produce farmers bring for sale are green vegetables, sweet potatoes, cassava and arrow roots. The people who come from around the factory have also benefitted because they no longer have to go to Kakunga or Ingavira, which were the then nearest shopping centres. Lubao, Ingavira and Kakunga shopping centres have also benefited from the establishment of the factory. 88.2 percent of the owners of businesses in these other centres agreed that they get customers from the factory especially at the end of the month.

Farmers in the area also utilize the shopping centres for most of their needs. From the field survey it was found out that 75 percent of the respondents do their shopping within the centres found in the location and 56.1 percent get entertainment and recreation with the Location. This is an indication that much of the money earned from sugarcane does not live the Location, suggesting that it is utilized to develop the area. It then can be said that the factory has had an impact on business and trade because incomes earned both by workers and farmers from the factory is used to buy goods and services from the centres around the factory and within the location. The tables below show where people go for shopping and

PLACE	NO OF PEOPLE	PERCENTAGE
Within the location	60	75%
Malava Rural <i>Centre</i>	18	22.5%
Kakamega Town	2	2.5%

Source: field survey 1991.

Table 4.6 Where people go for entertainment/recreation

PLACE	NO OF PEOPLE	PERCENTAGE
Within the location	37	56.1%
Malava <i>Rural</i> mkt centre	25	37.9
Kakamega Town	4	6.1%

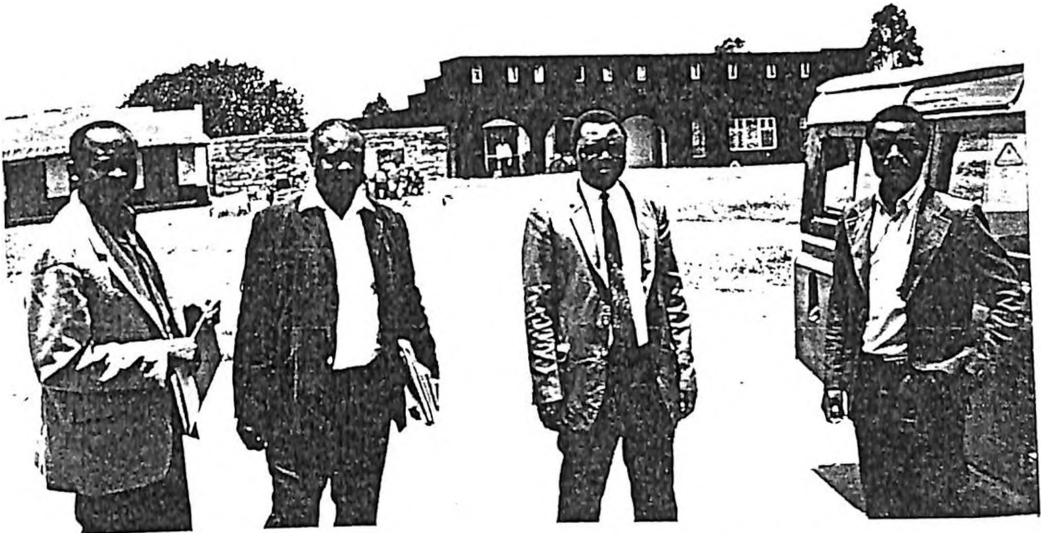


Plate 4.3 Modern commercial building at Kakunga Market centre.

Improvement of business stock can be used to suggest the performance of business. 52.9 percent of the businessmen interviewed acknowledged that they had improved stocks of goods to meet the rising demand of the people in the area. From the business interviews done, 47.1 percent were retail shops, 17.6 percent tailoring, 11.8 percent Hotels, 5.9 percent carpentry, 5.9 percent weaving and 11.8 percent bicycle repair. From cross tabulations of business type and incomes earned from the businesses it was revealed that Hotel, carpentry and retail shops were doing well in terms of business returns. The monthly income of those

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Kakamega Town	4	6.1%

Source: Field survey 1991.

Most business men interviewed 58.9 percent started their businesses between 1981 and 1991. This could be explained by the establishment of the factory in the area in the early eighties. Due to good business prospects some of the centres are characterized by modern buildings (see photo) below.

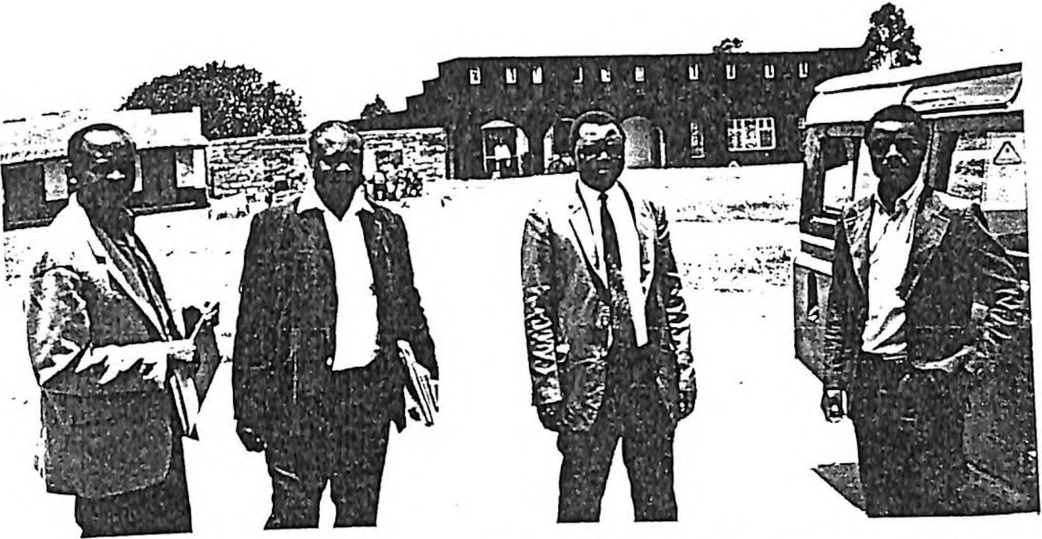


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in carpentry and hotel business was found to be Ksh 5000 and above while retail business the range was from Ksh 300 to 4000 per month. Bicycle repair works was common in the three shopping centres considered. This could be explained by the fact that most factory workers and farmers in the study area own bicycles. On average the business income in this area was found to be Ksh 1792 per month while the average rent paid was Ksh 326. Most of the stock sold in these shopping centres is bought from Kakamega town and Malava market centre. One of the factors that attract people into business is the availability of customers to be served by the facilities and demand for services. 66.6 percent of the business respondents said that they were attracted into business because of good business prospects in terms of availability of customers in the area. 50 percent of those in bicycle repair and 33.3 percent of those in tailoring cited the demand for their services as the factor that attracted them into business. When asked about new commodities they sell now due to the establishment of the factory, 40 percent said they now sell households equipment of these 50 percent were in Kakunga and 50 percent in Lubao. The likely reason for this could be because the two market centres are located a long Kakamega- Webuye main road and hence transportation is not a problem. The other shopping centre (Ingavira) is about 7

kilometres from the main road.

Cross tabulations of where customers come from, by market showed that Ingavira and Kakunga attracted most customers from the factory. Ingavira was found to attract 53.3 percent while Kakunga attracted 46.7 percent. This could be because of proximity of Ingavira to the factory.

The clerk to Kakamega County Council noted that there has been an increase in the revenues to the Council through issue of licences, cess collection and service charge collection from the area under study because of the factory. The table below show the type and number of business licences issued for the 3 centres considered in year 1990;

Table 4.7 Types of business licences issued in 1990

TYPE OF LICENCE	No of licences issue per centre			
	*Lubao	Ingavira	*Kakunga	Total
B ₁ Wholesale	-	-	-	-
B ₂ caterers	-	1	1	2
B ₃ Motor vehicle repair	-	-	-	-
B ₄ Regulated	13	12	16	41
B ₅ Miscellaneous	1	-	-	1
B ₆ Manufacturers	-	-	-	-
B ₇ Distributors	-	-	-	-

* Market Centres

Source: Kakamega District Trade Office.

From the above table it can be observed that a higher proportion of the licences (95 percent) given in 1990 were of the regulated type. B₄ Regulated refers to all retail business licences.

4.1.4 Impact on agricultural practices.

The introduction of sugarcane as a cash crop and later the introduction of the sugar processing in the area has had an effect on the agricultural practices. Particularly the white sugar processing. On the outset there has been an increase in the acreage of land under sugarcane in the whole of Kabras Division. A survey done in 1982 revealed that the whole Division had 2000 acres of land under sugarcane. Due to encouragement and extension services from both the West Kenya Factory and Agricultural Officers, the whole Division, by May 1990 had 7000 hectares (17290 acres) of land under sugarcane out of which 80 percent is in South Kabras Location. This perhaps could be because of the presence of the factory in this Location. This means that more people have been attracted into sugarcane farming because of the factory where they can sell their cane and get some income.

Agricultural utilization of land in the whole

Division is as shown in the table below;

Table 4.6 Agricultural Utilization of land in Kabras

Activity	Area (hectares)
Sugarcane	7000 ha
Maize	16000 ha
Other crops (Bananas, cassava, millet etc.)	7000 ha
Grazing and forest	20389 ha
Total	50389 ha

Source: Divisional Agricultural office.

The above table shows that in terms of crops the Division has more land under maize. Though this is the case at the Divisional level, at the individual farm level there were marked differences between land under sugarcane and maize as revealed by the study. In testing the hypothesis that there is no significant difference between land under sugarcane and that under maize, the following results were obtained;

Paired samples t-test: FSSUGAR farm size under sugarcane

FSMAIZE farm size under maize now

Variable	Number of Cases	Standard		Standard
		Mean	Deviation	Error
FSSUGAR	79	8.8070	13.337	1.501
FSMAIZE	79	5.8513	5.303	.597

(Difference)	Standard	Standard	2-Tail		t	Degrees of	2-Tail
Mean	Deviation	Error	Corr. Prob.		Value	Freedom	Prob.
2.9557	10.559	1.188	.668	.000	2.49	78	.015

t value observed	= 2.49	
t value expected at 0.05 significant level		= 2.00

t (observed) is greater than the t (expected), hence reject the null hypothesis that there is no significant difference between farm size under sugarcane and that under maize.

The results show that there is a significant difference between farm size under sugarcane and farm size under maize. This also shows that more land at the individual household level is devoted to sugarcane farming because sugarcane is more profitable than the other crops. If this trend continues then there is a likelihood of the area having food shortage in terms of the major food crop (maize). 50 percent of the respondents acknowledged that sugarcane was taking much land leaving less land for maize. In testing the third hypothesis of the study, that there is no significant difference between farm size under maize now and farm size under maize before commercial sugarcane farming, the results showed a significant difference. (See the t test below)

Paired samples t-test: HZACRBGC acreage under maize before sugarcane far

FSMAIZE farm size under maize now

Variable	Number of Cases	Mean	Standard Deviation	Standard Error
HZACRBGC	77	6.7760	3.046	1.031
FSMAIZE	77	5.9123	5.343	.609

(Difference) Mean	Standard Deviation	Standard Error	2-Tail Corr. Prob.	t Value	Degrees of Freedom	2-Tail Prob.
2.8636	6.389	.728	.720 .000	3.93	76	.000

t value observed = 3.39

t expected at .05 significant

level = 2.00

t observed is greater than t expected therefore reject the null hypothesis. There is a significant difference between the amount of land devoted to maize before than that devoted to maize now.

This can be explained by the shift from subsistence to cash crop farming in the area due to the presence of ready market for the sugarcane. Though maize can be grown for cash the returns are less than those of sugarcane. The field findings showed that on average farmers harvest 22 bags of shelled maize from an

average of five acres of land. Of the maize harvested 60 percent is sold and 40 percent consumed by the households. The size of land devoted to crops can be used to determine the yields. A regression analysis of farm size under sugarcane and the yields showed the following results.

*** MULTIPLE REGRESSION ***

	Mean	Std Dev	Label
SUGYIELD	66.446	118.804	sugar yield in tonnes
FSSUGAR	8.848	13.608	farm size under sugarcane

N of Cases = 74

Correlation:

	SUGYIELD	FSSUGAR
SUGYIELD	1.000	.808
FSSUGAR	.808	1.000

*** MULTIPLE REGRESSION ***

Equation Number 1 Dependent Variable.. SUGYIELD sugar yield in tonnes

Variable(s) Entered on Step Number 1.. FSSUGAR farm size under sugarcane

		Analysis of Variance		
		DF	Sum of Squares	Mean Square
Multiple R	.80804			
R Square	.65293			
Adjusted R Square	.64811	Regression 1	672747.77523	672747.77523
Standard Error	70.47503	Residual 72	357604.50855	4966.72929
		F =	135.45086	Signif F = .0000

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
FSSUGAR	7.054598	.606152	.808041	11.638	.0000
(Constant)	4.027051	9.791937		.411	.6821

The above analysis shows a very positive relationship between sugarcane yields and farm size under sugarcane. As the farm sizes increase the yields also increase. From the above the regression line is: SUGYIELD= 4.03 + 7.05 FSSUGAR.

From the regression line it can be observed that, farm

size under sugar explains 64 percent of the sugar yields and for a unit increase in the size of land under sugarcane, sugarcane yields go up by 7.05 tonnes. In Comparison the regression analysis of farm size under maize and maize yield showed the following results;

* *
* * MULTIPLE REGRESSION * * * *

	Mean	Std Dev	Label
MZEYIELD	22.214	23.964	maize yield
FSMAIZE	5.561	4.392	farm size under maize now

N of Cases = 70

Correlation:

	MZEYIELD	FSMAIZE
MZEYIELD	1.000	.521
FSMAIZE	.521	1.000

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. MZEYIELD maize yield

Variable(s) Entered on Step Number 1.. FSMAIZE farm size under maize now

Multiple R		Analysis of Variance			
R Square	.27160	DF	Sum of Squares	Mean Square	
Adjusted R Square	.26089	Regression	1	10779.82001	10779.82001
Standard Error	20.61908	Residual	68	28909.96570	425.14655
		F =	25.35554	Signif F =	.0000

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
FSMAIZE	2.846090	.565213	.521154	5.035	.0000
(Constant)	6.387992	3.993983		1.599	.1144

From the above the regression line is :

$$\text{MZEYIELD} = 6.39 + 2.85 \text{ FSMAIZE}$$

This analysis shows that farm size under maize explains 26 percent of the maize yields, meaning that there are other factors other than land size that can be used to explain maize yield that were not considered in the equation. From the above equation, a unit increase in the size of land under maize, the yields go up by 2.85 bags of maize. The above two equations suggest that farm size is an important factor in explaining sugarcane yields than maize yields. It also suggests that for a unit increase in the acreage of either sugarcane or maize, sugarcane returns are more than those of maize, therefore it is more profitable to increase land under sugarcane than land under maize.

The table below shows the 1991 targets and achievements for the cereal grown in the study area.

Table 4.9. 1991 cereals targets and achievements.

CROPS	1991 TARGETS			ESTIMATED FIELD SITUATION			ACHIEVEMENT
	HECTARES	YIELDS/ HA TONS	PRODUCTION TONS	CUMULATIVE HECTARE PLANTED	YIELDS /HA TONS	PRODUCTION	% ACHIEVED
MAIZE	12000	3.5	42000	15163	3	45489	108
SORGHUM	150	1.2	180	200	1	200	111
MILLET	150	.6	90	63	.4	25.2	28

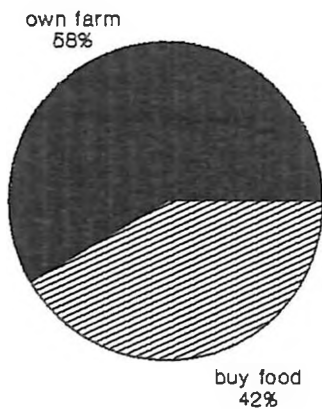
Source: Divisional Agricultural Office (Malava)

From the above table it can be observed that during 1991 there was an increase in acreage of maize from the targeted 12000 hectares to 15163 hectares. Discussions with Divisional Agricultural Officer revealed that the acreage of maize went up because some sugarcane farmers turned to the planting of maize because of problems of marketing sugarcane. Due to overproduction of sugarcane in the area most farmers experienced problems in getting permits to supply their sugarcane.

Food production in sugarcane growing areas has been quite an issue which most scholars have addressed. They have associated food shortages with the excessive planting of sugarcane. The situation is a bit different in Kabras. From the field survey it was established that 86 percent of the respondents depend on their own farms for food. On average it was found out that farmers were planting maize on 5.8

acre farms. Given that on average one acre gives about 12 bags of maize, a family is at least assured of about 60 bags of maize. Despite being the staple food and therefore grown for subsistence, maize is also grown for sale. From the field survey farmers on average sell 15 bags of maize while on average they consume about 13 bags of maize in a year. Maize consumption varied with family sizes in the study area.

source of food for farmers



field survey 1991

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GRAPH 4.3



Farmers also plant beans and on average they harvest 5 bags of which 3 bags are sold and the rest left for consumption. To a great extent Kabras farmers rely on their farms for food production. In other words farmers don't over rely on sugarcane production but rather balance out between food production and sugarcane production.

4.1.5 Impact on living standards

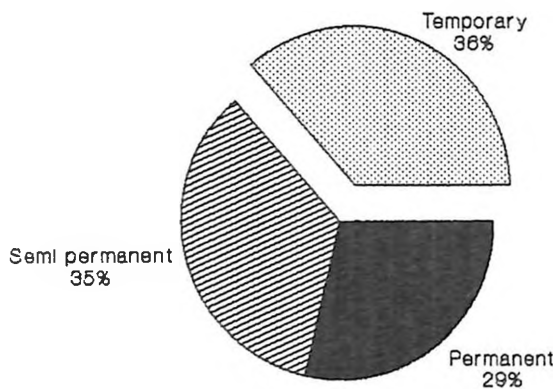
Improvement of the living standard of the rural people is one of the objective of the governments efforts to encourage industries to establish in rural areas. In this study it can be argued that due to increased incomes from sugarcane in this area, people also enjoy relatively higher standards of living than before. This can be associated with the factory since it offers market for the sugarcane. Asked to comment on the standards of living, 72.5 percent of the respondents said that increased incomes from sugarcane has enabled them to have better life than before. For example they have been able to built houses, take their children to school and buy other basic necessities. 52.5 percent said that before the factory was established, there was no sure market for their sugarcane and the prices offered by the Jaggery factories were and are still lower than that offered

by West Kenya sugar factory. During the period of research, it was established that Jaggery Factories were paying between Ksh 1000 and Ksh 1200 per one tractor, which on average is 9 tonnes. In West Kenya sugar factory sugarcane is weighed on a 20 tonnes weigh bridge and payments made according to tonnes recorded. Therefore the coming of West Kenya has improved their incomes compared to what they use to get from Jaggery Factories and hence their disposable incomes have improved. With the money now they can afford to meet most of their household demands, which reflect better standards of living.

Reacting to the statement that "the sugar factory has improved their living," 63.8 percent of the respondents agreed with this statement. Meaning that the factory has greatly , through the purchase of their cane improved their living standards in Kabras.

Housing also can be used to determine peoples standards of living. From the field survey, 28 percent of the respondents had permanent houses, 35 percent semi-permanent and 36.6 percent had temporary houses. The classification of housing was based on building materials used. Thus a house built of stone, brick or block wall and corrugated iron sheets or tile roof and cement floor was considered to be permanent. Semi-permanent houses were those built of mud walls and corrugated iron sheets, while temporary ones were

TYPE OF MAIN HOUSES



FIELD SURVEY 1991

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GRAPH 4.4



those built of mud walls with grass thatched roofs. Considering cumulative percentages of permanent and semi-permanent houses, 63 percent of the respondents were having good houses, which is a sign of improved standards of living. When asked what sugarcane farming has helped them to do, 80 percent of the respondents said it had helped them built good houses.

Income expenditure patterns also can be used to determine the standards of living of people. From the field survey, farmers on average spent 31 percent of their monthly income on food, 10.7 percent on education, and the rest on miscellaneous. Since their expenditure patterns are distributed across a variety of goods and services, then it can be said that they are having better standards of living.

Improved welfare or living standards can be measured considering accessibility to most infrastructural facilities. As already indicated before, it is only access to health facilities, credit and farm inputs that is inadequate. Some infrastructural facilities in the area are directly related to sugarcane farming as an activity, which earns farmers some income. Generally as established from the impact of the factory on household incomes, the farmers in this area have better standards of living since income is used as a measure of improved standards of living.

4.1.6 Social and Environmental Impact.

The social and environmental impact of the factory could not be ascertained in quantitative terms by the researcher. However concern was raised by the respondents of, lack of marine life in the nearby river where the factory discharges its liquid wastes.

The smoke and gases emitted in the air could be contributing to air pollution but the extent could not be determined by the researcher.

Another possible environment impact, if the factory continues using fuelwood during the wet season when bagasse cannot dry, is the depletion of the trees in the area. However this problem is unlikely to occur because the factory has acquired a furnace that dries wet bagasse to be used as fuel.

At the household level, due to the need to have more income from sugarcane, there is a possibility of vegetation clearance to give room for sugarcane farming. Also there could be loss of soil fertility due to continued planting of sugarcane on the same piece of land, though presently farmers are practising rotational farming.

The notable negative social impact of the factory, is the deteriorating moral standard in the market just around the factory where single women have

rented rooms and practise prostitution. Women around this area complained that this was contributing to family breakages since some time married men are housed by the single women at the centre. This trend is likely to reduce because farmers are now paid through the bank in Kakamega. Before, farmers used to be paid at the factory and there was a likelihood of them spending some of their money on women.

Though the above was noted, it is important to note that the factory's positive externalities outweigh the negative externalities.

The negative externalities are only limited to a small radius while the positive externalities extend beyond Kabras to areas like Butsotso and Isukha.

CHAPTER FIVE.**5.0 FINDINGS AND IMPLICATIONS**
FOR FUTURE DEVELOPMENT**5.1.0 Summary of Findings**

From the foregoing analysis it has been established that the factory has had a role in rural development. Going by the definition of rural development as improving the living standard of the rural population, then the factory has contributed to rural development. It has been observed that the factory has contributed to rural development in terms of generating jobs for rural people. This is both at the factory and farm level due to the backward and forward linkages. Employment in Kabras area has been improved by the establishment of the factory especially because of its very labour intensive production methods. The scale of farming has improved from production for jaggery only to production for both jaggery and white sugar. Indirectly the factory provides additional number of casual jobs at the farm level including weeding and harvesting of sugarcane.

The factory has also contributed to rural development by creating a source of cash income to farmers. It acts as a market for the sale of sugarcane in the area. This has led to the improvement of incomes in the area as compared to the times when the

area depended solely on Jaggery Factories for the sale of sugarcane. Improvement of rural cash incomes has been one of the major objectives of rural development, which has been envisaged to come through improved agricultural productivity. The introduction of a cash earning crop like sugarcane helps an area to develop because improved incomes lead to improved standards of living. The availability of a market for sugarcane has encouraged many farmers in the area to start sugarcane farming and adopt better farming methods to improve yields and get more income.

The other important aspect of rural development that scholars have emphasised is the adoption of appropriate technology in the rural areas. As concerns this, it can be argued that the factory has contributed to rural development by adopting a technology of sugar production that is suitable to the Kenyan rural environment, which is characterised by unemployment. The adoption of labour intensive technology helps to ease the problem of rural unemployment unlike capital intensive technology, which creates fewer jobs. The factory uses an open pan sugar production technology, which is labour intensive and therefore encourages the growth of similar rural agro-based industries in line with the Government's Rural Development policy.

The factory's backward and forward linkages can

be used to illustrate its role in rural development. It has been observed that linkages between West Kenya sugar factory and the study area exists considering employment opportunities it directly offers to people and the incomes earned by farmers through the sale of sugarcane at the factory. Also a look at the factory's objectives reveals a close relationship between the factory and the objectives of rural development. Particularly the second and third objectives, which are, to create a source of cash income for farmers and to create rural wage-earning employment respectively. From the analysis the factory has achieved these objectives and therefore has contributed to rural development.

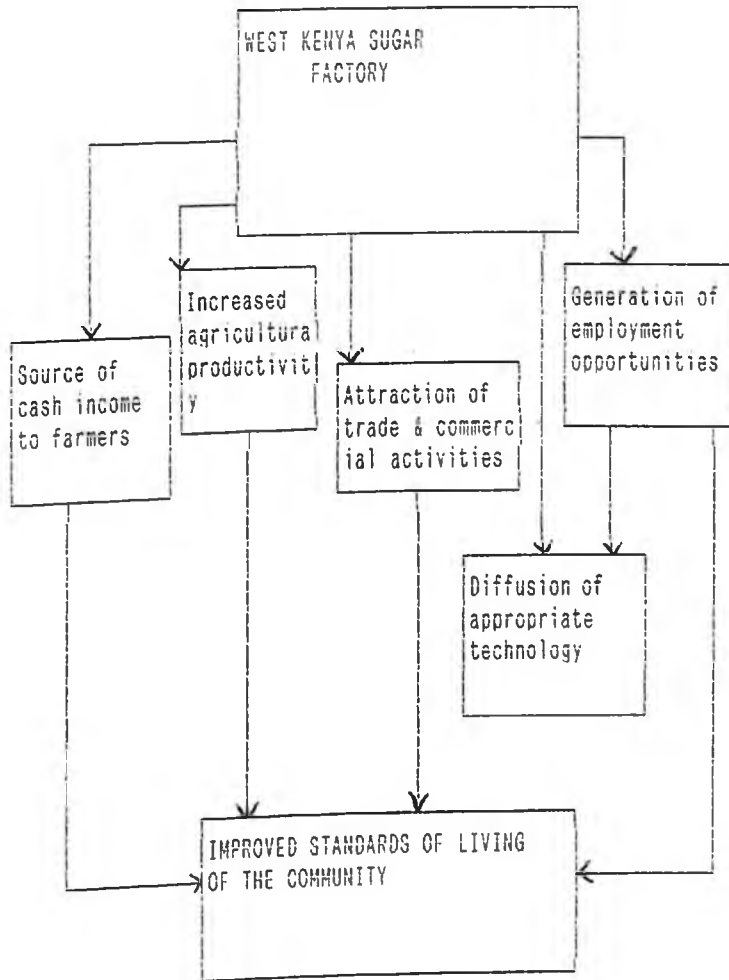
Currently the factory plans to expand its capacity to 500 tonnes crushing capacity per day (tcd) and built a workshop. During the study time the preparation of the site for the workshop was in progress. The expansion of the factory and construction of the workshop will have an added impact on rural development. For the workshop in particular, it has been looked at as going to contribute to the following,

- (a) Create employment opportunities.
- (b) Save foreign exchange by producing its own spare parts.
- (c) The factory will be able to do its own

site maintenance.

It was established that the expansion of the factory will give added income to farmers in the tune of Ksh 50 million per annum besides creating employment opportunities and sugar supply. The role of the factory in rural development can be illustrated by a model adopted from Myrdal's model of cumulative processes.

Fig 5.1 Model Showing The Role Of West Kenya Sugar Factory



The above model also can be applied to other small scale agro-based industries like Tea factories and coffee factories.

The study has also established that in the recent past, due to the introduction of the factory and therefore market for sugarcane, there has been a problem of overproduction of sugarcane. This is because everybody wants to grow sugarcane to earn some

income. There has been overproduction in the sense that the factory's capacity of 200tcd cannot cater for the sugarcane grown in the area. In other words the factory's capacity is small.

Closely connected to the issue of capacity is the issuing of permits to farmers for the supply of sugarcane. Mostly farmers are limited to two tractors irrespective of the amount of sugarcane a farmer has. This has been a disincentive to farmers who have much sugarcane to supply. Farmers also expressed concern that if a permit has to be issued then they have to bribe the field officers from the factory.

The other problem associated with sugarcane farming for the factory is that sugarcane has replaced much of the land that used to be under maize. This has resulted in a declining trend in the production of maize, which is the major staple food crop grown in the area.

Generally the problems expressed about the factory are: difficulties in getting permits, problem of middlemen/agents buying farmers sugarcane because they have arrangements with the factory, delayed payments to farmers, harvests left to dry after cutting because the permits are limited to two or three tractors and finally alleged corruption among factory officials particularly field officers who directly deal with farmers in inspecting sugarcane

farms before issuing permits. The problems are perpetuated because the sugar factory is the only one of its kind in the area, hence acts as a monopoly.

5.1.1 Implications for planning.

There are issues that have arisen from the study that have implications on the planning of future facilities of the kind of West Kenya sugar factory. In general agro-industries have particular industrial constraints or problems that need to be addressed. This include;

1. Insufficient supplies of raw material
2. Lack of technical and managerial skills
3. Infrastructural constraints

However for an industry like West Kenya an issue like infrastructure is not much of a problem because as revealed from the field survey, this kind of factory fits in most of the existing basic infrastructural facilities like roads water and power.

For the sugar factories in particular certain basic conditions must be met before operation starts. These include cane supply, labour availability, infrastructure and investment opportunity. For

sugarcane supply it is important to note that sugar is not actually produced in the factory but rather it is extracted from sugarcane which farmers plant. It is therefore fundamental that the factory is geared to the needs of the farmers and vice versa. However the relationship between the farmers and the factory must be based on mutual understanding and respect. A factory cannot operate without sugarcane and it would be pointless to grow sugarcane if there were no factories to process it, also there could be no factories if there was no sugarcane in the particular areas. Therefore it is in the common interest of both the factory and the farmers that each should be efficient and profitable. Both parties must remember that land on which sugarcane is grown can be used to produce other crops. Therefore really the operation of a sugar factory will depend much on the availability and willingness by farmers to plant and supply sugarcane to the factory.

Sugarcane, with a relatively high input of labour in both harvesting and processing, can help in this process of rural employment generation. The issue here is that when planning for a facility such as a sugar factory there must be an assurance of availability of labour to work both at the factory and at the farm level.

Infrastructure is considered an important factor

in planning for any investment. For sugar processing in particular the large scale factories, a reasonable degree of infrastructure is essential. Roads for cane transport, power for factory operation and usual administrative and service functions have to be present or must be created at considerable cost. However due to the high cost of establishing factories and also because of increasing cost and difficulties in providing the infrastructure in a reasonable period of time, planners have considered alternative ways of arranging and planning development. As a result there has been an increasing interest in the possibility of establishing small scale sugar factories- with cane requirements in tonnes required for an economically sized full scale factory. The main attraction as revealed by the study findings is that the small scale factories can be established without extensive and expensive infrastructure and a gradual build-up of the cane area could be achieved to provide, in time, the eventual cane supply for a major producing unit. As concerns housing ,it has been revealed that small scale factories draw most of their labour from the surrounding areas. Therefore little investment is needed for a service like housing because most of the workers stay in their homes.

Investment opportunities have to be weighed before a factory is established. What has been

observed with the major sugar factories where the Government has shares, is that there has been much mismanagement and interference with the working of the factories. At least with private investors survival of the factories can be guaranteed because the prime motive of the entrepreneurs will be to maximize profits and hence will ensure efficient management. Public sector investments are especially sensitive to political consideration. These ensure that the liquidation of even an unprofitable factory, to the detriment of the farmers, is a serious and unlikely step.

West Kenya sugar factory has distinct features that are worth discussing. First and foremost this factory is unique in the sense that it doesn't operate a nucleus like the other big factories. This implies that it wholly relies on small scale farmers in the area for the supply of sugarcane. This suggests that when planning for such small scale sugar factories, one does not need to worry about having a nucleus to supply sugarcane. The issue of displacement of people to create land for a nucleus is out of question. There is needs to induce small scale farmers to plant sugarcane for the supply of cane to such a factory. Once the need is established of planting sugarcane other farmers are induced to plant sugarcane In addition, in Western Kenya sugarcane is the leading

industrial crop as well as cash crop compared to the other crops grown in the area. Even without small scale white sugar factories, farmers have been planting sugarcane for supply to the Jaggery factories. With an introduction of a white sugar factory, which offers better returns for sugarcane supplied than the Jaggery Factories, the supply of sugarcane becomes assured.

Secondly, the issue of the technology used by the factory is a factor that can be considered when planning for similar activities. The initial capital involved can be managed by the local entrepreneurs. For example West Kenya at its full operational scale, has capital assets worth Ksh 45 million while its initial capital was Ksh 14 million. At the moment, it can take, on average Ksh 22 million to start an open pan white sugar factory of a capacity of 200tcd per day. Therefore the issue of cost of establishing a sugar factory has implications to what kind of investment has to come up. With this times of appropriate technology, it is only that technology that costs less in terms of capital, that is favourable for rural areas. In this case therefore the open pan technology becomes most suitable for rural areas where sugarcane is grown.

Another very important issue that can be learned from West Kenya sugar factory is that it does not

contract farmers ie does not bind farmers like the other large scale factories do with outgrowers. The advantage of not contracting farmers is that there exists a free choice mechanism that allows farmers to decide where to sell their sugarcane. For example problems faced by out grower farmers of Nzoia sugar factory, whose cane overstayed in the farms for five years could not have occurred if they had a free choice of where to take their sugarcane. This is a very important aspect of West Kenya sugar factory that should be adopted when planning for other facilities of the same kind. What it also suggests is that there is a mutual understanding between farmers and the factory based on the knowledge that the farmers need the factory for the sell of their sugarcane, and the factory needs the farmers sugarcane. It is therefore important to cultivate good relationship for proper functioning and management of such a factory.

Another issue that has been revealed from the field survey is that the establishment of such a factory does not need enormous investment in terms of infrastructure. The existing infrastructural facilities in sugarcane growing areas is adequate to facilitate the establishment of small scale sugar factories. For example West Kenya sugar factory has had very little or no impact on the basic infrastructure in the area where it is established. It therefore

implies that small scale sugar factories can fit in the already existing infrastructural facilities already established by the Government in most of the sugarcane growing areas. It also can be argued that if Jaggery Factories have been operating in these areas since the sixties there should not be any problem with small scale sugar factories, which are basically improvements of the Jaggery Factories. It is in this spirit coupled with the low cost of converting Jaggery factories into small scale white sugar factories that the District Development Committee of Kakamega has recommended for the conversion of Jaggery plants into small scale white sugar factories.

The issue of food shortage in sugar schemes is slightly different when one compares areas serving large scale factories and those serving small scale factories. It has been revealed from this study that for small scale factories farmers have not devoted all their land to the planting of sugarcane. This means that the land is divided among the various crops including the most important food crop (maize). This is a fundamental issue to be considered in planning for small scale agro-based industries in that farmers do not practice mono-culture but rather besides industrial crops they also grow food crops.

From the above features of West Kenya sugar factory, a justification for small scale sugar

factories can be made. First where sugarcane is in repeated surplus and existing capacity of large factories is unable to cope, there is a case for allowing small scale factories to operate. In other words small scale factories should complement large scale factories toward the national goal of self sufficiency in sugar production. Secondly it is possible that due to increasing rate of subdivisions, land available for sugarcane production is bound to be inadequate to supply large processing plants, but that small quantities of sugarcane may be usefully grown for small scale factories therefore a case for small scale factories.

Following the success of West Kenya sugar factory, other factories of the same scale and technology, are under implementation in Kakamega District. These are, Kamulamba sugar factory, which is a cooperate effort of farmers and the other one is Shikalame sugar factory being but up in Butsotso.

5.1.2 Recommendations.

From the literature reviewed in this study and the findings, it becomes necessary to emphasize recommendations given by various scholars and give additional recommendations that are implicated by the study findings. There have been various arguments in favour of small scale industries particularly the ability and efficiency to operate and manage the industries and the adoption of labour intensive technologies that are used.

From this study and other related studies, the following recommendations could help in enhancing rural agro-based industries and particularly small scale factories:

1. Due to the high cost of establishing large scale factories and also because of increasing costs in providing infrastructural facilities, local entrepreneurs should be encouraged to establish small scale factories because they are deemed viable in supplementing the already existing factories.

2. For efficient marketing of sugarcane, farmers could form cooperatives to facilitate the marketing of their produce. From the field survey it was found out that no farmers had formed cooperatives for the purpose of marketing their crop. Also through cooperative efforts

- small scale factories can be established.
3. Due to the encouragement and extension services given to farmers in Kabras and the neighbouring divisions to plant sugarcane, there is need to establish more small scale factories to meet the demands of the small scale farmers. This could be achieved by the planning of Kamulamba and Shikalame sugar factories both in Kakamega district.
 4. To be able to avoid the problem of food shortages and other related problems in sugarcane growing areas, programmes such as food production, nutrition education and possibly new sanitation technologies, cooking technologies and other important elements of the whole package of appropriate technology could be provided for the same regions.
 5. Since it has been found out that small scale factories offer better opportunities for employment, and have advantage over large scale factories, the prime objective of policies aimed at developing small scale sugar industries should be , creation of rural employment, with additional benefits such as mobilization of private capital and minimal requirements for public sector investment.
 6. To encourage the development of open pan

technology as a sugar production technology, the Government could give investors the following concessions and financial incentives;

(a) Exemption from import duties on equipment. This measure is already in operation for rural industries importing up to Ksh 10 million of equipment. This could be extended to rural industries importing up to Ksh 20 million worth of equipment. If this is done it could result in a significant reduction in the capital cost per tonne of sugar for open pan plants.

(b) Exemption from excise duty on sugar produced by small scale mills. This would substantially raise returns to entrepreneurs.

7. Possibilities should be explored for establishing local sugar engineering industries, which would cater for the small scale sugar production plants.

8. For the establishment of agro-based industries, there is need for through surveys of the resources of the rural area, to determine, which agro-based industries can be sustained by the hinterland. This is important to ensure constant supply of raw materials and a void unnecessary closures related to shortage of raw materials.

9. The Government should encourage private sector

involvement in the establishment of agro-based industries by giving special incentives to investors. This is because private entrepreneurs prime motive is to run profitably and hence there is unlikelihood of mismanagement of industries run by the private sector.

10. Possibilities of establishing industries, which can utilize the by-products of sugar industries should be explored. This also will contribute to rural development in terms of generation of employment opportunities. Studies have shown that molasses, which is a by-product of sugarcane can be exported and also sold locally as animal feed mix and a feed stock for making either portable or power alcohol, which can be used in pharmaceutical industry as methylated spirit, in toiletry preparation and by the printing industry. This then would form forward linkages of the sugar industries.

11. High sugarcane transportation costs reduce farmers returns to sugarcane. Alternative modes of cane transportation should be tried. For small scale factories in particular the use of animal drawn carts could be considered, particularly for those farmers living within 5 to 10 kilometres radius of the factory.

12. To be able to deal with farmers problems in

Kabras, a committee composed of the top factory officials and a representative of the farmers should be formed to look into the welfare of farmers. It also should oversee the activities of the field officers and where necessary manage the issuing of permits. This will ensure efficient communication between the farmers and the factory.

5.1.3 Conclusion

This study had a broad objective of examining the role of rural agro-based industries in rural development. Using the example of West Kenya Sugar Factory it has been revealed that the major role played by rural industries in rural development is the generation of employment opportunities. They also offer a source of cash income to farmers who supply the raw material needed in the industries. They also contribute to the raising of agricultural productivity of the particular crops they process through extension services. For West Kenya Sugar Factory, it has induced development in the area and particular households that supply their cane to the factory. The development in this area can be associated both with the sugar processing and sugarcane farming as an activity. To a larger extent the magnitude and pace of the development is dependent on what happens in the

agricultural sector. Nevertheless both the factory and the farmers need each other for further development of the area. Though the factory is geared to the needs of small holder farmers it also caters for large scale farmers within the area. Focusing on specific objectives set for the study, it was revealed that;

1. The factory was attracted to the area because of the potential for sugarcane farming and the willingness of the farmers to grow sugarcane.
2. The choice of technology was in line with the objectives of rural development. The technology is labour intensive and therefore suitable to the rural environment.
3. The factory has had an impact on employment, household incomes, agriculture, standards of living and on trade and commerce in the area.

In general it can be concluded that the factory has had a positive role to play in rural development based on the findings of this study. The future development of rural agro-based industries will be closely linked to the agricultural economy of the areas in which they would be established.

This study has not exhausted the subject under study. The following have been identified as area of further research

1. A much more broader scope should be adopted to determine the role played by agro-based

industries. The scope should include the various agro-based industries depending on the potentials resource base of various area.

2. Studies should be done to determine the range of both negative and positive externalities of small scale agro-based industries particularly as they contribute to rural development.
3. Studies should be done to establish the number of jobs that most of the industrial crops can produce at the farm level.

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Appendix 1

UNIVERSITY OF NAIROBI
DEPARTMENT OF URBAN AND REGIONAL PLANNING

HOUSEHOLD QUESTIONNAIRE

1. Questionnaire Number-----
Date of Survey-----
Name of respondent-----
Sublocation-----
2. Household characteristics

NAME	RELATIO N TO H/H HEAD	SEX	AGE	EDUC	OCCU P	MARITA L STATUS

3. When did you start growing sugarcane?-----

4. What is the farm size under the following crops?
Crop Acres/hectares Yields Q marketed Q consumed
 Sugarcane
 Maize
 Beans
 Other crops

5. What reasons made you to start growing sugarcane?
1. Government advice
 2. For Jaggery Factories
 3. More profitable than other crop
 4. My land is only suitable for sugarcane
 5. Other reasons

6. How many harvests have you had since you started growing sugarcane

Harvest Yield Place sold

- 1.
- 2.
- 3.
- 4.

7. Before you started growing sugarcane what crops were you growing?

Crops Acreage

8. What types of livestock were you rearing before you started sugarcane farming?

Livestock No Acreage under pasture Q of milk Qsold

Grade cattle

Indigenous

Goats

others

9. What type of livestock do you rear now?

Livestock No Acreage under pasture Q of milk Qsold

Grade cattle

Indigenous

Sheep

Goats

others

10. Would you your opinion say you had mor food before you started sugarcane farming than now? give reasons-----

11. What are your sources of food now?

Farm-----

Purchase-----

Borrowing-----

Others-----

12. Approximately how much income were you getting per month before you started sugarcane farming?-----

13. Approximately how much income do you get per month now?-----

14. What are your other sources of income apart from sugarcane farming?-----

15. Would you in your opinion say that your standard of living has improved since you started sugarcane farming? Give reasons-----

16. What are your expenditure patterns(monthly) in order of importance?

<u>Item</u>	<u>Amount Ksh</u>
Food	
Clothing	
Education	
Travelling	
Health	
Recreation/ Entertainment	
Relatives	
Miscellaneous	

17. Did you deliver sugarcane to West Kenya Sugar Factory last year (1990) Yes/No

If yes how much money did you get and how did you spend it?

Total amount-----

<u>Category</u>	<u>Expenditure</u>			
	<u>None</u>	<u>Ksh 1--500</u>	<u>500--1000</u>	<u>1000+</u>
Food				
Clothing				
Improved House				
Buying Land				
Farm improvement				
Livestock				
Paying Bride wealth				
Repaying debts				
Rituals/Funeral				
Gifts to relatives				
Consumer goods: bed, bicycle, radio etc				
Saved				

18. Type of main structure of dwelling occupied by household.

- a. Permanent (stone, bricks, corrugated iron sheets)
- b. Semi permanent (mud walls and corrugated iron sheets)
- c. Temporary

19. What has sugarcane farming helped you to do?-----

20. What development do you think are associated with sugarcane farming and West Kenya Sugar Factory in this area?-----

21. Reaction of sugarcane farmers to different statements

Statement Agree Disagree No answer

- a)The sugarcane needs my cane.
- b) The factory pays a higher price for my cane.
- c) I can make more money from farming because the sugar factory is near.
- d)The sugar Factory has improved my life.
- e)I could make a higher profit on another cash crop than sugarcane.

22. Was your life better before the coming of the factory than it is now? Explain-----

23. What problems do you have with the Sugar Factory?-----

24. What is the difference between selling sugarcane to the Jaggery Factories and selling it to West Kenya Sugar Factory?-----

25. What are the advantages of West Kenya Sugar Factory compared to the other large Sugar Factories found in Bungoma and Kakamega Disticts?-----

26. Are you a member of a sugar growers cooperative?
Yes/No

If yes

a) Which one-----

b) What benefits do you get from the cooperative?

Advice----

Credit facilities-----

Transport-----

Easy procurement of inputs-----

Makes arrangement with the Factory

to supply sugarcane -----

27. What problems do you experience with the cooperative?-----

28. Where and how far do you go for the following?

Facility

Place

Distance

- a) Shopping
- b) Nursery School
- c) Primary School

- d) Secondary School
- e) Recreation/Entertainment
- f) Health Centre
- g) Hospital
- h) Farm inputs
- i) Market place
- j) Credit facilities
- k) Matatu/Bus stage
- l) Post office
- m) Clean source of water

29. Since you started growing sugarcane what have been your major problems?

- Lack of credit-----
- Low profits-----
- Labour shortage-----
- Non availability of inputs-----
- High prices of inputs-----
- High cost of production-----
- Pests and diseases-----
- Management-----
- Transport-----
- Others-----

BUSINESS QUESTIONNAIRE

1. When did you start your business?-----

2. What attracted you into business?-----

3. What changes have you noted in your business since the factory was started?-----

4. a) What is your monthly income from this business?-----

b) How do you compare your income before and after the establishment of the factory? -----

5. What improvements have you had in your business since the factory started? -----

6. What business problems do you face now? -----

7. What new commodities have you started selling since the coming of the factory?-----

8. Where do buy most of your stock?-----

9. What advantages do you have in locating your business here? -----

10. Where do most of your customers come from? -----

ELDERS QUESTIONNAIRE

1. Give a short history of how and when this factory started in this area -----

2. What in your opinion are the advantages of having such a factory in this area? -----

3. What changes have you seen taking place since the establishment of the factory ?. -----

4. What problems were being experienced before the factory started? -----

5. What problems are there now since the factory started? -----

6. Do you think this was the right place for the factory? Give reasons -----

COUNTY COUNCIL OFFICIALS QUESTIONNAIRE

1. What in your opinion is the contribution of West Kenya Sugar Factory in the development of the area? --

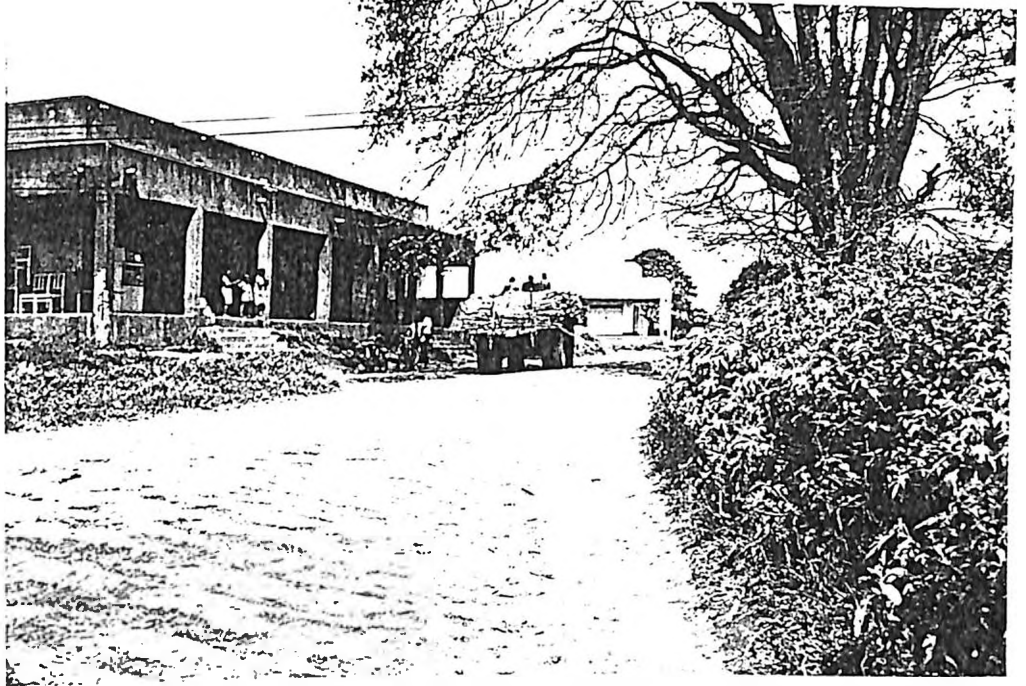
2. What benefits and growth effects has the factory had on the centres around it ? -----

3. Have your revenues improved due to the establishment of the factory ? -----

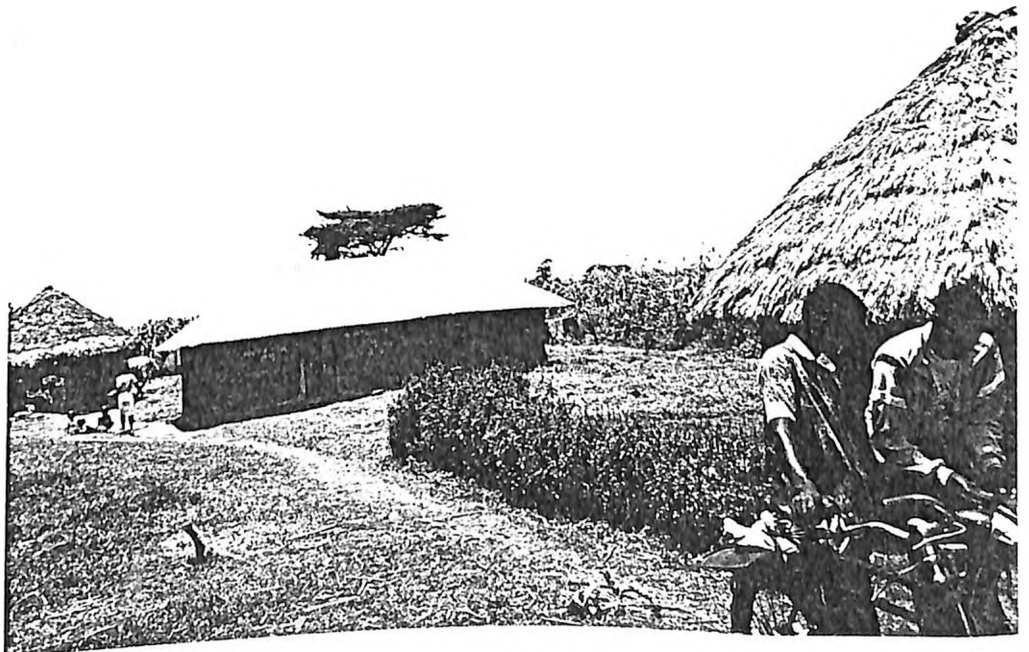
4. What planning problems have you experienced in the area due to sugarcane farming and the establishment of the factory? -----

5. Do you think trade has improved in the area due to the establishment of the factory? Explain-----

APPENDIX 2



A tractor transporting sugarcane to West Kenya sugar Factory



Most farmers have built semi permanent houses from sugarcane income



sugarcane farms near West Kenya Sugar factory



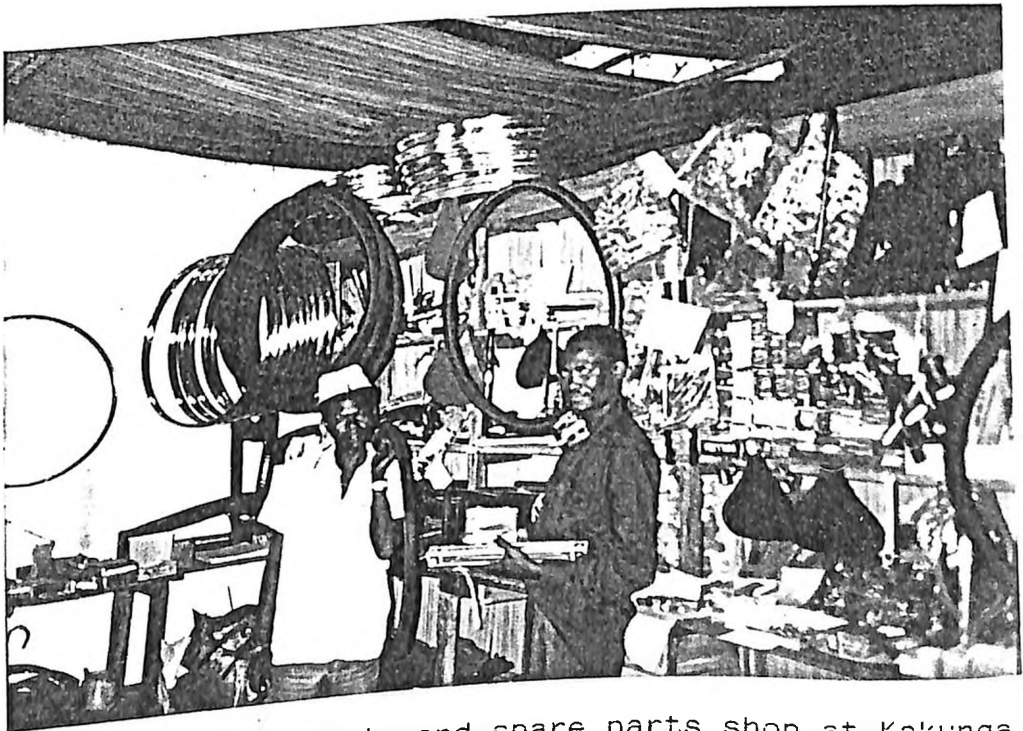
Lubao Market Centre on a Sunday



Kakunga Market Centre



Wool weaving cottage industry at Kakunga Market Centre



Bicycle repair and spare parts shop at Kakunga



Small farming family which supplies cane to West Kenya Sugar.



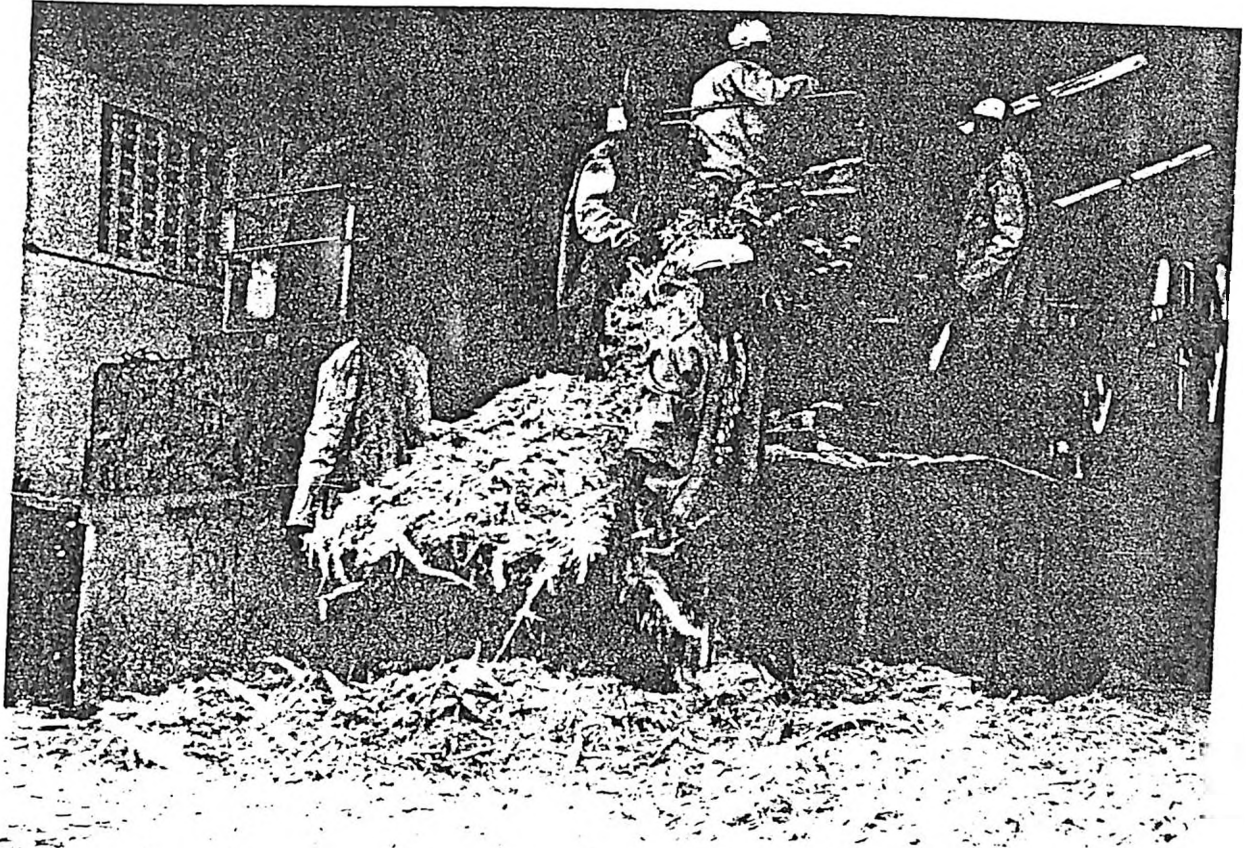
Mature sugar cane.



The factory's juice settling and filtration plant.



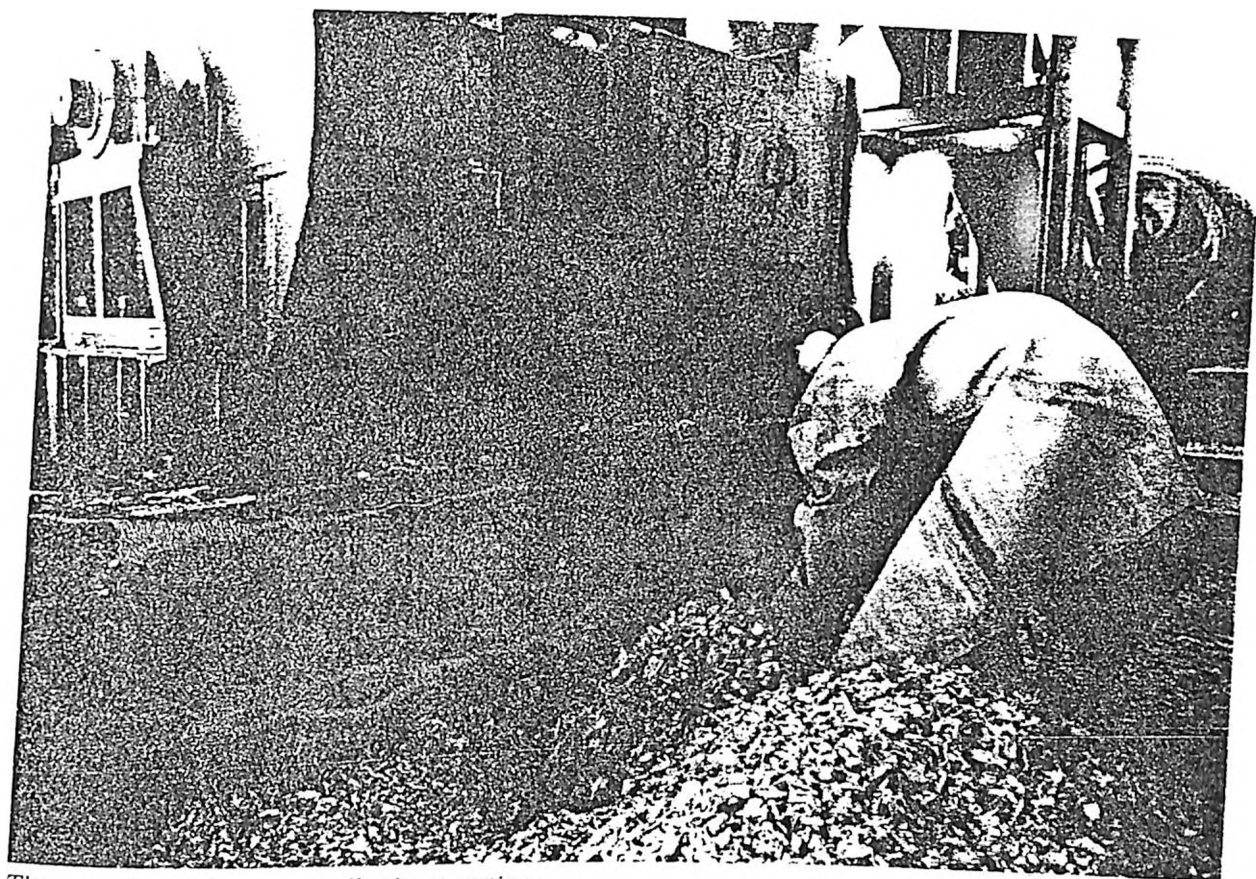
Up to 15 tonnes of sugar are bagged per day at WKS.



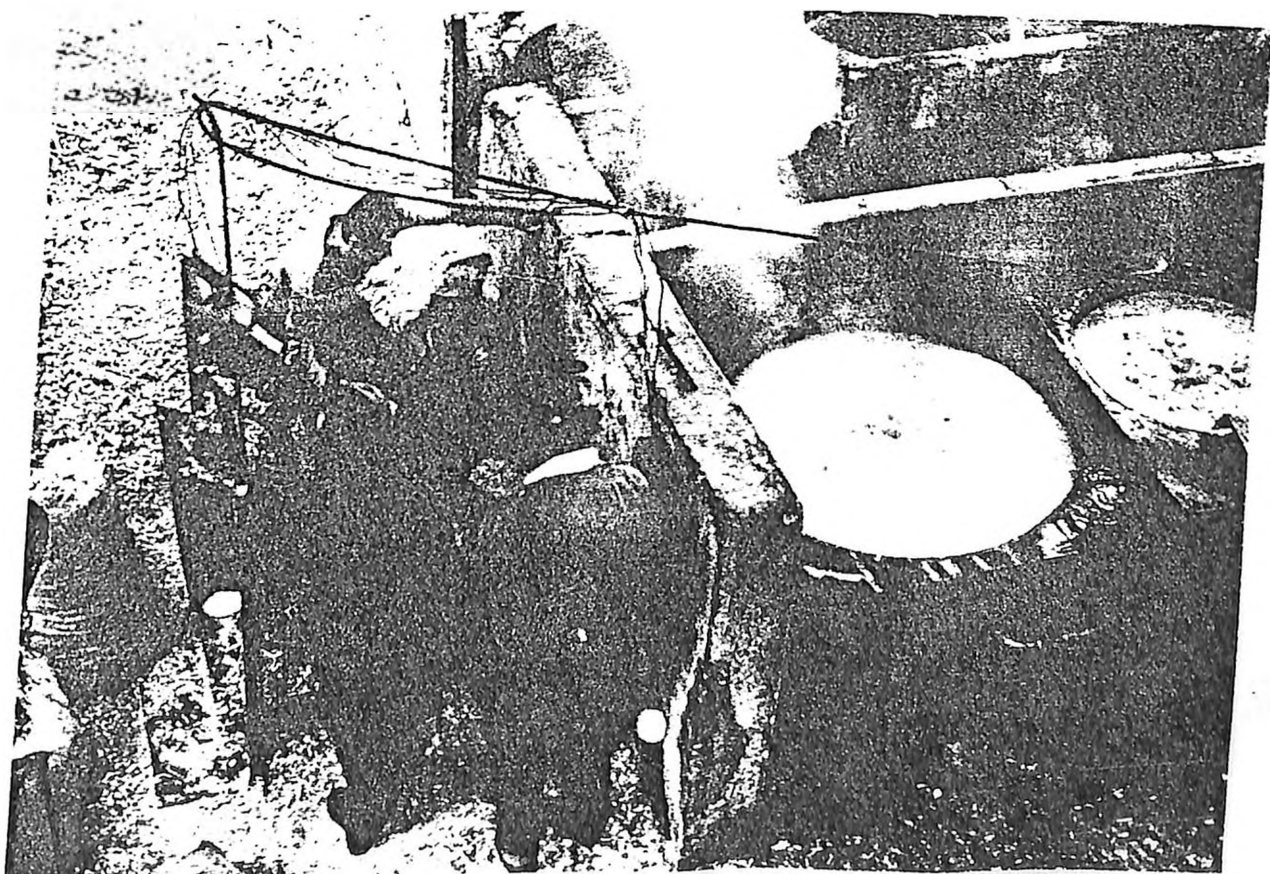
Small-scale sugar processing technology creates significant numbers of jobs.



The cane crushing unit at WKS.



The experimental cane expeller in operation.



Tests being carried out on furnace development.