

## VITA

Dr. George Kinoti Kingorihah was born in 1945 at Nkomo, Tigania, Meru - Kenya. He received his early education from Uringu Primary School and Kanjalu Intermediate School. He then proceeded to Meru School and Thika High School for secondary and high school education, respectively. After this he obtained his Bachelor of Arts degree in Land Economics from the University of Nairobi in 1971.

After graduation, Dr. Kingorihah worked with Kenya's Department of Lands between 1971-1974 as a Valuation Officer, during which time he grew up to be Valuer in Charge of Central and Eastern Provinces. At this time he was appointed by the Minister of Local Government as a Rating Valuer for all local authorities in these two provinces. During this period he became a member of the Institution of Surveyors of Kenya, Valuer's Chapter (1973) and the Secretary of the Institution.

In 1975 he joined Nairobi University's Department of Land Development as a Lecturer in Land Economics. Between 1977 and 1980 he also taught and studied Land Economics, Economics and Economics Geography as a Graduate Assistant and University Fellow in Indiana State University. He came back to Kenya in 1980 after obtaining his Master of Science degree in Economics (1978) and a Doctor of Philosophy in Economic Geography (1980).

In 1983 he became Senior Lecturer in Land Economics. Shortly thereafter he was appointed the Chairman of the Department of Land Development. Currently he is the Dean of the Faculty of Architecture, Design and Development.

"INTRODUCTION TO LAND ECONOMICS"

GEORGE K. KINGORIAH

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TO MY MOTHER ✓

## PREFACE

Land Economics is a relatively new discipline of study in social sciences as compared to Economics, Geography and other similar disciplines. Serious study of Land Economics as an independent subject did not start until about a half a century ago, because the traditional classical and neo-classical economists were too much preoccupied with value theories. Space and its effect on economic variables and factors of production was given scant consideration - and only as an adjunct to the study of economic theory in general. Even to the present day many people - academics, laymen and professionals - are largely ignorant of the subject matter of land economics. This is confirmed by the number of questions any trained land economist has to answer in connection with his professional and academic capabilities. In short, the study involves the application of economic theory in the examination of what affects the supply and demand for land, and its market. In a wider sense it involves even the understanding of space and those factors that influence the location of economic activities over space. It also examines the implications of this spatial distribution of economic activities from many dimensions. Knowledge in this study acts as a useful aid in making many important decisions concerned with the allocation and distribution of the scarce resource - land.

One cannot overemphasize the importance of the resource land to Kenya and other East African countries; and the need for the allocation and distribution of this resource rationally and (as much as practicable) equitably. Important decisions need to be made (and are made) at all governmental levels; and at individual levels in relation to land resource allocation and distribution. A whole discipline of study - Land Law - deals with the legal implications of these decisions and entire government departments have been set aside to make these decisions.

In recognition of this the University of Nairobi has appropriately designed a full degree course in Land Economics, which has been running since 1967. A number of other University academic disciplines, and various postgraduate programmes are concerned with the study of various aspects of the resource land. Therefore, it is not only land economists or valuers who need to understand the economic principles governing the use of this resource. Geographers, Economists, Civil Engineers, Architects, Lawyers, Sociologists, and a whole range of other professionals seek to understand these principles; and therefore need to know them - albeit in an elementary way - as aids to their respective practices.

In the last twelve years I have been teaching this subject, and giving it a serious appraisal in terms of how best to make it easily understandable in the interest of national development. I have read numerous textbooks with this view in mind. As I taught the subject using these numerous textbooks, my students and my colleagues all over these years have asked me scathing questions based on what I have tried to put across using paradigms derived from these textbooks. These paradigms have been scattered all over the textbooks written by professionals of varying training backgrounds and disciplines; and have been difficult to obtain for use by an ordinary undergraduate. Consequently, I have come to a conclusion that a serious attempt is required - to synthesize the data in this wide field of study; and to reduce it into a simplified outline that would, at first reading, give the reader a clear idea of the relationships between the various topics that make up the subject matter of Land Economics.

Most of the textbooks available on this subject seem inadequate for this purpose. They are first of all too complicated, and therefore incomprehensible by the people who need to understand them most. Such people are found mainly in the medium and senior cadres of government and local authority executives who make most land use decisions. Secondly the texts are usually too generalized, and at times, out of focus in their

approaches to the subject matter. This is because studies in this field fall under various disciplines like Geography, Sociology, Economics, Regional Economics, Agricultural Economics, Land Use, Town Planning, etc. Any book on these and many other subjects touching land economics does so in passing and cannot give a novice in the subject Land Economics the clear view he requires.

This text aims at trying to fill the existing need for an elementary textbook. It cannot cover all the requirements of a Baccalaureate degree in Land Economics but it will be useful for conducting one of the key courses in this degree - Land Economics - which I have been teaching for a long time. In addition, Town Planners, Land Use Analysts, Land Surveyors, Geographers, Sociologists, Regional Economists, Agricultural Economists, Architects, Engineers, and a variety of other disciplines concerned with land use will find it useful as a concise introduction on Land Economics. It is expected that after reading this book, further reading into Land Economics will not only be possible, but interesting and challenging.

The book comprises Part I, Part II and Part III. Part I deals with the theoretical concepts that influence the supply and demand for land and real estate. It begins with Chapter I that sets the stage for discussion as it differentiates Land Economics from related subjects,

such as Economics, Regional Science and others. Chapter two discusses the general theory of factors of production, and later focusses on land as a factor of production. Chapters Three, Four and Five discuss various theories of investment, rent and land values; and Chapter Six synthesizes these and discusses the equilibrium concepts and land values. A related subject to this micro-view called "Housing Market" is discussed in Chapter Seven.

Part II which forms Chapters Eight, Nine and Ten discusses the broad economic factors that influence demand and supply of land in a region or a town. These fall in the broad study area of Regional Economics; because land values are affected by economic activities and investment expectations in a region; and the region is, in addition, subject to the broad economic forces in a nation or a group of Nations. Issues like regions, regional delimitation, location of economic activities, location of industry, urban structure and form are discussed here in detail.

Part III, forming Chapters Eleven, Twelve and Thirteen discusses the applications of the theory of Land Economics by various as planners, valuers, economists, etc., and later they discuss the relevance of Land Economics to the East African economic landscape. Issues of Land Use and Regional Spatial Organization are highlighted. The text then goes on to discuss some issues



related to economic growth and development within the context of Land and Regional Economics.

All this should make very interesting reading to both the land economics practitioner, the persons trained within allied disciplines, and enlightened citizens who may need to know something about what makes land values "tick". The textbook is designed for a one year course for Universities that have annual course structures; and for two semesters for those that are run on a semester basis. I welcome comments and criticisms from all readers in this first edition: which I hope to use for improving on subsequent editions. I wish all readers a happy time through the text.

George K. Kingoriah

Nairobi University

April, 1987.

## ACKNOWLEDGEMENTS

When I joined Nairobi University as a lecturer in 1975 I was made to teach the subject Land Economics to the final year class of undergraduates taking B.A. degrees in Land Economics. This was not because I was the best teacher in this subject, but because there was nobody else to teach it at that time. I assembled my teaching notes in a great hurry and began teaching straight away. As I taught the subject through the unusually short academic year of 1975 I was asked scathing questions by my curious students and was forced to do much more research on the subject Land Economics. To these students (Class of 1975) and to my subsequent students, both here and elsewhere, I owe much in the form of questions and criticism to my notes and diagrams. Without these enquiring students this text may not have been compiled.

Similarly, I owe much to Nairobi University for affording me a quiet academic environment in which I could compile this work; and to my children, Gakii and Kithinji for making those disturbing (but welcome) noises to me as a parent while I was compiling the work.

I am deeply indebted to Dr. Paul M. Syagga and W.H.A. Olima for using my manuscript to teach Land Economics; thus giving it an independent trial in the classroom environment. I cannot escape expressing

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George K. Kingoriah.

# C O N T E N T S

	Page
PREFACE .....	(iv)
ACKNOWLEDGEMENTS .....	(x)
LIST OF ILLUSTRATIONS .....	(xvi)
LIST OF TABLES .....	(xxiii)

## PART I: INVESTMENT THEORY AND ITS APPLICATION TO LAND

### Chapter

ONE: URBAN REGIONAL ECONOMICS AND LAND ECONOMICS .....	1
Economics: Subject and Methodology .....	1
Resources and Resource Allocation .....	6
Land Economics .....	8
Regional Science .....	10
Scope of the Text .....	11
TWO: LAND AS A FACTOR OF PRODUCTION .....	16
General Characteristics of Factors of Production .....	16
Theory of the Firm .....	17
Demand For Factors of Production .....	44
Supply For Factors of Production .....	63
THREE: THEORY OF RENT .....	77
Introduction .....	77
Ricardian Theory of Rent .....	79
Differential Rents, Transfer Earnings and Quasi Rents .....	109

Chapter

FOUR:	LOCATION, LAND RENTS AND LAND VALUES .....	119
	Introduction .....	
	The Von Thunen Model of Land Rent .....	
	Modifications of the Von Thunen Model .....	
	Empirical Examination of the Von Thunen Model.	
	"Von Thunen Meets Ricardo".....	
FIVE:	THE ECONOMY, LAND VALUES AND INVESTMENT .....	166
	The Economy and Land Values .....	
	The Process of Investment .....	
	Investment and Cash Flow .....	
	Equilibrium For Investment in an Economy .....	
	Rent Theory and Investment Theory .....	
SIX:	OPERATION OF THE PROPERTY MARKET .....	2
	Financial Markets and Investment in	
	Real Property .....	2
	Effects of Government Economic Policies	
	on the Property Market .....	2
	Investment In Real Property and	
	Alternative Investment .....	2
	Availability of Land For Investment .....	2
	Equilibrium in Real Property: Fact or Fiction.	25
SEVEN:	THE HOUSING MARKET .....	26
	Introduction .....	26
	Economic Considerations in Housing Production	
	Subsidized Housing .....	28
	Rent Control .....	30

Chapter	Page
PART II: REGIONAL ECONOMICS	
EIGHT: ORGANIZATION OF REGIONAL SPACE AND REGIONAL GROWTH .....	315
Introduction .....	315
Regions and Regional Delimitation .....	319
Location of Regional Economic Activities ....	334
Central Places and Regional Growth .....	375
NINE: DISTRIBUTION OF ECONOMIC ACTIVITIES OVER THE URBAN SPACE .....	399
Introduction .....	399
Nature of Land Use in Urban Areas .....	402
Location of Retail Centres in Urban Areas ...	429
Residential Location in Urban Areas .....	439
Location of Public Service Facilities .....	446
TEN: LOCATION OF INDUSTRY .....	461
Survey of Industrial Location Theory .....	461
Industrial Orientation and Localization .....	487
Industrial Cost Structure .....	499
Industrial Location and Regional Growth .....	512
PART III: APPLICATIONS OF LAND ECONOMICS	
ELEVEN ORGANIZATION OF EAST AFRICAN REGIONAL SPACE .....	522
Introduction .....	522
Colonial Spatial Systems .....	527
Evolution of the Kenyan Spatial System .....	533

Chapter	Page
The Evolution of Ugandan Spatial System .....	549
Evolution of the Tanzanian Spatial System .....	556
→ Appraisal of East African Regional Development Policies .....	565
 TWELVE: LAND USE IN EAST AFRICA .....	 581
Introduction .....	581
Rural Land Use .....	583
land Use in Urban Areas .....	612
 THIRTEEN: LAND ECONOMICS, LAND VALUES AND LAND USE .....	 643
General Real Estate Appraisal .....	643
<u>Urban-Regional Economic Analysis</u> .....	669
Physical Planning and Land Use .....	683
 BIBLIOGRAPHY .....	 698
 INDEX .....	 708

## LIST OF ILLUSTRATIONS

Figure		Page
2-1	Isoquants and Isocosts .....	19
2-2	An Illustration of the Concepts of "Budget Lines" .....	24
2-3	Equilibrium of a Product as Derived Using Isocosts and Isoquants .....	26
2-4	An Illustration of a Scale Line .....	27
2-5	Showing Alternative Production Technologies Using Isocosts, Isoquants and Scale Lines .....	29
2-6	Derivation of the Total Product Curve from a Family of Isoquants .....	33
2-7	A Labour Production Function: Usually Called a Total Product Curve .....	34
2-8	Relationship between Average Costs and Marginal Costs .....	37
2-9	Relationship between Total Product Curve, Marginal Product Curve and Average Product Curve .....	39
2-10	A Directional and Conceptual Relationship between the Product Curves and Cost Curves .....	41
2-11	The Cost and Revenue Curves of a profit Maximizing Firm .....	43
2-12	The Supply Curve for Labour .....	68
2-13	The Equilibrium of a Factor Producing Firm which is not a Monopsonist .....	73



Figure		Page
3-1	Ricardian Model of Rent .....	84
3-2	Extensive Margin of Cultivation .....	91
3-3	Extensive Margin of Cultivation When Rent is Payable .....	97
3-4	Intensive and Extensive Margins of Cultivation .....	99
3-5	Scarcity Rent for Land and that of Other Factors of productions .....	108
4-1	A Rent Bid Function for One Crop only .....	127
4-2	A Rent Bid Function for Two Crops .....	130
4-3	A Three Dimensional View of Rent Bid Functions Around a Market Centre .....	133
4-4	A Composite Rent Bid Function and a Plan of Concentric Land Use Zones Around a Market Centre .....	136
4-5	Von Thunen's Rings of Concentric Land Uses Around a Market Centre .....	138
4-6	Von Thunen's Rings as Distorted by a Cheap Mode of Transport .....	142
4-7	The Effect of Cheap Transportation in One Direction, on Rent Bid Functions .....	144
4-8	The Effect of Reduced Fertility on the Width of Land Use Rings and the Gradients of Rent Bid Functions.....	147

Figure		Page
4-9	A Pocket of Infertility and Its Effect on Land Use Rings and Rent Bid Functions .....	148
4-10	Effect of a Subsidiary Trading Centre on Land Use Rings .....	150
4-11	Iso-Rent Lines Around the Eastern Megalopolis of U.S.A.....	157
5-1	The Marginal Efficiency of Capital Function .....	183
5-2	The Average Factor Cost Function .....	190
5-3	Equilibrium in the Capital Market .....	192
5-4	Aggregate Equilibrium in the Investment Market .....	194
5-5	A Simplified Hypothetical Illustration of How the Ricardian Model Would Function Within a Von Thunen Land Use Framework.....	203
6-1	A Profit Maximizing Model for an Investor with Two Alternative Kinds of Investment .....	234
6-2	A Profit Maximizing Model for an Investor with Two Alternative Kinds of Investment Showing Choice Between Land Intensive and Other Investment Intensive Technologies .....	236
6-3	A Model of Economic Life of Buildings and Capital Infrastructure .....	255

Figure		Page
7-1	A Simplified Isocost-Isoquant Surface for Housing Commodity, with Two Factor Combination; Land and Structure .....	273
7-2	A Simplified Isoquant-Isocost Surface for the Housing Commodity Showing the Scale Line Resulting from Increasingly Cheaper land .....	276
7-3	An Implicit Demand and Supply Model for the Housing Commodity .....	280
7-4	An Isocost-Isoquant Model Showing the Amounts of Housing Produced as Owned Housing Becomes Cheaper than Rental Housing .....	292
7-5	A Supply and Demand Model Showing the Expected Market Conditions, and those Conditions that Prevail under Subsidized Housing .....	296
7-6	A Rent Control Model .....	310
8-1	Spatial Organization of Land Uses Within an Urbanized Area: Boswell, Indiana .....	330
8-2	Boundaries and Market Areas of Goods and Services Produced in a Small Rural Centre - Boswell, Indiana .....	332
8-3	A Simple Linear Model of Evenly Spaced Consumers .....	337
8-4	Range and Threshold of a Good .....	339

Figure	Page
8-5	Demarcation of Trade Areas of All Orders of Goods ..... 342
8-6	Development of Hexagonal Trade Areas Over a Uni-tropic Space ..... 349
8-7	A Theoretical Arrangement of Orders of Central Places and Their Hinterlands ..... 352
8-8	The Nine Smallest Hexagonal Territories in a Loschian K. System ..... 354
8-9	The Three Main Nesting Principles According to Walter Christaller ..... 355
8-10	Actual Spacing of Central Places in Southern Germany During Christaller's Time .... 357
8-11	Distribution of Settlements in the Loschian Landscape ..... 361
8-12	A Spatial Arrangement of Urban Tributary Areas as Affected by High Order Central Places and Transportation Routes ..... 369
8-13	A Classification of Retail and Wholesale Activities in Hierarchical Order ..... 371
8-14	Spatial Distribution of Trading Centres in Upper Mid-West U.S.A. .... 372
8-15	Trade Centres in South-Western Wisconsin ..... 374
8-16	A Regional Growth Model Showing the Effect of Changes in Export Demand on Changes in Wages and Price Levels in a region ..... 386

Figure		Page
9-1	Functional Structure of Nairobi's C.B.D.....	409
9-2	The Concentric Zone Model of Urban Land Use Pattern .....	417
9-3	A More Realistic Land Use Pattern in the Axial Development Hypothesis .....	418
9-4	The Radial Sector Model of Urban Land Use Pattern .....	422
9-5	The Multiple-Nuclei Model of Urban Land Use Pattern .....	424
9-6	Land Value Gradients and Land Use Relationships Where Boundaries of Trade Areas Meet .....	432
9-7	Internal Arrangement of Land Values in Topeka, Kansas .....	438
9-8	Interaction of Equity and Efficiency Curves .....	451
10-1	The Location Triangle .....	465
10-2	Weber's Isodapanes and Location Triangle .....	468
10-3	Weber's Illustration of Agglomeration .....	472
10-4	Tord Palander's "Threshold Areas".....	474
10-5	What Happens When (Industrial) Location Change is Considered .....	494
10-6	Hoover's Conception of Variation of Transport Costs with Distance Among Different Modes of Transport .....	506

Figure		Page
10-7	How Agglomeration Economies Operate .....	511
11-1	.A Model of the Development of Colonial Spatial and Transportation Systems in the Less Developed Countries .....	531
11-2	Kenya's Colonial Spatial System .....	540
11-3	Uganda's Colonial Spatial System and Levels of Economic Development During the Early 1960s .....	553
11-4	Pre-Colonial Trading Routes on the East African Mainland .....	558 .
11-5	Tanzania's Colonial Spatial System .....	564

## LIST OF TABLES

TABLE		Page
2-1	Maize Output Per Plot of Land .....	31
2-2	Total Product, Average Product and Marginal product of labour .....	35
8-1	Grades of Urban Places and Their Corresponding Populations .....	326
8-2	Orders of Central Places and Inter Centre Distances .....	351
8-3	The urban Hierarchy in Southern Germany .....	359
8-4	Central Place Hierarchy and Inter Centre Distances .....	378
8-5	Basic/Non-Basic Ratios for Selected Centres in the United States.....	394
10-1	Percentages of Total Spatially Variable Costs .....	502

PART I  
INVESTMENT THEORY AND  
ITS APPLICATION TO LAND



## CHAPTER ONE

### URBAN REGIONAL ECONOMICS AND LAND ECONOMICS

#### Economics: Subject and Methodology:

Economics has been defined as a social science that examines the nature of resources and the manner in which human beings respond to the necessity of selecting the most optimum method of allocation of such resources.<sup>1</sup> This definition implies that first of all, we explore into what is meant by "social science", "resources" and "optimum method" of resource allocation. Science could be viewed from two complementary viewpoints, none of which is necessarily superior to the other, and none of which is complete by itself without the other. One of these views is "static", and the other "dynamic". From a static point of view science is defined as a system of present interconnected principles, laws, and theories explaining phenomena in the universe and the universe itself. This view takes stock of what exists that is the result of science; and what is studied by people wanting to understand the scope of science. This view takes into consideration everything that has been discovered about natural phenomena of the universe as a result of systematic investigation by man since the beginning of time. It includes all the published material that documents empirical and other experimental studies.

But this alone does not explain the concept of "science". Systematic study, and systematic discipline does not constitute all there is about science. For example, we cannot argue that stamp collecting is a science; since a stamp collector could have an inventory of stamps since the 'Penny Post' in England during the 1840s; and since such a collector has his own system of collecting stamps, classifying stamps, and having an inventory of how many kinds of stamps there are in the world. His stock taking and classification does not amount to scientific investigation. It amounts to taking an inventory; and once he has done this he would run out of his activity. This leads to the next question. Since there exists an inventory of everything that is "Scientific" in the form of written work, would science continue to exist if all research work were stopped? The answer is No. Science left without research of any kind degenerates into dogma - studied as truths, but without further investigation. Absence of experimentation and investigation would render any growth of knowledge and any further studies of the nature of universally accepted facts impossible. In that case, science is viewed as a dynamic activity wherein people are constantly looking for new truths out of the known ones; because all the existing knowledge is not known in its extreme form. There are always phenomena that have never been fully investigated due to the complexity of the universe; and that of the

phenomena themselves as they interact with countless other variables in the universe. Each new discovery always stimulates further inquiry into the nature of the phenomenon discovered; and so the research activity always goes on, perpetuating scientific investigation.

In some branches of science one can measure with great exactitude the amounts of variables involved. He can manipulate the variables in the laboratories, and set up control experiments; and thus his research findings reflect the accuracy pertaining to dealing with tangible variables. The branches of science where **this kind of variable control is possible** are called "Natural Sciences" or "Physical Sciences". In other branches of knowledge this kind of study is not possible due to the existence of too many variables that interact at the same time. These 'sciences' are the so called "Social Sciences". "Natural Sciences" deal with the study of natural phenomena, with perhaps an exception of man's behaviour and activities. Social sciences, on the other hand, attempt to study the social institutions; interactions of human beings, and the behavioral aspects of such interactions - hence the branch of social sciences classified as "behavioral sciences" like psychology. Economics falls within the ambit of behavioral sciences because of its concern with the behaviour of human beings in relation to the scarce resources; and his activity in the allocation of such resources.

In Natural sciences the 'theory' underlying the discipline is generally thought of as being completely 'objective' in substance - i.e. independent of ideology on the part of the scientist, or the political and social structure in which he may work. Natural scientific experiments come out the same no matter who undertakes the experiment, where, or when such experiments are tried; or what political and social environment surrounds the investigator. Although, in principle, this objectivity should apply to economic theorizing as well, economics does not have that exalted status of an objective science as do the natural sciences. This is because economists are probably more prone to using subjective value judgements - in the choice of the problems to be tackled and in conducting experiments - than are natural scientists. This view explained above is espoused by adherents of 'normative economics';<sup>2</sup> whereas the 'positive economics' adherents believe that subjectivity can also be possible in the study of economics.<sup>3</sup>

Because of the multiplicity of variables interacting in the behavioral context of economics it has been necessary for economists to work with only 'models', as opposed to 'experiments'. While the latter can result in the formulation of 'laws' the former can only reveal 'tendencies'. Thus often economists disagree on many results of their models

because they may be capable of seeing the results from a different perspective; depending on which of the many variables that are taken into consideration.<sup>4</sup>

Despite these shortcomings in the study approach and the study context the accepted method of problem investigation in all sciences is held by most researchers to be the 'scientific method of investigation'. This is a universally accepted process of verifying the truth from empirical hypotheses on how certain phenomena which are the subject of any study are affected by the variables, which are themselves phenomena. This 'Scientific method' is commonly credited to Sir Francis Bacon (1561-1626) who set forth its tenets in his work Novum organum (or The New Method). Before his time, answers to questions on phenomena - whether natural or behavioral - had been accepted primarily by unquestioned belief in authority, either based on faith, or conjecture of logic. Bacon expressed the opinion that these methods of problem solving were often wrong. He advocated a process which began with the problem for which a solution or "hypothesis" would be suggested. This hypothesis, assumption, or educated guess then guided the research through observation, analysis, synthesis, and finally, to the conclusion. The conclusion would only come after the hypothesis was thoroughly tested. On the basis of the evidence gathered, the hypothesis would either be rejected or accepted as an answer to the original

question. During this process, the investigator remained objective, and suspended all judgement until all evidence was gathered. In the process data would be recorded carefully, and precisely.<sup>5</sup> In dealing with his models the economist behaves in much the same fashion, but the complexity of his variables prevent him from being as accurate as the natural scientist. This accuracy is also affected by his dealing with only models with certain subjective assumptions.

Resources and Resource Allocation:

Resources are 'agents' or 'factors' of production used in an economy or by a firm to produce and distribute goods and services to the human population. They are conventionally classified as land, labour, and capital; where each of these names is generic, describing a large set of productive services. The category 'land' includes natural resources, properties of soils and water bodies; or simply the ability to contain human activities ..... or to be 'built on'. The term 'labour' summarizes both manual and non-manual labour; and capital refers to the services provided by machinery, buildings, tools, and other productive instruments. In certain cases the distribution between these resources are not clear-cut. For example, a worker may be regarded more as a capital good than a unit of labour when one is thinking in terms of investment in 'human capital' through the process of supplying skilled manpower.<sup>6</sup>

The most significant characteristics of these resources is that they are relatively scarce - i.e. relative to the total flow of goods and services which the human society desires to produce using them. This relative scarcity correspondingly creates a need for their allocation in the process of production so that the result of their combination (or their product) can be as much as possible; and can help satisfy the human needs as fully as possible.<sup>7</sup> This superior degree of satisfaction in the performance of resources in the process of production is the so called 'optimum allocation' of resources.

In the study of optimum allocation of resources economics concerns itself with the studies of the markets for these resources and other commodities that are produced using them. All this is aimed at finding out which level of production or allocation is 'optimum'. This study of markets involves the study of demand and supply of all the commodities produced using these resources; the study of productive enterprises; the study of consumer behaviour; and how all these are affected by variables in the socio-economic environment; like financial and government institutions.

### Land Economics

Although economic theory has a long and respectable ancestry, traditional economic theory has been (until recently in the 1940s and 1950s) largely concerned with questions of value, resource allocation and distribution. Classical economists wrote about the evolutionary sequence of economic activity, and their formal analysis was related predominantly to a static, spaceless world or a 'wonderland of no dimensions' <sup>8</sup> This was because, in an attempt to study the market for commodities it was necessary to make certain assumptions, one of which was a static space. The problem of optimum location of economic activities and population over space was relegated to a trivial position as compared to those questions relating to growth and stability of the national economy and the optimum allocation of resources. <sup>9</sup>

Only recently <sup>10</sup> did the economist begin to take interest in economic activities as located over space, and the optimum location of such activities in relation to that of population. Thus, a new and wide discipline called 'Urban-Regional Economics' came into being. This concerned itself with all the topics studied in economics and many others, but from a spatial context.

→ The discipline examines the forces governing the distribution of economic activities over space; and how the spatial setting and dimensions of these activities affects the behaviour



of enterprises, consumers, and institutions. Like the pure economist, an urban-regional economist uses models and real life data to test his hypotheses on the spatial setting of economic activities.

Land economics is a narrower branch of urban-regional economics, concerning itself with the forces affecting the demand and supply of land as a factor of production - i.e. those forces that influence optimum allocation of the resource land in the production process of consumer goods and services. In this 'subject' or 'discipline' the theory of economics is applied to problems related to the use of land, just as labour economics, public finance, and international trade are studies aiming at showing how economics can explain the causes and consequences of human actions in these fields.<sup>11</sup>

In land economics, the urban-regional economic activities are examined with a view to understanding their effects on land values (prices) and on the distribution of land as a factor of production. The model-building tools of the economist are used to analyse the causes and effects of land values; the land market and those factors that affect them. Land is examined as a resource, and the manner in which humanity responds to the necessity of selecting the most optimum method of its allocation is examined.

A land economist is, in effect, a regional economist specializing in examining the economic forces within the region as they affect the commodity land. He is, indeed, an economist like the labour economist, financial economist, etc., and his tools of analysis are similar.<sup>12</sup>

### Regional Science

An urban-regional economist has a wider scope. His study centres on land economics, but includes an examination of every other economic commodity and factor from a regional context. (An urban area is a special kind of a region). He belongs to a group of social scientific disciplines that have developed recently out of the dis-satisfaction with their mother disciplines' lack of sufficient concentration and attention on activities located over space. In effect, a new discipline which includes urban-regional economics has come into being out of the realization that spatial variables are numerous, complex and multi-dimensional; and require a multi-disciplinary attention if they are to be fully understood. The discipline is best formed in the western world, and has adapted universally accepted tools of study and study methodology - the 'scientific method'. Although objectivity similar to those of natural scientific studies is difficult to attain because of the complexity of the study it is now universally accepted that use of that method

of study gives the best and the most rigorous approach to the understanding of phenomena. Regional scientists comprise such scholars and practitioners as economists, geographers, sociologists, political scientists, anthropologists, lawyers, engineers, architects and physical planners.<sup>13</sup> All these extend their areas of study from their mother disciplines to the spatial distribution of the phenomena of their interest.

#### Scope of the text ,

This book aims at examining Land Economics as a sub-discipline of Urban-Regional Economics, Economics, and Regional Science in general. The text aims at avoiding a narrow approach to the introduction of such a complex subject as land Economics. It aims at making the student aware of the wider reaches of the subject into Regional Economics and regional science. In it, a region is assumed to be any definite space with internal consistency, homogeneity, and whose component parts are contiguous to one another. It can be any unit space ranging from a few acres to the entire sub-continent. As indicated later in chapter eight, the spatial context of any region depends on the subjective definition of it by the people involved in its examination. An urban area is considered as a special type of a region with its own peculiar problems originating from its unique characteristics. Any study of an urban area is therefore regional science;

and in particular regional economics. It is believed that the determination of the value of an individual land plot in an urban area, or the value of a farm is impossible without clear understanding of those factors affecting the unique economics of each urban or rural area. The forces operating within these regions influence the location of activities over space, and therefore the demand for space itself. The availability of space within the area of study constitutes the 'supply' of such space or land for locating these activities. The interaction of demand for land and supply of land determines the 'market' price or land value in any particular area. Thus the understanding of land economics enhances the understanding of the causal factors of land values from either static or a dynamic point of view.

Part one of this text concentrates on the understanding of land as a factor of production. The factors affecting demand and supply of land; and those affecting the remuneration of land as a factor of production are examined. The markets for land as affected by other forces in the economy are considered. This necessitates the consideration of general economic policy and economic regulation machinery like fiscal policy; monetary situation of the economy and the monetary policy; the general level of employment, economic activity; and ordinary economic indicators. These parameters are examined with a view to investigating

the causes of demand and supply of investment in real property (or land) .... i.e. what determines whether or not investors should decide to invest in real property.

After concentrating on land and real property, and their investment criteria it is expected that these alone do not constitute the understanding of the market for land and landed property in any area. The study therefore broadens; and this text goes on to introduce the other causes of the diversities in land values - locational factors. Some attention is paid to the causes of diversity of land values over space that depend on the location of the piece of land under consideration.

For example, the supply of land for specific types of activities will be seen to depend on how much such land is available in specific locations in relation to cities, natural resources, natural features, and other diverse human activities. The demand for land for specific types of development will also depend on whether these activities require being located in specific locations for their optimum operation - besides the general socio-economic circumstances prevalent in the economy at a specific time. The reasons why some investors demand to locate their activities in specific locations, and not in others will therefore be examined in the second part. This view will be reflected in a brief examination of

industrial location, after general considerations of location theory. Lastly, land use in East Africa will be examined at convenient points in both parts, in the context of the existing theory. Analysis of this topic will then follow in greater detail within the last chapters, to emphasize the spatial setting and the environment in which the author works.

#### FOOTNOTES

- 1 Graham Bannock, R.E. Baxter and Ray Rees; A Dictionary of Economics. (London: Penguin, 1971).
- 2 Philip W. Bell and Michael P. Todaro, Economic Theory. (Nairobi: Oxford University Press, 1969); p.1.
- 3 Ibid.
- 4 Ibid., p.2.
- 5 L. Lloyd Haring and John F. Lounsbury; Introduction to Scientific Geographic Research. (Dubuque, Iowa: Wm. C. Brown Company Publishers, 1975), p.2.
- 6 Graham Bannock, et al. A Dictionary of Economics, p.352.
- 7 Ibid.
- 8 Harry W. Richardson; Regional Economics. (New York: Praeger Publishers, Inc., 1969), p.1.
- 9 Ibid.
- 10 J.H. Von Thunen (1826) and a few economists explored this field in the 19th century; but most economists of the time were preoccupied with the theory of value, and the causes of the prices of goods. Only in the last fifty years or so did serious attempts at considering the effect of locational factors on economic activity take place. A fully fledged discipline of Regional Economics and Land Economics did not develop until the 1950s.

11 W. Lean and Brian Goodall; Aspects of Land Economics. (London: The Estates Gazette Limited, 1968); p.2.

12 Ibid.

13 Walter Isard; Introduction to Regional Science. (New York: Prentice Hall Inc., 1971); chapter 1.

## CHAPTER TWO

### LAND AS A FACTOR OF PRODUCTION

#### General characteristics of

#### Factors of Production

#### A Factor of Production

According to Alfred Marshall, a factor of production is anything required for the manufacture of commodities - any means of producing consumer goods and services. Classical and neo-classical economists have, since Adam Smith, recognized the existence of three factors of production: Land, Labour and Capital. In neo-classical times the risk-taker or the entrepreneur has been classified as a production factor, largely because of his skill in the combination of the other factors for optimality in production. In modern terminology, all these factors would be referred to as 'inputs' into the production process wherein consumer goods and services are made.

Land is the most obvious input in, for example, agricultural production, but economists define land as all 'natural resources' (including rainfall and other climatic variables) like soils and mineral resources. Human beings supply labour; and when they get skilled and specialized in managing resource combination they supply entrepreneurial ability. Capital takes the form of implements, plant and machinery, seed, fertilizers, and other materials



which must be used in the process of production.<sup>1</sup>  
When viewed from a productive viewpoint, money (cash) has been regarded as 'liquid capital' because it can be used to purchase other factors of production as and when needed.

Classical economists were interested in the problem of how much the receipts of industry and agriculture went to each of the factors of production. For social and political reasons they felt that it was important if they understood clearly how the relative incomes of various social groups were determined. ~~Later the centre of interest in economic~~  
analysis shifted towards investigation into what determined the prices of factors of production than towards what determined their respective shares of national income. Applied economists, like Land Economists, remain interested in both questions.<sup>2</sup> In this work some exploration is done into the price determination (of the values) of the factor land. However, before this is done, some of the basic principles on the theory of firm require a brief review.

### Theory of the firm

#### Introduction

It is presumed that the readers of this text will have some knowledge of economics, and that some of the concepts introduced here will be familiar to them. However, even those who have not done economics before should not encounter any considerable difficulty.

This is because these concepts are merely introduced with no elaborate or exhaustive details; so that it will be possible to discuss the pricing of land as a factor of production. If there is any doubt the reader is advised to refer to any element of any Micro Economics Textbook.<sup>3</sup>

In figure 2-1 it is assumed that there are two factors of production: X and Y which are being used to produce a certain product (or consumer good) - all other factors required for the production of the same consumer good are held constant for the sake of simplicity. The amounts of factor X are measured along the X axis, and those of Y are measured along the Y axis. In this diagram, the producer can combine the two factors in different ways, and still he can manage to produce 100 units. He may use more of factor X and little of factor Y or vice versa. In this diagram he uses  $Y_1$  of factor Y and  $X_1$  of factor X to produce 100 units of the consumer good. Alternatively, he can use  $Y_2$  of factor Y and  $X_2$  of factor X to produce the same quantity of the consumer good. An isoquant is therefore the locus of all possible combinations of X and Y factors that produce the same quantity of the required good. Another name for an isoquant is an equal product curve.<sup>4</sup>

If the reader is familiar with indifference curves<sup>5</sup> he will no doubt notice that an isoquant in the theory of the firm is similar to an indifference curve. It shows all those combinations of factors that yield a

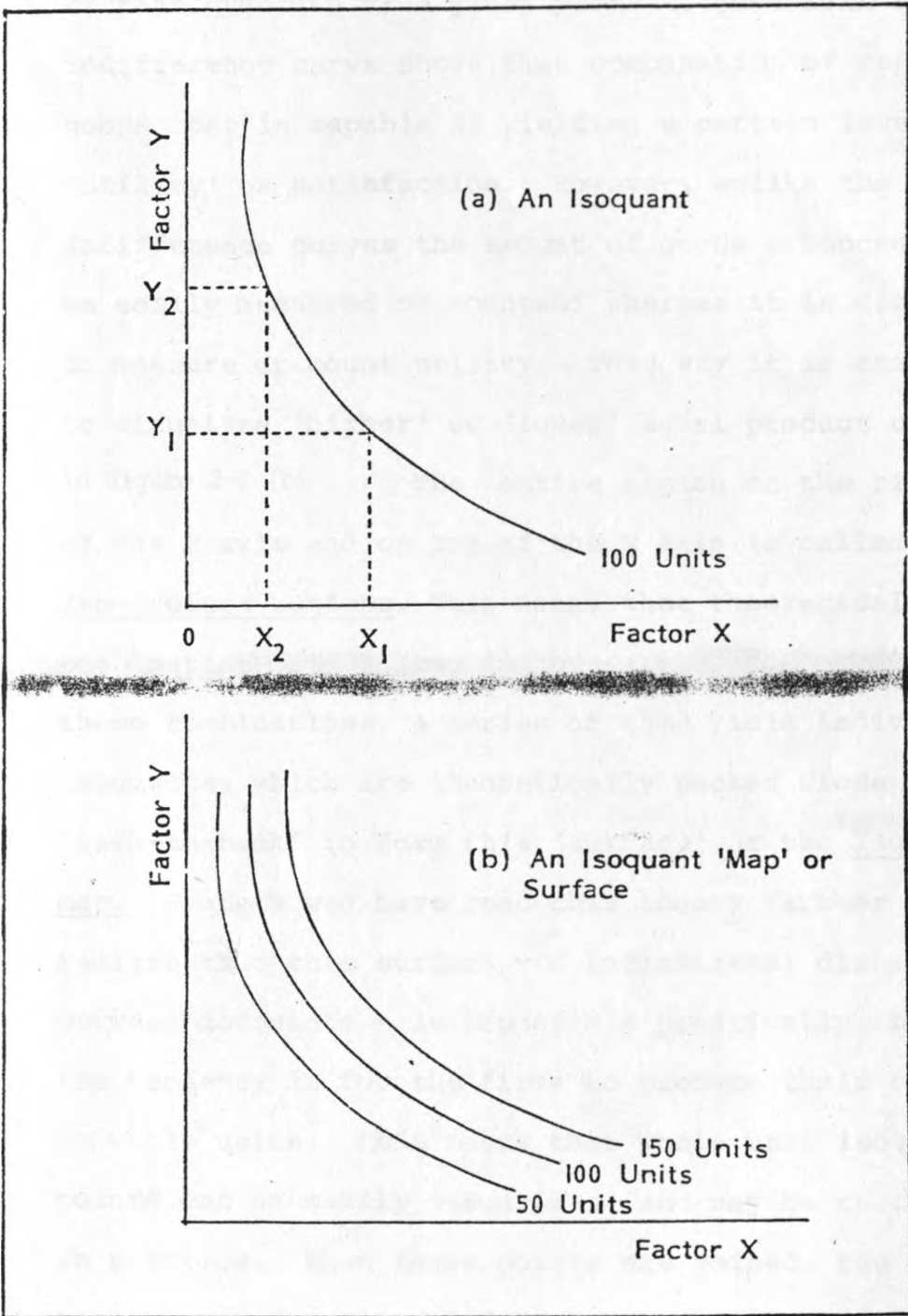


FIGURE 2-1 Isoquants and Isocosts.

certain quantity of a given product, just like an indifference curve shows that combination of consumer goods that is capable of yielding a certain level of 'utility' or satisfaction. However, unlike the indifference curves the amount of goods produced can be easily measured or counted; whereas it is difficult to measure or count utility. This way it is easier to visualize 'higher' or 'lower' equal product curves as in figure 2-1 (b) . The entire region on the right of the Y axis and on top of the X axis is called the Iso-product surface. This means that theoretically many combinations of the two factors are possible. Of these combinations, a series of them yield individual isoquants, which are theoretically packed close together 'back-to-back' to form this 'surface' or the Isoquant map. Readers who have read this theory farther will realize that this surface - of infinitesimal distances between isoquants - is impossible practically, because the tendency is for the firms to produce their outputs in whole units. This means that whole unit isoquants points can be easily visualized, and may be calculable in practice. When these points are joined, the resulting curve is angled instead of being continuous as the theoretical one.

Isoquants may not cross, because this violates their principle. If they were to cross, this means that it is possible to get a larger quantity which is at the same time smaller than another quantity below it.

A good analogy of isoquants is that of contours in map-reading. If a contour crosses another one this is wrong, because it implies that one height is higher than another one, but then later (after crossing) it is lower than a lower contour!

Rational producers will want to produce any level of the quantity of a good using as small factors as they can possibly manage. It is for this reason that isoquants are never concave to the origin. If they were it may mean that the part bulging farthest from the origin is on the same production level as ~~the two ends nearest the origin. But each of these~~ ends would be using smaller amounts of factors than at the "Knee" of the bulge of the isoquant. There is no reason why a producer could be indifferent to this technology situation, because he will choose those cheapest points of production at the ends of the isoquants, and ignore the more expensive input combination at the "Knee" of the isoquant that is concave to the origin. Therefore, isoquants have to be convex to the origin to maintain the producer's "indifference" on the factor input combinations.

Assuming that rational producers are interested in producing positive quantities, isoquants will always have a negative slope. A positive slope implies that a given product can be produced with less of both factors of production. Since production factors have positive prices a positive slope implies that

equal production levels can be reached at a lower cost down the positively sloped isoquant. No profit maximizing producer would agree to use more of the factors to produce the same quantity of the product when cheaper means are available. This means positive slopes of isoquants are theoretically impossible.

There are the three main qualities of isoquants. For a better analysis the reader is advised to consult elementary economics texts.<sup>6</sup> The important thing to note is that isoquants represent some form of a 'trade off' between factors of production in producing given levels of output. This means that for each level of output a producer can give up certain quantities of one factor X, in return for the use of other quantities of the other Y, and yet he can manage to produce the same quantity of his product say 100 units as in figure 2-1 (a). The slope of an isoquant is the marginal rate of transformation between the two factors. At any point on this curve the slope represents how much of one factor say Y a producer is likely to acquire when he gives up a marginal unit of the other factor - say X.

To choose the optimum quantities of two inputs, the producer or the firm must take the factor prices into consideration; and also the amount of money available in his account for the purchase of two inputs. At any one time the producer is likely to have a fixed amount of money for purchasing the two inputs.

If one input Y costs 150/- and the other input X 100/-; and he happens to be having 1,500/- for the entire process of production he can either use the entire money to buy 15 units of factor X or the entire amount of money to buy 10 units of factor Y as shown in figure 2-2.

The line joining these two points of total expenditure on one factor represent a budget constraint or an isocost line. This producer, given 1,500/- of the production budget cannot afford any factors which will involve his spending more than the 1,500/- at his disposal. The isocost line is the locus of the combination of the two factors when one is not allowed to spend more than a certain amount of money, (say 1,500/-) for both factors.

If for example the financial outlay of this producer is doubled and he has now 3,000/- to spend on both factors his new <sup>isocost</sup> ~~isocost~~ will be above the older one; which means he can afford to buy more amounts of both factors, as long as he does not exceed 3000/-. (Figure 2-2). The reader can visualize an entire map in the same way as an isoquant map. Optimal production for the firm at any level of output will result when a particular isocost is tangential to an isoquant. This means that the producer is willing to produce that quantity falling on a certain isoquant; and to use the amount of money indicated by the isocost which is tangential to that particular

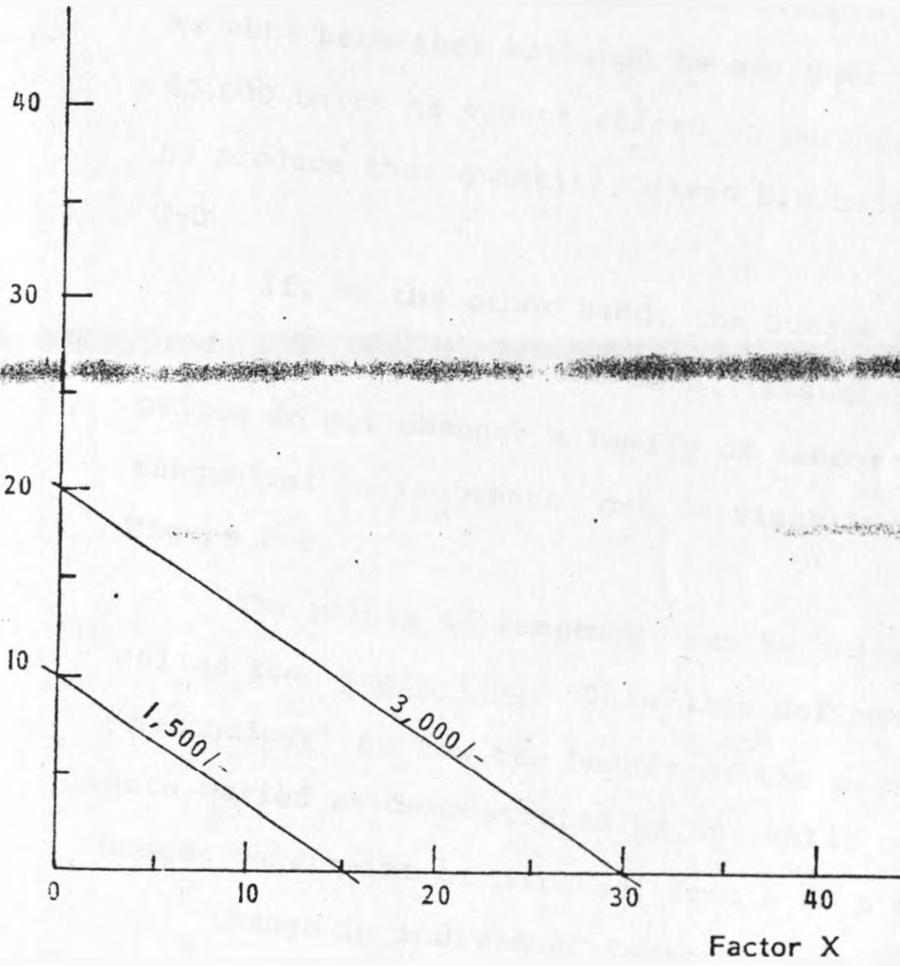


FIGURE 2-2: An illustration of the concept of "Budget lines".



isoquant. (Figure 2-3). In particular it means that he can afford to buy a factor combination  $X_1; Y_1$ . These factors can enable him to produce a certain quantity of the product, as depicted by point A. This point is one of the many points available on the level of 50,000 unit (isoquant) for example. (Figure 2-3). We note here that although he may desire to produce 60,000 units he cannot afford to purchase the factors to produce that quantity, given his budget constraint C-D.

If, on the other hand, the budget of the ~~producer is varied up and down~~, (assuming that factor prices do not change) a family of isocosts which are tangential to isoquants can be visualized as in Figure 2-4.

The points of tangency can be joined by a line called the scale line. This line defines the 'technology' or how the budget of the producer gets varied as demonstrated by the shift of the budget constraint or 'isocost' from A to B to C; etc.

Change in individual factor prices cause changes in the slope of budget constraints; implying that the rational producer will use more of the cheaper factor, and substitute it for the more expensive one. For example, if factor X becomes cheaper than Factor Y more of X will be used, and the family of isocosts will have flatter slopes. The family of isocosts and their tangential isoquants arising under

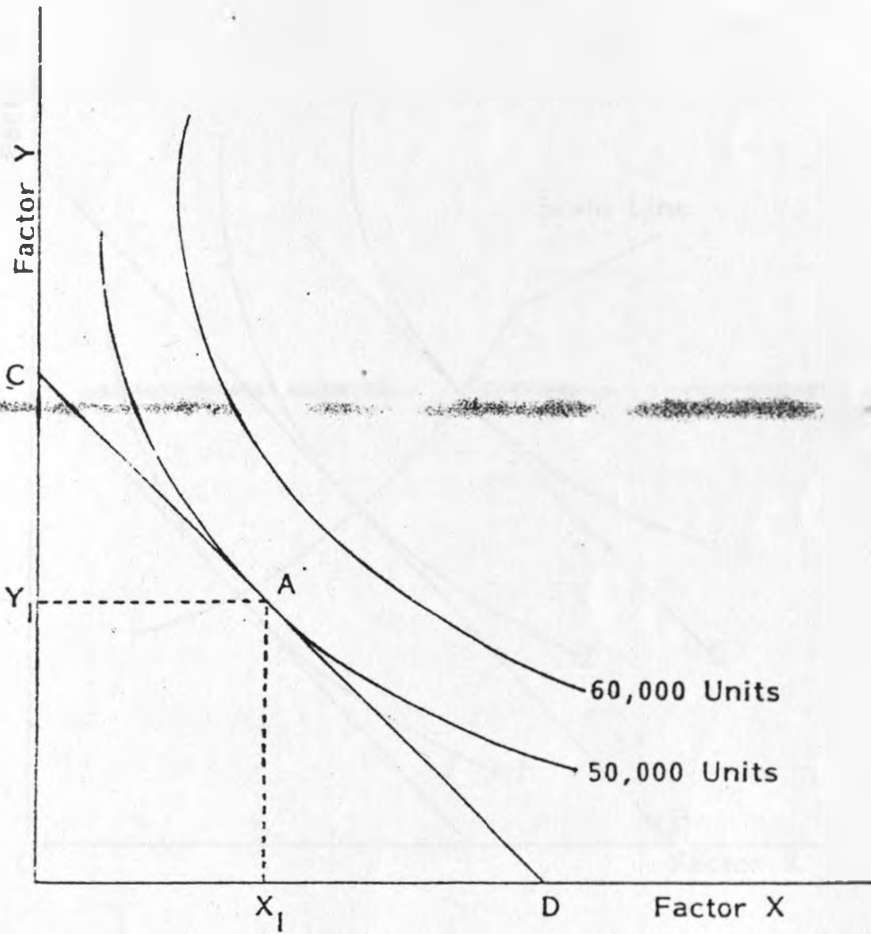


FIGURE 2-3 Equilibrium of a product as derived using Isocosts and Isoquants.

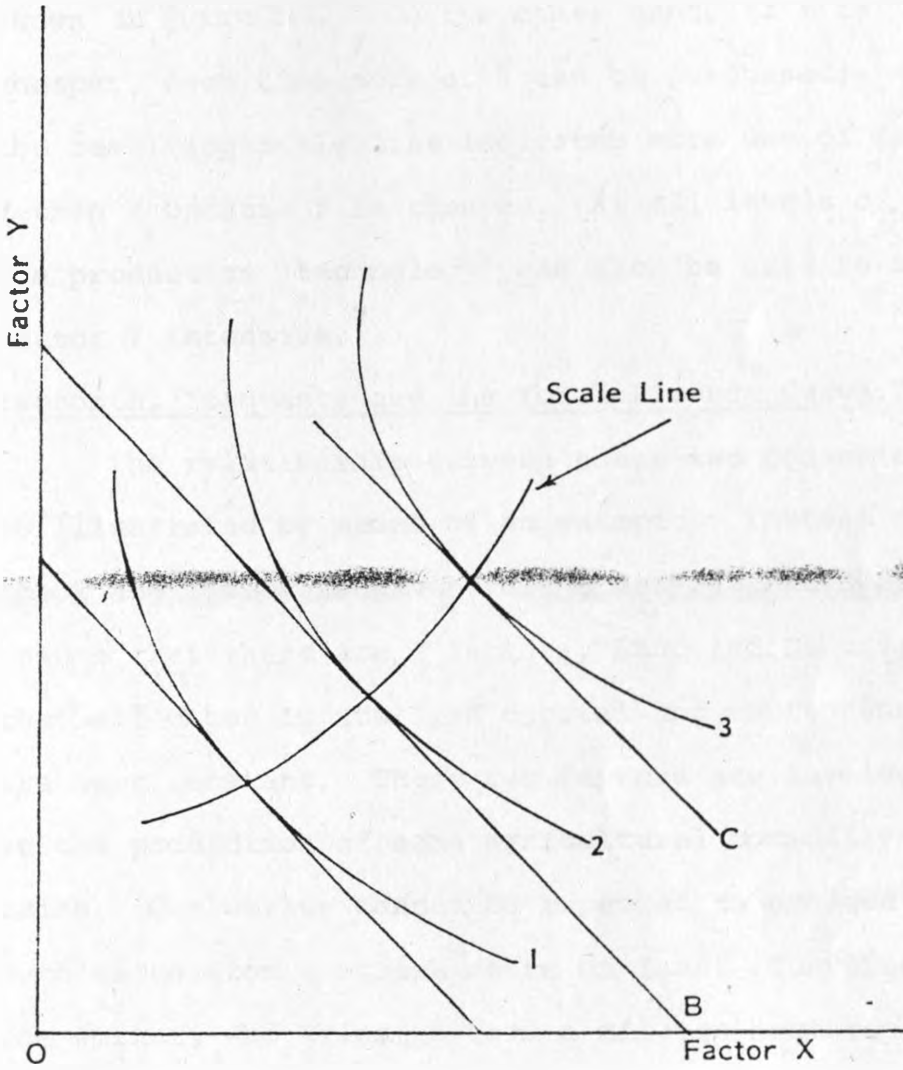


FIGURE 2-4: An illustration of A Scale Line.

these new conditions reflect a technology that is factor X 'intensive' at all levels of output; as shown in figure 2-5. On the other hand, if Y is cheaper, each time more of Y can be purchased; the resulting scale line indicates more use of factor Y than X because Y is cheaper. At all levels of output the production 'technology' can then be said to be factor Y intensive.<sup>7</sup>

#### Isocosts, Isoquants and the Total Product Curve.

The relationship between these two concepts can be illustrated by means of an example. Instead of ~~the X and Y factors given in the earlier examples~~ assume that there are 2 factors, Land and Labour; and that all other inputs like capital and entrepreneur are kept constant. These two factors are involved in the production of some agricultural commodity - say maize. One worker cannot be expected to produce much maize from a square metre of land. Conversely, one worker, who tries to farm a million hectares of land cannot produce much wheat either in one year, if his labour is 'spread' over all that land. He will not even finish one agricultural operation within the year, because of the size of the land involved. It therefore follows that an optimum input of labour must lie within these two extremes.

The total product produced on a fixed amount of land can be found by varying the amount of labour (i.e. the number of men) employed steadily while

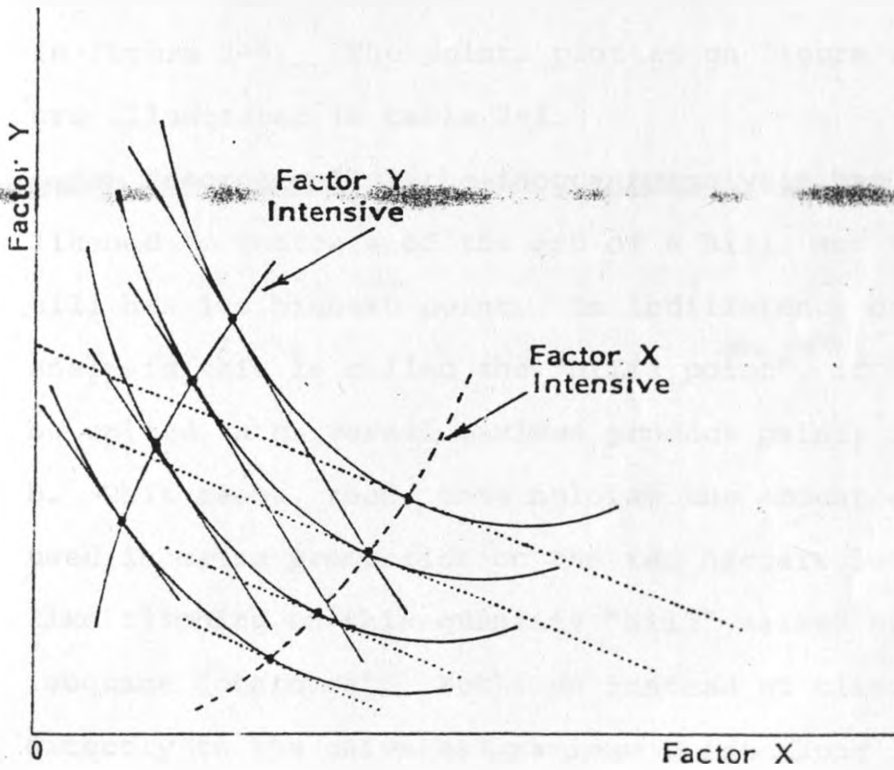


FIGURE 2-5: Showing alternative production technologies using Isocosts, Isoquants and Scale Lines.

land is held constant.<sup>8</sup> Assume a ten hectare tract of land, and assume that the number of men is increased on that tract of land, and the resulting output of maize is duly recorded. Assume also that the land is of equal fertility. In isoquant terms this is similar to drawing a line parallel to the "Labour" axis at the ten hectare level of land, and to allowing the amount of labour to change along the labour axis, while holding the amount of land constant;<sup>9</sup> as shown in figure 2-6. The points plotted on figure 2-6 are illustrated in table 2-1.

~~Theoretically, the isoquant analysis has been~~  
likened to contours of the map of a hill, and this hill has its highest point. In indifference curve analysis this is called the "bliss point", it may also be called a universal maximum product point; as at B. This means, then, that holding the amount of land used in maize production on the ten hectare level is like climbing on this quantity "hill" marked by isoquant "contours". But then instead of climbing directly to the universal maximum point along line OB one cuts the "spur" of the hill as at AX. This implies a steady climb from A to T - where the isoquant indicates an output of 64000 kilograms. From this point onwards there is a steady fall towards X; i.e. after passing the maximum product point at T; along this land 'constraint'. The cross section of this 'map' is the so called Total product

Plot No.	No. of Workers	Output in Kilograms
1	1	10000
2	2	23000
3	3	38000
4	4	52000
5	5	60000
6	6	63000
7	7	64000
8	8	63000
9	9	60000
10	10	50000

Table 2-1: Maize Output per plot of land.

Each plot is 10 hectares wide.

All land is of equal fertility.

curve shown in figure 2-7 below.

### Average Product and Marginal Product

The total amount of maize produced on a fixed amount of land by a steadily increasing labour input as given by the isoquant map on figure 2-6, data on table 2-1, and the curve on figure 2-7 depends on the amount of labour employed on the ten hectare piece of land. Economists call this type of relationship a labour production function, because it shows how much output is produced by different amounts of labour. In other words, the output in ~~this diagramatic "model" is a 'function' of the number~~ of workers employed on the ten hectare maize shamba.

The average product at each time can be calculated as at table 2-2 and this relationship can be graphed as the 'average product' curve. The average produce can be defined as the total output of a good devided by the number of units of a factor of production used to produce that good. In this case, considering figure 2-6 the amount of maize produced at each isoquant would be noted, and the number of labourers used to produce that good would also be known along the labour axis. Each time, the cumulative total product would be devided by the cumulative number of men used to produce it. The results are shown in table 2-2.



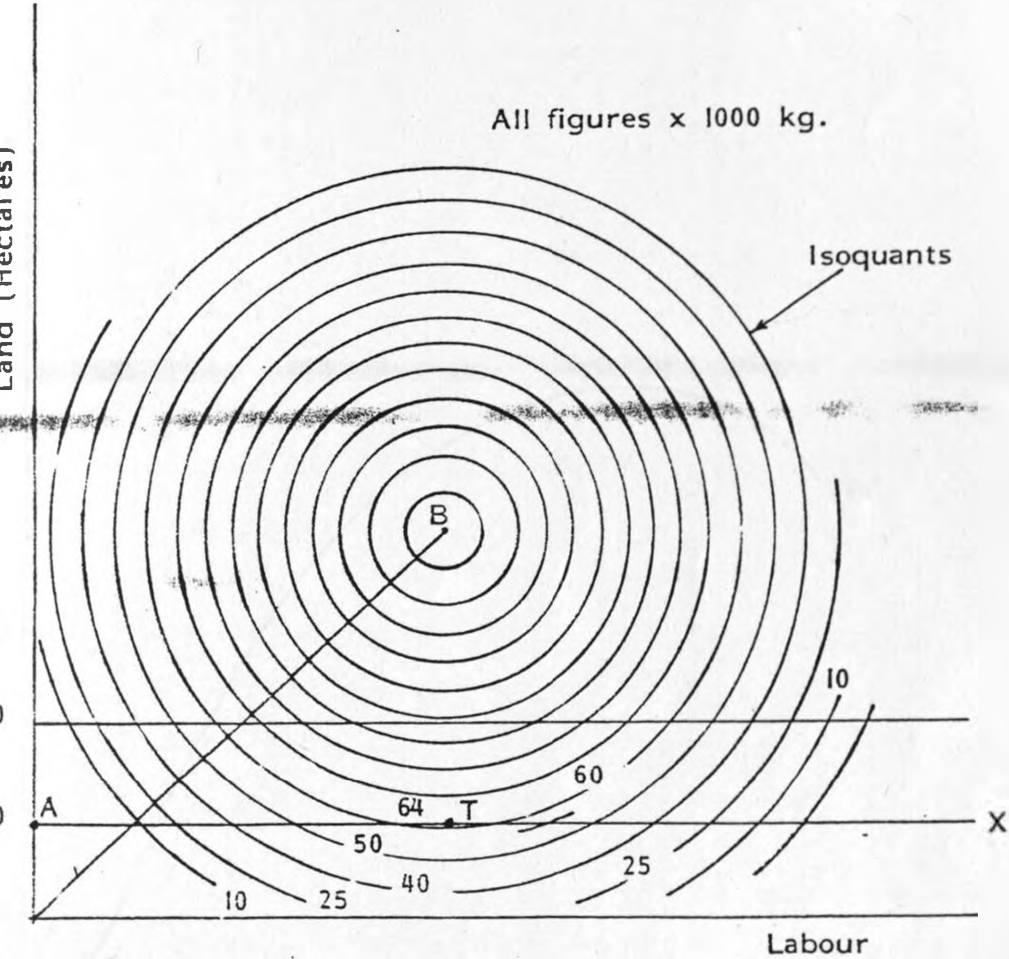


FIGURE 2-6: Derivation of the Total Product Curve from a family of Isoquants. Point B is the highest point on the Isoquant hill map. Here the land available is held constant while labour is allowed to vary.

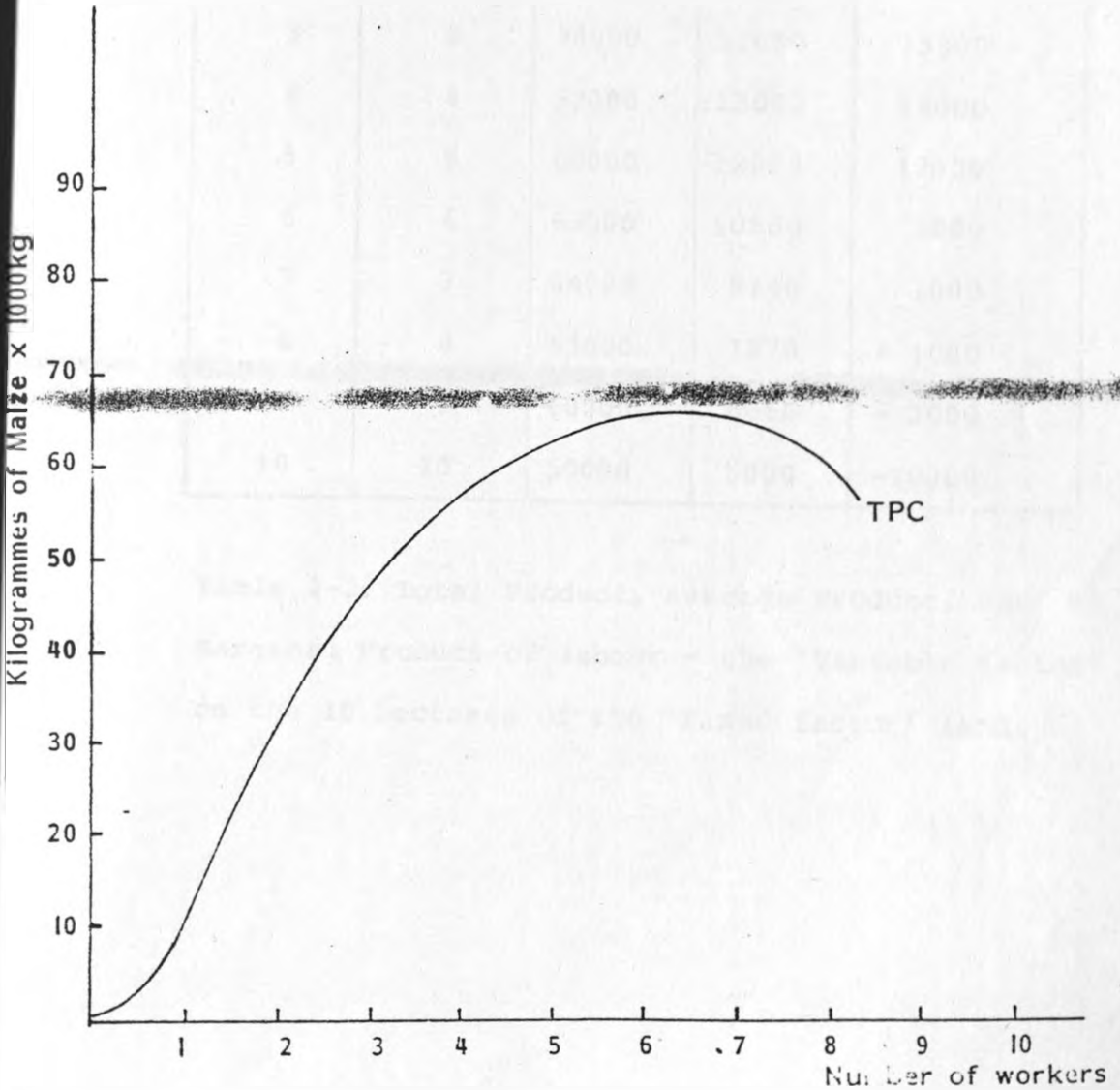


FIGURE 2-7: A labour production function: usually called a Total Product Curve. It shows the total amount of maize produced each time labour is increased.

Plot No.	No. of Workers	Total Product	Average Product	Marginal Product
1	1	10000	10000	-
2	2	23000	11500	13000
3	3	38000	12660	15000
4	4	52000	13000	14000
5	5	60000	12000	12000
6	6	63000	10500	3000
7	7	64000	9140	1000
8	8	63000	7870	- 1000
9	9	60000	6666	- 3000
10	10	50000	5000	-10000

Table 2-2: Total Product, Average Product, and Marginal Product of labour - the 'Variable factor' on the 10 hectares of the 'fixed factor' land.

The marginal product, on the other hand, is the additional total output which results from the addition of one unit of the variable input. In this case the 'variable input' is labour; as opposed to the 'fixed input' land. The marginal product can also be deduced from the increases in total output each time one unit of labour is added to the variable factor; as shown in table 2-2. and Figure 2-8.

Continuous increases in one factor (labour), while holding the other factor (land) constant eventually leads to a decrease in the per unit ~~output of the variable factor. Both the average and~~ the marginal products increase at first, each time an additional man is added to the labour force, but then decline later with each addition of a person to that labour force. However, at this time, the marginal product drops faster than the average product. The system of maize production is then said to be subject to the law of diminishing returns. A production function is said to be subject to this 'law' with respect to its marginal product. Changes in the variable factor increase the production function by increasing amounts (marginal product) each time an additional labourer is added. After some point, these increases become smaller and smaller, causing the total product to grow at a slower rate. The additional growth in the total product due to an additional variable factor input

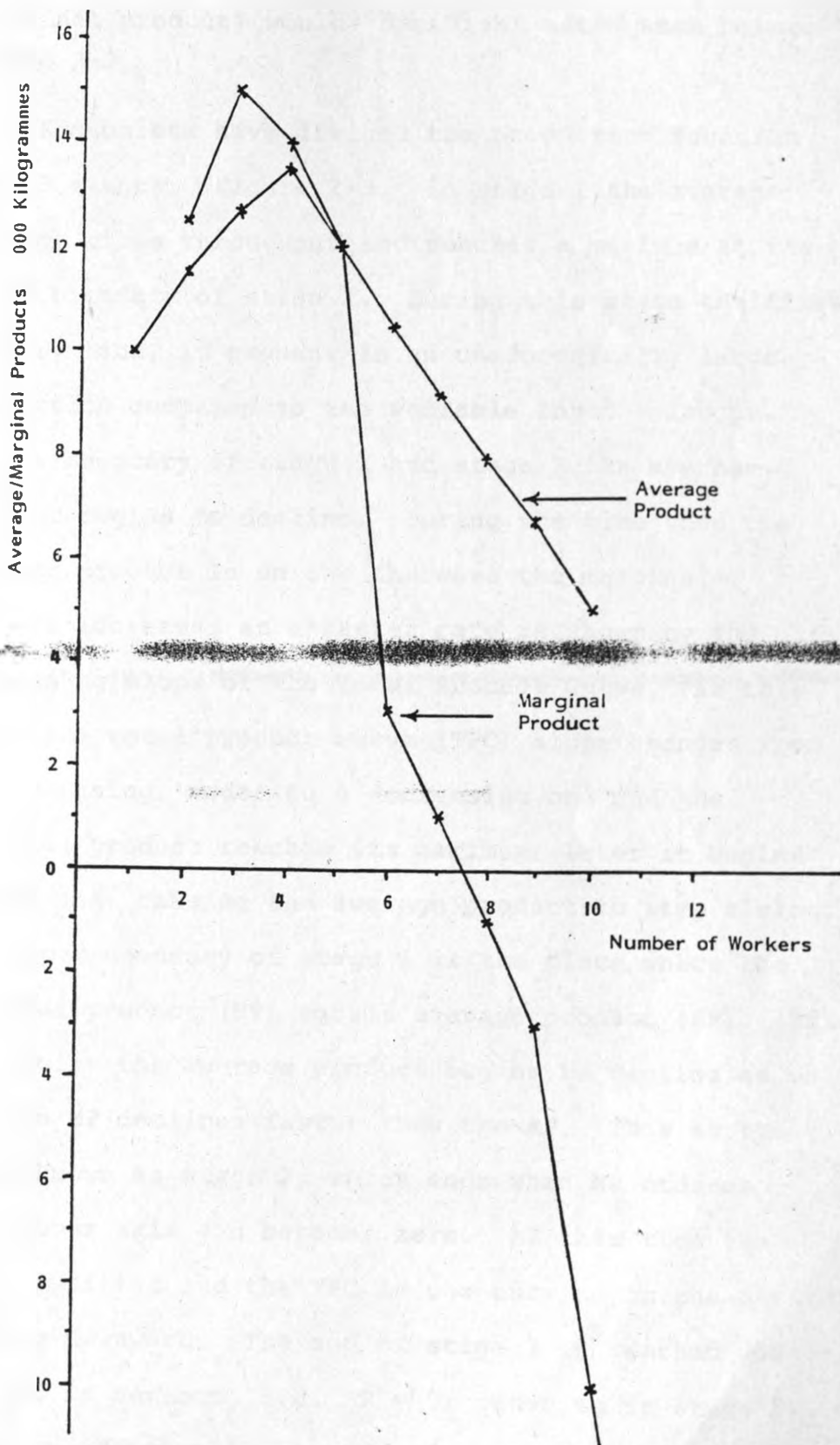


FIGURE 2-8 Relationship between Average Costs and Marginal Costs as derived from Figures 2-6 and 2-7.

(marginal product) would 'diminish' after some point.<sup>10</sup>  
Figure 2-9.

Economists have divided the production function into 3 stages. Figure 2-9. In stage 1 the average product rises throughout and reaches a maximum at the upper boundary of stage 1. During this stage the fixed factor, land, is present in an uneconomically large proportion compared to the variable input - labour. At the boundary of stage 1 and stage 2 the average product begins to decline. During the time when the average product is on the increase the marginal product increases at a faster rate as shown by the ~~increasing slope of the Total Product Curve.~~ In this stage the total product curve (TPC) slope changes from an increasing 'mode' to a decreasing one and the marginal product reaches its maximum; later it begins to decline; causing the average product to stop rising. The upper boundary of stage 1 is the place where the marginal product (MP) equals average product (AP). After this point the average product begins to decline as well, and the MP declines faster than the AP. This is the phase known as stage 2; which ends when MP crosses the labour axis and becomes zero. At this time the AP is positive and the TPC is now curving on the way to bending downward. The end of stage 2 is reached when the TPC is maximum, i.e.  $MP = 0$ ; ushering in stage 3; when any additional unit of labour decreases the total product. This means that the MP are negative,

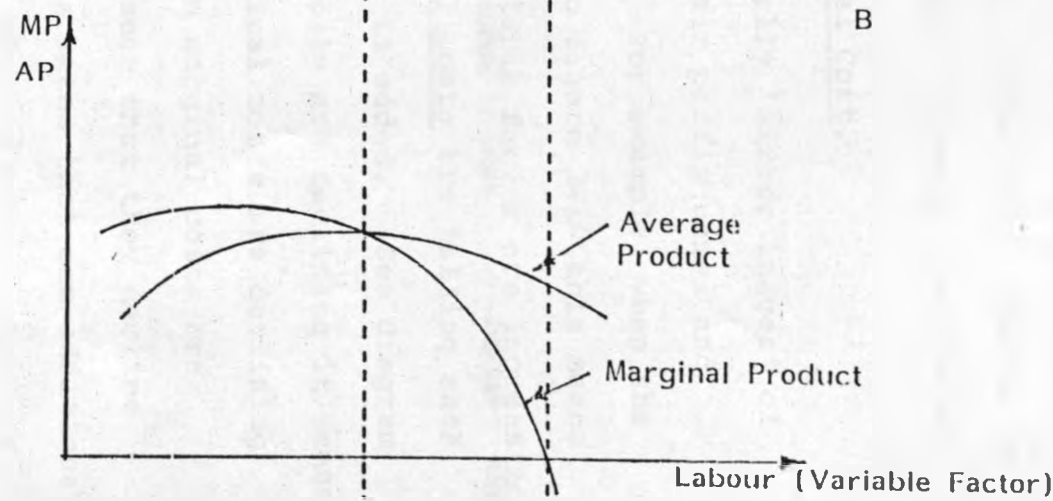
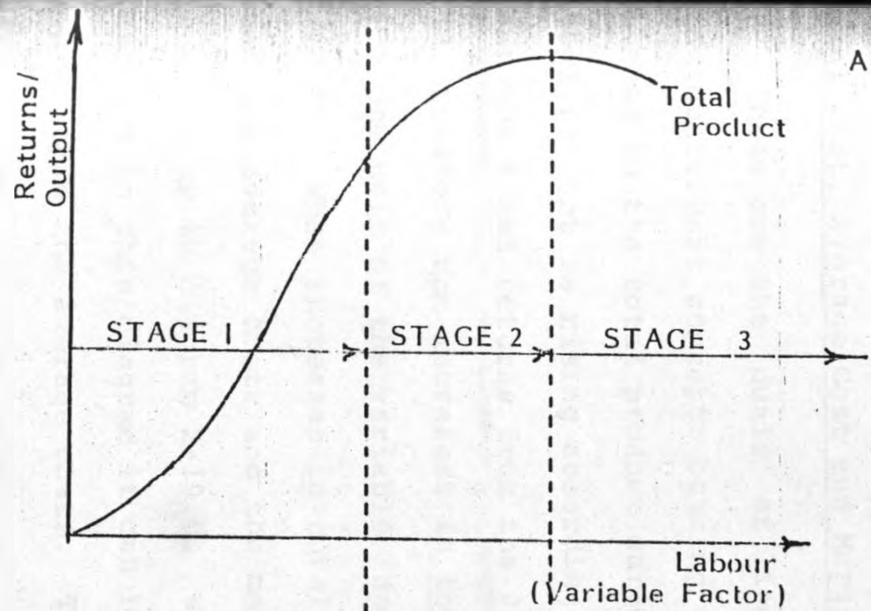


FIGURE 2-9. The relationship between Total Product Curve, Marginal Product Curve and the Average Product Curve; showing the stages of the Production Function.

although AP may be positive. No Rational producer would be expected to go very much into this stage. In fact, most producers are profit (or product) maximizers, and they prefer restricting production in stage 1 where an additional unit of labour gives the highest marginal returns. The point of production depends on the philosophy of the firm, whether it is a sales maximizer, product maximizer or even a satisfier.<sup>11</sup>

### Total Cost, Average Cost and Marginal Cost.

These are the 'duals' or literally 'mirror images' of the counterpart concepts bearing their prefix names and related to the total product curve. For example, when the total product is rising according to figure 2-10 this means that the total returns from the variable factor are increasing, and therefore the increases in total costs are falling each time one unit of the variable input is added. (See diagram 2-10 C). When increases in total costs are declining it means that the average costs and the marginal costs are declining as well; as in diagram 2-10 D. When marginal costs are examined in this diagram it can be seen that they decline faster than the average costs. This means that one additional unit of the variable factor must be able to affect the cost of production in such a way as to cause relative decline of the total cost curve and to pull the average cost curve.<sup>12</sup>

After a certain stage the increases in total costs reach their minimum point and begin rising; as shown in Point X of diagram 2-10 C. This is the point of inflexion on the total cost curve; where it changes direction and begins rising.



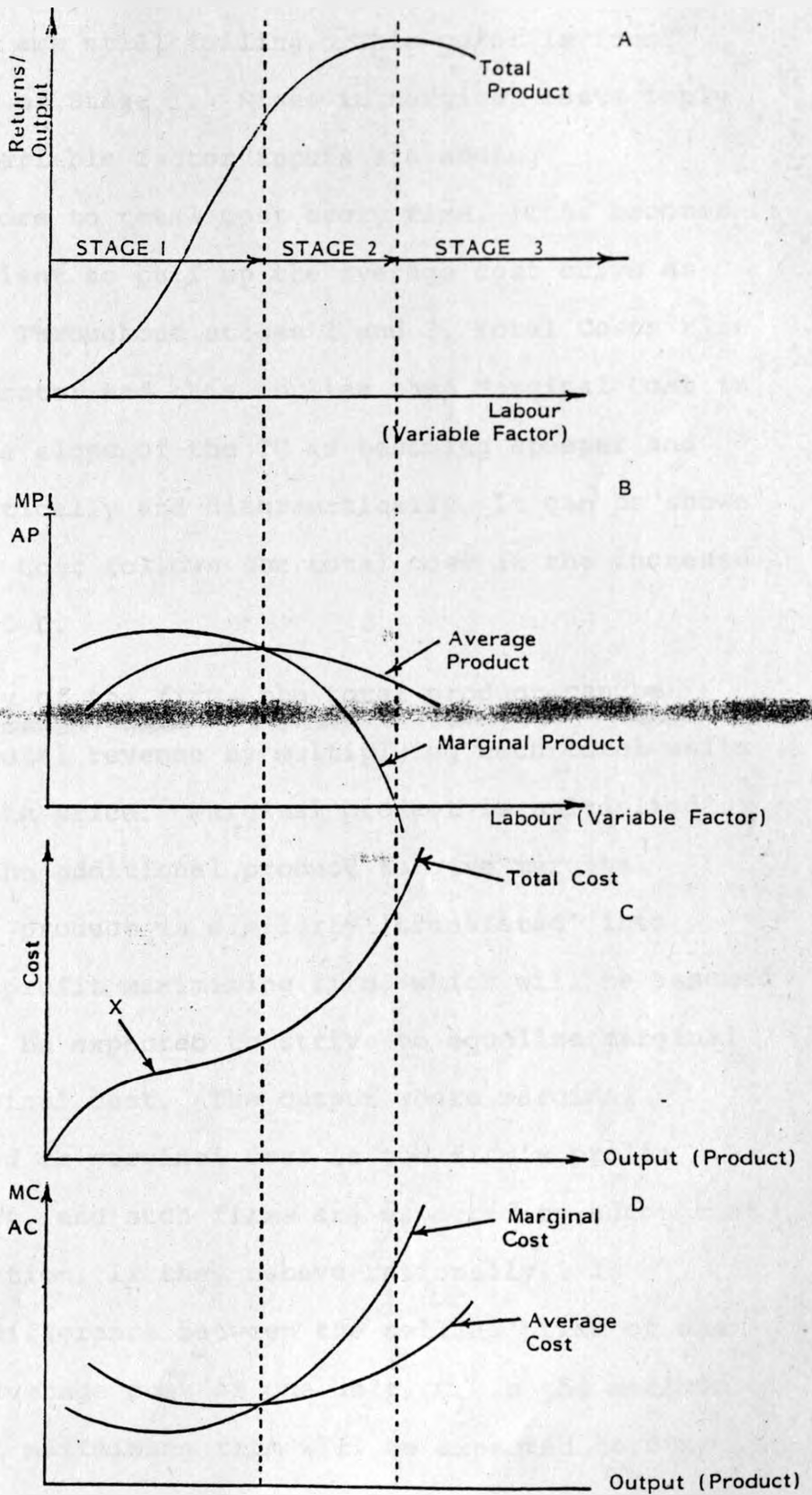


FIGURE 2-10. A directional and conceptual relationship between the Product Curves and Cost Curves.

At that point, the Marginal costs are at their minimum, but the Average Costs are still falling. This point is found around the middle of Stage 1. Rises in Marginal Costs imply that additional variable factor inputs are adding proportionately more to total cost every time. This becomes eventually sufficient to pull up the average cost curve as described above. Throughout stages 2 and 3, Total Costs rise at an increasing rate: and this implies that Marginal Cost is increasing, or the slope of the TC is becoming steeper and steeper. Mathematically and diagrammatically, it can be shown that the Marginal Cost follows the total cost in the increase as in diagram 2-10 D.

In the theory of the firm, the total product can be translated into total revenue by multiplying each total units of the product with price. Marginal product is multiplied by the price of the additional product to give marginal revenue. Average product is similarly 'translated' into Average Cost. A profit maximizing firm, which will be assumed in this text will be expected to strive to equalize marginal revenue with marginal cost. The output where marginal revenue is equated to marginal cost is the firm's profit maximizing product, and such firms are expected to adapt that 'scale' of production, if they behave rationally. In figure 2-11 the difference between the selling price of one unit  $P_1$  and the average cost of one unit,  $C_1$  is the maximum profit. A profit maximizing firm will be expected to fix its 'scale' of production, and always keep on producing the product  $Q_0$  units. Any product lower or higher than that would yield less profits than  $P_1$  minus  $C_1$ .

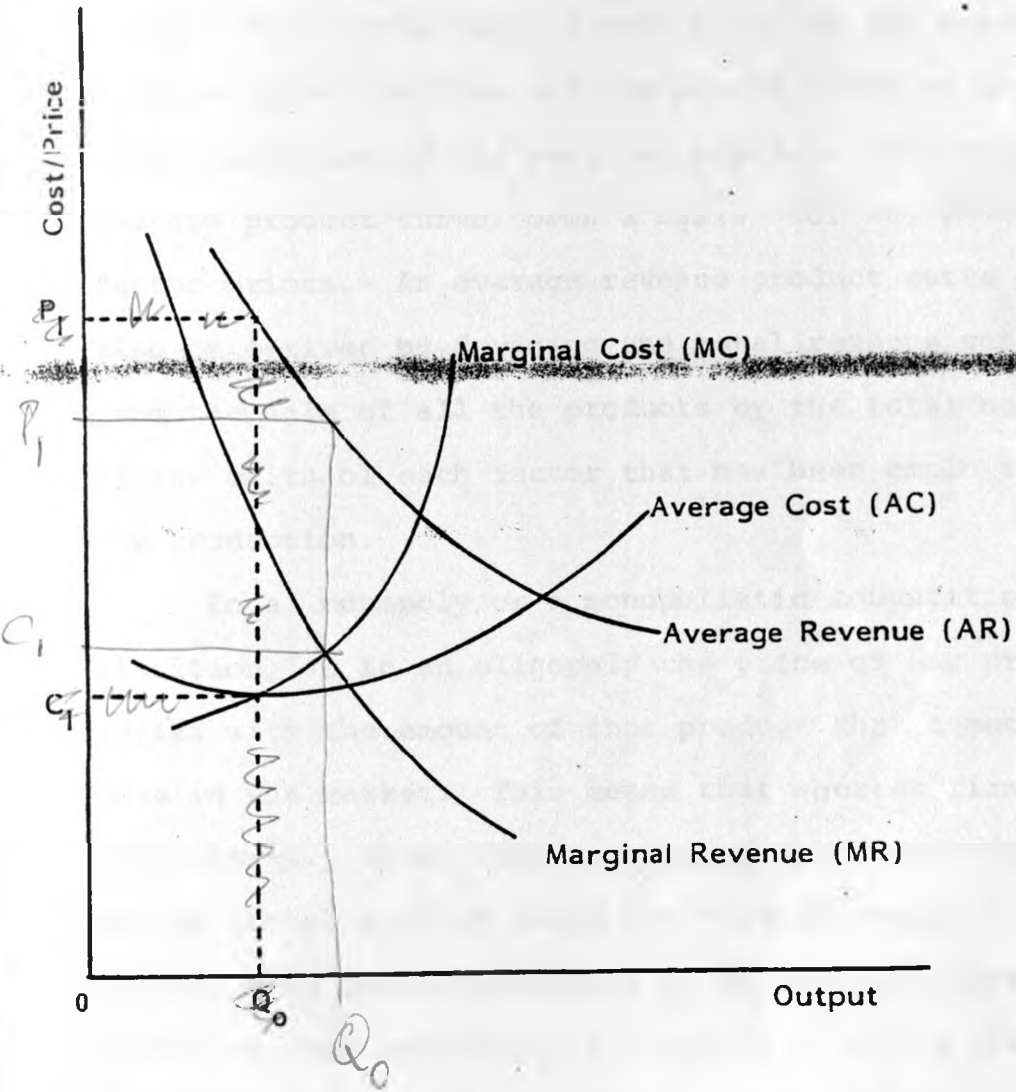


FIGURE 2-11. The cost and revenue curves of a profit maximizing firm, showing the quantity which must be produced to maximize profit.

## Demand for Factors of Production

### Demand for Factors: Demand Curve

Once the marginal product curve of any factor has been derived, the Marginal Revenue product curve can be derived by multiplying the marginal quantities the goods produced with the price of those goods. This curve has the same shape as the marginal product curve, because all the points along it are price functions of the marginal product. The marginal revenue product curve forms a basis for analysing factor prices. An average revenue product curve can **also be derived by deviding the total revenue resulting** from the sale of all the products by the total number of the units of each factor that has been employed in the production.

In a monopoly or a monopolistic competition situation, or in an oligopoly the price of any product varies with the amount of that product that comes on sale in the market. This means that whereas firms are generally faced with increasing total revenue curves (total product times the revenue earned by the sale of each product) because of additional sales resulting from additional factors that are in the market; the marginal revenue earned from each unit product is on a steady decline. It must be remembered that the more of a product is available in the market, the less the price. Therefore a monopolistic or monopolistically competitive firm has to decide how

much of each factor it can employ to increase production, and therefore the revenue. However, armed with this knowledge) that the marginal revenue of its products is decreasing) the firm is careful not to employ more factors that will cause significant decline in the marginal revenue. The firm is also careful not to hire any factor for any amount, unless such a factor can produce an equivalent marginal amount. An additional factor is hired only for the marginal product it will produce. The demand curve for any factor of production is therefore the marginal revenue productivity curve of that factor. The demand for any factor is therefore derived demand, since the factor is demanded because of the goods that this factor can be used to produce; and the factor is paid only for what it can produce. The demand for factors of production is therefore 'derived' from the demand of the product it is used to produce.

This is a very brief argument about the derivation of the demand curve for the factors of production; and the reader, who happens to be unfamiliar with economics is required to understand it intuitively, and match the argument to the concept of the marginal revenue product. Otherwise any standard economic textbook will clarify any outstanding doubts.<sup>13</sup>

Any firm employs more than one factor of production. A firm will always try to minimize the production costs and maximize profits. Therefore, all the inputs in the production process are adjusted to ensure profit maximization. The value of the marginal product of each firm is equated to the marginal costs of the production. The marginal cost happens to be that which has been incurred when purchasing additional factor inputs that produce the marginal product. This still retains the argument that all marginal products resulting from the additional factor inputs are equal to marginal costs for a profit maximizing firm. Each of the demand curves for these factors is therefore the value of the marginal product, or the marginal revenue product curve.

Therefore factors of production are not needed because of their own right, but because they are used to produce consumer goods. Demand for land is derived from the demand for space. Almost every economic activity requires the physical space where it can be located. Very few activities are centred in mid-air, and very few occupy only a small space. Economic activities result in the production of goods. When the demand for these goods increases, the firms begin looking for space, whereon to locate their productive activities. Space is land or land based; and space happens to be one of the indispensable

in the production process. Increases in demand for goods, somehow, means increase in demand on which these goods are produced. We can mention that demand for labour and capital is derived from the demand of the goods that they are (jointly or singly) needed to produce. Increases or decreases in the demand for the consumer goods causes increases in the demand for all factors used in their production. Thus demand for all factors of production is "derived demand" from that of the consumer goods produced by means of these factors.

Elasticity of factor demand.

Having identified the demand curve for factors in production the concept of elasticity requires a further analysis. Elasticity of demand is generally defined as a measure of the responsiveness of the quantity of a good in demand to changes in price. (Price Elasticity), The concept has been extended to measure such responsiveness in the quantity demanded to changes in income (income elasticity), to changes in demand for other factors (cross elasticity) and so on. In simplistic terms, the concept of elasticity defines changes in the quantity of a good demanded, with respect to changes in another variable.<sup>14</sup> In considering the elasticity of demand for a factor of production several factors that should be borne in mind.

- (a) The price of that factor, and the factors that influence the price. This helps discover the cause of price elasticity of demand for the factor of production under consideration.
- (b) The availability of substitute factors in the process of production; so that if one factor turns out to be too expensive it can be substituted by incorporating another factor of production in its place, within the production process.
- (c) The elasticity of demand for complementary factors of production, such as labour and capital. This means that if other factors are expensive, and the goods cannot be produced without them, the quantity demanded of those factors will fall; and even that of the other factors combined with them will also fall. This is cross elasticity of demand.
- (d) The vitality, necessity, or value of the goods the factor is producing. Some goods are absolute necessities with inelastic demand curves. This means that a change in price of these goods does not influence the quantity of the goods that the consumers want. An example of a good with inelastic demand is a drug that is



utilized to cure a rare disease. Demand for factors or inputs used in the production of those goods whose demand is inelastic is also inelastic.

- (e) The availability of incomes to the producers for purchasing the factor - or the financial and economic position of the producers (producer income elasticity).
- (f) Factor mobility to those places where they are required in the process of production. Mobility of factors ensures that in any location, if the factors become expensive substitute factors can be taken from alternative locations; or to alternative employments in the process of production to take the place of the more expensive factors.
- (g) The span of time in which the factor is required in the production process.

#### Price Elasticity

The quantity of any good, including the factors of production that is demanded depends on the price of this good. This is the idea behind the Marshallian demand curve. The slope of an ordinary demand curve is a measure of the elasticity of demand of the goods under consideration.<sup>15</sup> Each good, hence each factor, has its own individual demand curve. This means that all factors have individual measures or magnitudes for their individual elasticities of demand because their

individual demand curves have different slopes; measuring the differing rates of change of the quantity of each factor that is demanded as the price for that factor changes.

Land, for example, is an absolute necessity in most production processes; because, as we have already mentioned, each production process requires space. Generally speaking, demand for land is inelastic. On the other hand, labour and capital are fairly more price elastic than land. An increase in wages may cause employers to reduce the amounts of labour employed; and an increase in the price of capital may have producers to substitute labour for machines, etc; but demand for space can rarely be satisfied by any other factors.<sup>16</sup> Land, or space demand is therefore price inelastic.

#### Substitutes

It has already been pointed out that if a factor of production has many substitutes, an increase in the price of the factor will cause producers to substitute it with other substitute factors of production. Labour, capital, and even entrepreneurs have many substitutes when individual units of these factors are considered. However, land has very few substitutes, because of the demand for space by all activities. This is because of the physical immobility of this factor that brings

in the location factors. For example, there is an aspect of spatial monopoly of land near cities, at city centres, etc. In places where land is in high demand other land cannot be "called" or brought from some distance to satisfy that demand. Land at places where it is in great demand, like at city centres, has inelastic demand because it is the only one that could be used in those locations. Some agricultural land may be suited to one kind of production because of soil conditions, and may not have close substitutes nearby. So the demand for such land is inelastic.

When considering other factors, labour could be specialized in the production of a certain good. ~~Capital (items of machinery) could be made specially~~ for a specific production process. In this case demand for such specific factors will be inelastic because there are no substitutes that could be used when the price of these specific factors increases. This reveals the fact that factors which are specific in a certain production process, with no easy substitutes have inelastic demands. Specificity implies lack of substitutes in the production process.

#### Cross Elasticity

There is some cross elasticity of demand between factors. For example, in times when the economy is such that purchase of capital is difficult

due to a credit squeeze, etc, the demand for capital goods (machinery, etc.) is low, because there is no credit money to purchase such capital. If there is no capital for use in the production process, demand for labour that is required to operate these machines is low; and similarly, demand for space whereon to locate these machines and the entire production processes is low - hence demand for land and landed property.

Elasticity of demand for consumer goods may also affect that of factors of production. For example: demand for maize products, beans, (etc.) in the market may cause a rise in the demand for agricultural land that is used in the production of these products. ~~Demand for professional services causes demand for~~ lawyers, architects, accountants, land economists, etc. This causes increase in the demand for office spaces in which to house all these professionals; and therefore demand for land situated in towns. Elasticities of demand of these "goods" are therefore interrelated. If the demand for goods and services is inelastic the demand for factors used in the production of these goods will also be inelastic.

#### Income Elasticity

If everybody had unlimited income and resources to purchase the commodities they need whenever the need for such commodities arise, these commodities would be purchased at whatever cost.

However, for economic reasons outside the scope of this introductory work money is always scarce, and so are other income generating resources. It follows, therefore, that the higher priced commodities are out of reach from the people with low income. Human beings are also not equally endowed with wealth; and this fact has created differences in income among people.

In the same way, different producer firms have sources of income of differing magnitudes, because they derive their production money from risk takers or entrepreneurs with different financial abilities. The firms will therefore take their income into consideration at the time when they are thinking about which resources to employ, and how much of each should be employed for their productive objectives. It therefore follows that the choice of factor combination in the production process (choice of technology) by any firm will be made by the owner of a firm taking the income of the owner of that firm into consideration. If the price of factor inputs rise within a particular production period the lower income firms tend to economize on the production costs by substituting the less expensive factors for the factors that become more expensive.

Therefore, the higher the price of factors, the less able the lower income firms are to afford

them; and the greater the tendency for most of this kind of producer to substitute cheaper factors for these more expensive factors. A good example about this fact could be discerned within the current (1980s ) trends of energy usage with the increase of oil prices. Running most machinery (capital) which require petroleum products is becoming increasingly expensive, and there is a tendency towards labour intensive technologies - or other energy saving technologies in an endeavour to save energy, and to cut on the costs of production. This is an incidence of factor price elasticity. Factor prices have gone up, or at least the cost of running production capital (machinery), and firms are substituting cheap ~~factors for the more expensive factors. One can~~ conclude that currently, the demand for "energy" hungry factors is "price elastic".

Some firms feel the pinch of a rise in capital running costs more than other firms, and the low-income-earning firms are the first to feel it. Some high income earning firms are continuing (at least theoretically) with more or less the same level of factor combination as before, because they can afford it. In this case, demand for 'energy hungry' factors is income elastic.' An analogy of this exists where some people afford running high-powered and high fuel consumption cars, despite the rise in petrol prices. It could be concluded that

the higher the income of some firms the more they use these energy hungry factors. Increasing the income of the firms therefore may cause the increase in the consumption of energy hungry factors. On the other hand, if the income of any firm is decreased, that particular firm can no longer afford to employ these energy hungry factors because of the rise in their prices. There will be a tendency to substitute factors with cheaper running costs for these 'energy hungry' factors.

Some factors are inferior goods in the process of production and are likely to be abandoned by any firm when its income increases. Most factor inputs have some degree of income elasticity; because the ~~higher the income of producers the greater the~~ tendency for most firms (producers) to increase the scale of factor combination, and therefore, scale of output.

In the developed economies with low unemployment levels labour is scarce, and therefore the price of labour is high. Consequently there is a tendency for the firms to adapt capital intensive technologies, resorting to high mechanisation in the production process. Due to firms competing for sites with the highest accessibility with respect to space within cities or regions, land values in the most accessible centres or city centres is very expensive. The combination of technology by either

substituting cheaper land for the expensive city land or hiring space in multi-storey office building, where more capital (in the form of building materials), and more labour has been utilized to provide space that uses the least land possible. This is the reason why it is logical to build multi-storey structures at the city centre. Here land has been replaced by labour, capital (in the form of materials and funds), and professional services of architects, lawyers, quantity surveyors, etc., that are involved in the construction of multi-storey buildings.

In times of credit squeeze, loans may not be available for purchase of land. So the income level potential of prospective land purchasers is low.

~~Any change in price of land and property may drive~~  
out small investors from investment in landed property. Here is then an instance of income elasticity with respect to land and landed property..... such that with less income, less land is purchased. When the credit squeeze is lifted, or in times of easy loan facilities more investment in land is possible; more of this factor is purchased the higher the disposable income. Land is therefore income elastic.

#### Factor Mobility

Theoretically, a rise in the prices of factors of production in one location should induce identical factors from lowly paying employments or from other



locations to move to the employments or locations offering this higher financial remuneration. A change in wages in one location for the better should attract labour from neighbouring locations to high wage locations. If one firm offers higher wages to one kind of labour than other firms it tends to attract labour from other firms to its payroll. Labour therefore tends to move to those areas, or those kinds of employment where it can command the highest remuneration.

A high rate of profits in one production process tends to attract entrepreneurs from the alternative processes to the higher paying one. Capital or investment funds are also channelled to ~~the highest-paying production process. By a change of~~ use, land tends to move to the highest best use.

If flats or apartment blocks command highest rents than bungalows and misonettes, then more land is put to flat construction than to bungalow construction, Old bungalows may then be demolished to give way (space and factor input land) to multi-storey flat blocks. This is what is called factor mobility, or the ability of factors to change from one process of employment to another; or to move from one location to another.

What about if factors cannot be easily substituted, because they are incapable of moving from one employment, or one place to another?

Factors are then said to be immobile. In the use of labour some older and middle-age people may have so many commitments in the current place of employment that they have a low tendency to change places of work. School children, easy transportation, cheap housing, mortgaged property, etc; are some of those considerations that may keep the older members of the labour force from moving easily from place to place, or even from employment to employment.

Some factors, like special types of capital (machinery) are made for only one particular purpose, and cannot be used for any other production process. These items of machinery are said to be "specific" to the process of production for which they were made.

Specificity or immobility affects the elasticity of demand for these factors so that in the case of specialized labour or machinery the demand tends to be inelastic, because they are the only factors that can produce certain items. A rise in their price does not change their quantity that is employed in certain firms. Demand for unspecialized labour, on the other hand is elastic because of its high mobility and the ease with which any section could be replaced by labour from other locations and/or employments.

Land, on the other hand, is one of these factors that is not easily substitutable because most

production processes are based on it. So, in general, demand for land tends to be inelastic. To compound the matter, land cannot be physically moved from one situation to another. An increase in the demand for land in one place cannot therefore be offset by a movement of land to where it is required most. Therefore, in specific locations, especially in city centres, demand for land tends to be highly inelastic. Producers tend to continue using land in certain locations despite its increase in price. Also, due to the continuous increase in the human population the amount of land per person is decreasing. New land cannot be "created" with the current technology. An increase in the price of land, in general, cannot therefore cause a noticeable decrease in the use of land as a factor in the production process. Demand for land is therefore price inelastic. It is also income inelastic because no matter how much income a firm has it still requires space on which to base its production processes. Generally speaking, demand for land is therefore inelastic.

#### Effect of Time

In general, demand for any commodity is more elastic with the passage of time. Within long time spans all the variables and parameters affecting the elasticity of demand tend to be altered and relaxed. For example, substitutes may be obtained

for specific factors that cannot have substitutes in the short run. This means that specific factors whose demand is inelastic in the short run may have elastic demands in the medium and in the long run. Incomes of firms may change, allowing more expensive factors to be purchased. These may have been income inelastic in the short run, but because of higher disposable incomes available to producers their income inelasticity may decrease, because people can now purchase larger amounts at any time. Also, because of their higher income they are not "chased off" from the use of one factor, simply because it is expensive. In other words need for stringent economy measures in the production process decreases because the higher the income, the less the marginal utility for money of the producer firms.

Over time, factor mobility increases, and this tends to provide an opportunity for substitution of specific factors with other factors that cannot be available in the short-run. Specific factors, whose demand is inelastic in the short run, tend to have more elastic demand in the long run. In the long run, land that is used for residential purposes could be available for office use through change of use. Overall demand elasticity for office land may therefore be affected by increased change of use of land from residential land to office land. A rise in price of office land in a certain location may cause a reduction in

quantity of land used for offices in that location, and an increase of land used in alternative locations that were previously used for residential purposes in the short run; and were therefore not available for offices within that time span.

With time, it is possible to manufacture alternative items of capital to take the place of specific machinery. This increases the elasticity of demand for old types of machinery (which was previously specific in the short run) over time.

In short, the elasticity of demand for goods in general, and production factors in particular could increase, or decrease, depending on the market circumstances of the factor inputs under consideration. Factors could turn out to have more elastic or inelastic demand curves over time.

#### Elasticity of Demand for Land

We have seen, that the demand for land is inelastic because there are not very many substitutes for space. Most activities producing vital commodities like food, other production factors, etc., are based on land; and therefore land is likely to be used in approximately the same quantities no matter what its price is. Land, as a factor, is immobile in the short run. Therefore, demand for land tends to be inelastic in specific locations, and for specific purposes within this time span.

This is because, as we said earlier, cheap land cannot be carried from one location to take the place of more expensive land in alternative locations.

Most factors, including land, are fairly price elastic. Producers tend to substitute <sup>cheaper</sup> cheaper factors for the expensive ones. As far as land is concerned this is only largely true in the long run. In addition, as mentioned above, land is an absolute necessity in most production processes. This fact introduces more inelasticity of demand that tends to counterbalance any income or price elasticity of demand that land may have in the short, <sup>medium</sup> ~~medium~~ and long run. Therefore, at lower disposable income levels, and at higher ones the same amounts of space is needed for the location of productive activities. Also, the same amount of land is required whether or not prices ~~change in the short term~~. Therefore demand for land is inelastic.

Besides, land is required as wealth for its own sake in most Western market and 'mixed' economies. The more land an individual has, the wealthier he is considered to be in these economic systems. Land is therefore owned for its sake and a considerable amount is hoarded to serve as a mark of wealth. Generally, the higher the income the more land tends to be required by the rich individuals; and this tends to increase the income elasticity of land.

As shown above, demand for land in the long run tends to be more elastic than in the short run

because land could be replaced by other factors; and less of it could be used than in the short run. A change of use could take place, affecting most land that is committed to specific uses in the short run; and making more land available for any use. In the long run, an increase in the price of one parcel plot, or tract of land may cause it to be abandoned for cheaper alternatives elsewhere, or for alternative factor inputs. Therefore an element of price elasticity may creep into the demand for land within this time span. However, this is insignificant.

#### Supply for Factors of Production

The quantity supplied of any commodity depends on the price that this quantity can fetch in the market; all other factors remaining constant. In economics the word supply means a schedule of possible prices, and the amounts that would be sold in the market at the prices. No simple statement about other variables affecting supply (except price) can be made because the analysis of supply is much more complex than demand. However, some other variables in relation to supply can be mentioned - such as prices of closely related commodities. The supply of pigs, for example, can be affected by the price of the pig-feed. The supply schedule of labour depends on the earnings of labour - the wage rate. For a general analysis of the other factors affecting

supply of commodities the reader is advised to consult an elementary economic textbook. The supply of factors of production could be affected by the prices of substitute factors that could be used in the same production process. The availability of substitutes affects the demand for alternative factors in the market generally, and their price. Because of the general price level, the producers of a particular factor respond accordingly; and supply the quantity of this factor that corresponds to the existing prices. The prices of those inputs or implements that are used to produce a factor can also affect the quantity of this factor that is supplied. This is because high costs of production derived from the price of factor producing inputs tend to deter the production of factors, and therefore the quantity of these factors available in the factor market.

Generally, a firm producing any factor of production will tend to equate the marginal revenue obtained from the sale of the extra-factor to the marginal cost of producing the extra factor. It therefore follows that the producers are unwilling to spend more money to produce a factor than they can marginally earn by the sale of this factor in the market. Assuming perfect competition the marginal revenue earned by the extra-factor is equal to the market price, or the average revenue. The factor producer will therefore equalize his marginal costs



with his marginal revenue that happens to be the market's average revenue.

In the short run, therefore, all the factors that the factor producer can produce have to be sold at the average market price. This way, his short-run average factor cost will equal his marginal cost which does not have to exceed the market average price, or his marginal revenue. If the factor prices on the market rise, this relationship will persist at a higher market price, namely Average factor revenue at the market is equal to Average factor Cost = factor producer's marginal revenue = his average factor cost. The locus of all the points bearing this relationship becomes the average factor cost schedule, or the supply curve of the factors of production for any firm. Therefore the average factor cost (AFC) is the supply curve of any factor to any firm (Figure 2-13), AFC shows the actual prices that the firm has to be paid to produce different factor quantities in the short run. For firms consuming the factors this is the price they offer for their inputs. It equals the marginal revenue earned by the producers for employing these factors.

The interpretation of the supply curve for factors of production, and that of AFC depends on the factor under consideration. Theoretically, the supply curves are derived analogously from the AFC

prevailing in the market, but there are certain modifications to each factor that need to be stated hereunder.

(a) Supply Curve of Labour

The supply curve for labour is derived from the fact that labour tends to 'trade off' leisure hours with the number of hours of work. Theoretically, a person need not work if the amount of money he is offered at the market does not pay, or does not yield him the pleasure he is deriving from leisure. At a specific wage level he will work only to sustain himself, but then relax off because more work is not attractive. An increase in the amount of money he can earn per unit time - say per hour may attract him towards doing more work, because more work pays. Farther increases will make him offer more of his services. His supply of himself or his service time depends on the wages available in the market per unit time, which is balanced with loss of marginal utility derived from leisure hours.

This relationship persists with increasing wages for service time, until at a certain point, when the wages are high enough, and working becomes some kind of an inferior good. After this level less work is offered at increasing wages because better paid people will tend to offer parts of their salaries to others to purchase leisure time. These other people

work for them while they relax. The highly paid may hire other labour to help him in his work - sub-contract, etc.

Figure 2-12 is an indifference curve map or surface which demonstrates a trade off between work and leisure hours for a certain type of worker, offering a certain quality of labour services. The map has the origin on both the right hand side and the left hand side and the left hand side in order to be able to eventually achieve a positively sloped supply curve for labour and to indicate trade off between leisure and work hours. The indifference curves indicate a trade off between enjoyment of leisure hours and the pleasure derived from the pay per working hour. Shs. 50/- per hour, for example, he is prepared to work for 14 hours 40 min; and so on along any ~~indifference curve.~~

The budget lines indicate the total working hours available, and how much money he can be paid at any going rate per hour. The point of tangency between the budget line and the indifference curve indicates the equivalence between the total paycheque available at the going rate, and how much money he can have due at that rate due to his leisure requirements at the rate. It is the labourer's equilibrium; where the amount of money he would like to earn equals that money that he actually earns.

The diagram implies and indicates that at very low pay - very much below 5/- per hour a labourer will theoretically work very few hours of his total 24 hour day and will prefer leisure time (in which he can do other

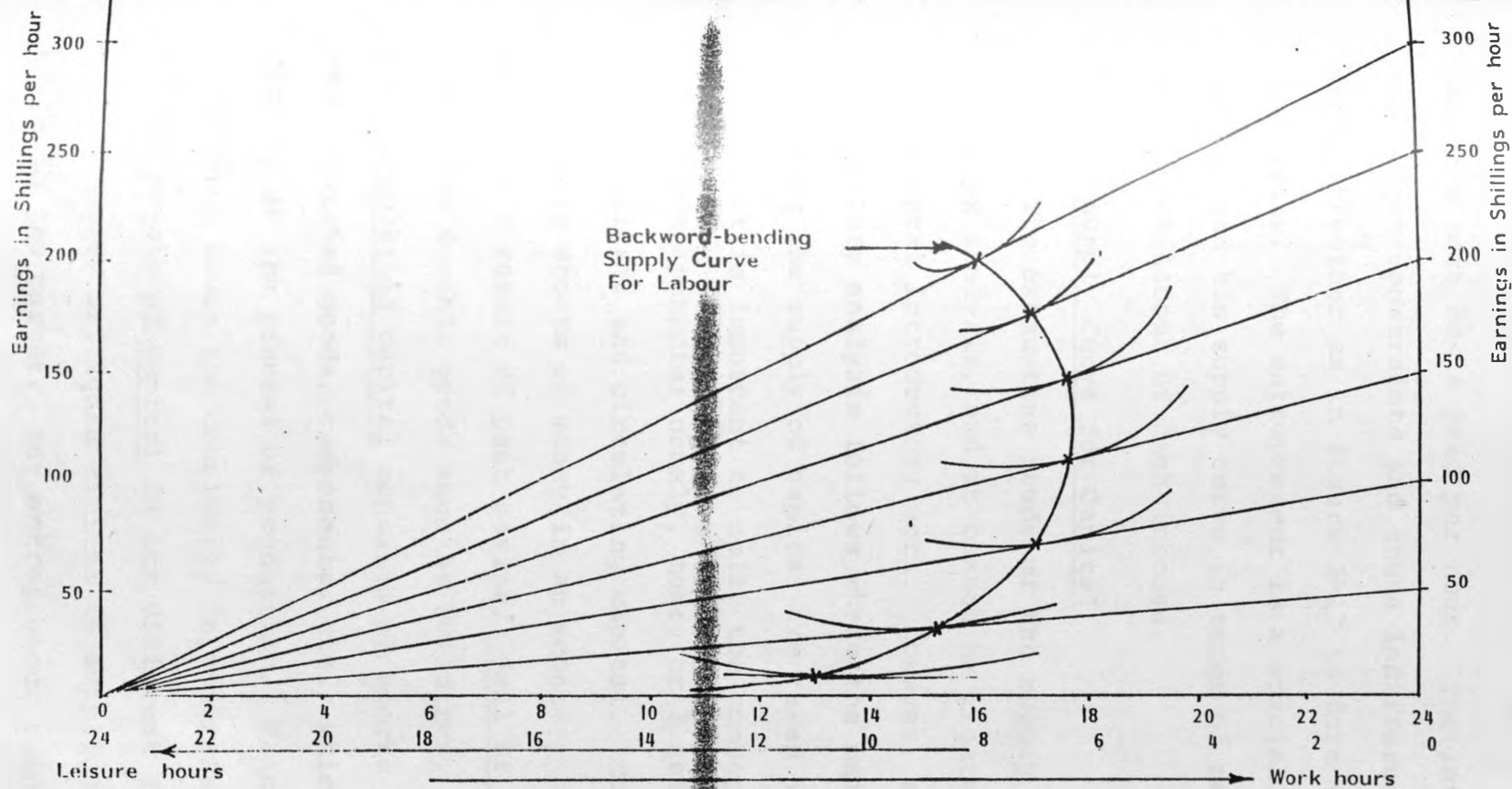


FIGURE 2-12. The Supply Curve for labour. The higher the remuneration per hour the more labour is offered; until after one point (150/- per hour) where work begins to be an inferior good, and the worker begins working less the more he is paid per hour.

more satisfying things) much over 16 hours per day. Above 150/- per hour work becomes an inferior good and the worker sub-contracts some of it to others. He thus begins working less the more he is paid per hour. The intersections between the budget constraints and these indifference curves can be joined together as in figure 2-12 to form the supply curve for labour. The entrepreneur is a specialised form of labour, and his supply curve in terms of man-hours is similar to that of labour of high incomes.

(b) Supply Curve for Capital

The exhaustive study of the supply for capital involves a complex analysis, and it cannot be treated adequately in this general introductory work. However, a general introductory analysis follows where the main aspects affecting the supply of capital are taken into consideration.

It is important to split the concept capital into its main sub-components: namely, money or liquid capital, real or fixed capital, and circulating capital. Money or liquid capital is stocks of money in an economy, or held by individual firms as a result of past saving. Real or fixed capital comprises durable goods such as buildings, plant and machinery, and circulating capital consists of stocks of raw materials, semi-finished goods, components, etc., which are used up rapidly in the process of production. These different components cause the complexity in understanding the nature of the supply of capital in its different forms.

Money or liquid capital is supplied according to its price in the market. Any entrepreneur requiring money as an input will be interested in maximising profits. He will therefore not hire "the money" for more than he can earn from it. So the rate

of interest offered is such as to enable these firms in sum to maximize profit. Although the theory of interest is complex, it can generally be said that the interest prevailing in the market reflects the sum total of the entrepreneurs' profit maximizing functions where the marginal cost of one input in every case is equated with its marginal revenue. The rate of interest in the market varies with the possibility for maximizing profit open to entrepreneurs. The higher the rate of interest the more people will be induced to save, and the more the supply of liquid capital available for investment. The supply of liquid capital is therefore a function of the rate of interest offered for it in the market.

Circulating capital is intermediate goods in the process of production. Their supply depends on their going price at their market - that faces the producers who are willing to utilize them. In a similar analogy to that discussed before, the supply of circulation capital depends on the average price it is offered at the market or its average revenue - which must equal its average production price or average factor cost; or marginal cost under perfect competition conditions. The higher the price for these goods offered in the market, the more they are produced; i.e. the higher the price of finished products using circulating capital the more the price of it, and the more of it is offered into the market.

The supply for real capital is analogous to that of circulating capital. Producers who anticipate high prices in the market for the goods they produce using fixed capital will offer high prices for the marginal units of fixed capital that they hire for the production of the final goods. If in the short run their marginal revenues equal these prices, it follows that the marginal units of capital cannot be purchased at prices higher than these. ( $MC=MR$ ). The people producing capital, on the other hand, are not willing to part with their capital or to produce any unless they can be remunerated in such a way as to maximize profit. The marginal unit that they produce must equal the marginal cost of producing these factors. But these are "average" prices of other factors; and once the factors are produced they cannot be sold for any other price in the market than this average price. It therefore follows that the marginal cost of producing factors equals average factor cost, equals marginal revenue, equals average revenue. Finally, the supply curve of capital is the same as the average factor cost curve.

### Supply of Land

The supply for land should, in theory, behave in the same way as that of other factors of production. High demand for goods and services produced using land should cause the producers of these goods to offer a rent commensurate with their marginal

revenues, to the marginal units of land they hire. In the final analysis, the supply curve of land should be the same as the average factor cost for land. This means that generally, higher rents should cause landowners to offer more land for the location of activities. The difference is that the physical amount of land that exists cannot be added. The physical supply of land is fixed, and, generally speaking, the supply curve is highly inelastic. Any increase in price or rent does not lead to a change in the supply of land because no producer is directly involved in its production. So in this case it is rather risky to regard the supply curve of land as being merely as a locus of average factor costs, because it generally does not behave this way. Nobody incurs costs in the physical creation of land.

#### Equilibrium in the factor Market

It has been pointed out that the demand curve for factors of production is the marginal revenue product, (or the value of marginal product) of the firm. Generally, this declines the more firms produce outputs... in... the market; under imperfect competition situations. The firm's average revenue curve (value of average product) also is declining as the marginal revenue curve, but generally at a slower speed than the marginal cost curve. The average revenue is the price of selling the firm's good in the market. Its decline is caused by the



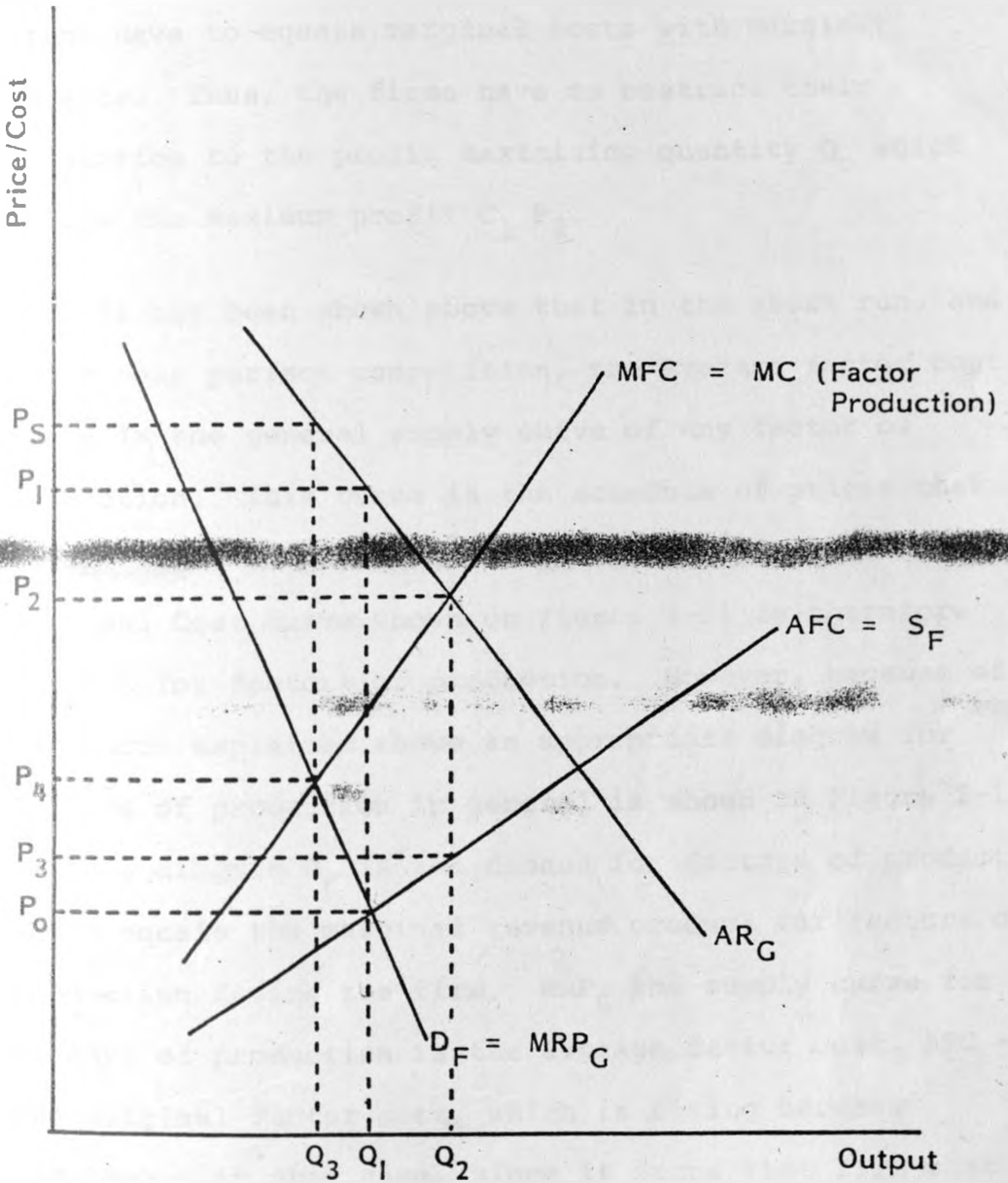


Figure 2-13. The equilibrium of a factor producing firm which is not a monopsonist; during the short run.

availability of more and more stock in the market (Figure 2-11). Because marginal revenue is declining, (the value per extra unit sold) it "pulls the average <sup>Revenue</sup> ~~cost~~ with it". In order to maximize profits, firms have to equate marginal costs with marginal revenue. Thus, the firms have to restrict their production to the profit maximizing quantity  $Q_0$  which yields the maximum profit  $C_1 P_1$ .

It has been shown above that in the short run, and under near perfect competition, the Average factor cost curve is the general supply curve of any factor of production. This curve is the schedule of prices that ~~the firm has to pay for different factor quantities.~~ <sup>T</sup> Marginal Cost curve shown on figure 2-11 is therefore the AFC for factors of production. However, because of the facts explained above an appropriate diagram for factors of production in general is shown on Figure 2-13. In this diagram  $D_F$  is the demand for factors of production, which equals the marginal revenue product for factors of production facing the firm.  $MRP_G$  <sup>?</sup> the supply curve for factors of production is the average factor cost.  $AFC = S_F$  The marginal factor cost, which is rising becomes irrelevant in this case, since it faces that firm that produces the factors of production alone, and is not taken into consideration by firms hiring those factors of production. It is a monopsonist's supply curve, and most factor producing firms are not necessary ~~monopsonists~~.  $AR_G$  is the average revenue of goods produced using the factors of production - the declining market price function

of these goods with the increasing output of the firm.

A profit maximizing firm employs only the factors to produce  $Q_1$  units of output where its  $D_F = MRP_G = AFC = S_F$ . It does not employ more, because if it did (at  $Q_2$  for example) any extra unit of factors earns a profit which is not maximum; smaller than  $P_1 P_0$ . If it employed less factors (say at  $Q_3$ ) it would not also be maximizing profit; because the profits would also be smaller than the maximum profits  $P_1 P_0$ .

#### FOOTNOTES

1 J. Brady Foust and Anthony R. de Sousa, The Economic Landscape: A Theoretical Introduction. (London, Charles E. Merrill, 1978), p.24.

2 Alfred Stonier and Douglas C. Hague, A Textbook of Economic Theory. (London, E.L.B.S. and Longmans, 1976), p.226.

3 Ibid., chapter 10;  
Philip W. Bell and Michael P. Todaro, Economic Theory: An Integrated Text with Special Reference to Tropical Africa and Other Developing Areas. (Nairobi, Oxford University Press, 1969), chapter 3.

4 Alfred Stonier and Douglas C. Hague, A Textbook of Economic Theory; p.251.

5 Donald S. Watson and Mary A. Holman, Price theory and Its Uses. (Boston, Houghton Mifflin Company, 1977), pp.87-112.

6 Ibid.

7 Ibid., chapters 8-12.

8 William J. Baumol, Economic Theory and Operations Analysis. (Englewood Cliffs, (N.J.), Prentice Hall, 1977), pp.267-276.

9 The Concept of Maximum utility is the so called "Blis point" by some economists, and is illustrated by Donald S. Watson and Mary A. Holman, Price Theory; pp.93-94.

10 Donald S. Watson and Mary A. Holman,  
Price Theory; pp.156-160.

11 William J. Baumol, Economic Theory,  
p. 388-390.

12 The reader is referred to any elementary  
text on micro-economic theory for more comprehensive  
analysis of these functions; especially Donald S.  
Watson and Mary A. Holman's Price Theory, pp.184-202.

13 Donald S. Watson and Mary A. Holman,  
Price Theory, pp.378-395.

14 Graham Bannock, R.E. Baxter and Ray  
Rees, A Dictionary of Economics, (London, Penguin, 1971),  
p.137.

15 Donald S. Watson and Mary A. Holman,  
Price Theory, pp.40-44.

16 This is a general statement at this stage  
stage of the discussion. A more precise analysis  
will be given later in this text; especially in  
chapters Three, Four, Eight and Nine. It will be  
found in later discussions that when space, or land  
becomes expensive - especially in urban areas - other  
factors are substituted to construct multi-storey  
buildings at city centres.

17 Graham A. Bannock et al.  
A Dictionary of Economics, p.55.

# CHAPTER THREE

## THEORY OF RENT

### Introduction

The concern of economists with rent dates back to the times of the Physiocrats, during the 18th century. The Physiocrats were a group of French economists, the most prominent of whom were Francois Quesnay and R.J. de Turgot. They believed in the existence of a natural order of economic activity that was not supposed to be interfered with by man. The role of governments, according to them, was that of ~~upholding this natural order, and of preserving~~ upholding this natural order, and of preserving property. To them, agriculture was the only source of wealth, and therefore this economic sector was the only one liable to taxation; because it was the only one they thought productive. To Physiocrats, the concept of rent was no different from the present colloquial use of the word; namely, payment for use of agricultural land.

This was not surprising; because these people lived in an agricultural society in which the mainstay of most economies was agriculture. At this time, cities and urban areas were unimportant, and were viewed as parasitic on the honest toil of agriculture.<sup>1</sup>

In modern colloquial terms, the word "rent" can refer to a periodic payment for the hire of a good.

For example, one can pay rentals for hiring houses, shops, appliances, etc. In economic terms, however, the word rent has a different meaning - namely; the payment made for factors of production which have an inelastic supply curve. Land is the main example of these kinds of factors. This rent may include the payment for the hire of improvements on land, or hire of land with improvements - if for example, we are considering the every-day situation where land is available with houses, trees, offices and other improvements anchored on it. The house rent, for example, may include the rent for house, the land it occupies, and all the accompanying amenities. It is the payment for all the factors of production that the landlord has used to construct the house. This payment has been de-capitalized in periodic terms to form rent; on the rationale that the landlord has invested his money in all these things expecting a return on this investment. This return is included in the total house rent. If he decides to sell his house, of course, he discounts the periodic income he should have received for the lump-sum sale value of the house.

## Ricardian Theory of Rent

David Ricardo: 1772-1823

One of the earliest explanations of the nature of rent - which approximates the modern economic definition of the concept - was provided by an Eighteenth Century economist called David Ricardo, who lived between 1772 and 1823. He was intellectually active during the Napoleonic wars of the late 18th and early 19th centuries. During this time, rent featured prominently in economic thought, owing partly to increased demand for foodstuffs to feed soldiers at the war-front. Land rents had risen sharply; and it was widely felt that the landlords were profiting from the misfortunes of the rest of the society. Economists of the time thought that the high prices of foodstuffs during that time resulted from the high rents that were being charged by the aristocratic landowners to the peasant farmers of the farmland that these aristocrats owned, but never worked. The landowning aristocracy at that time was losing considerable popularity because of the writings of the physiocrats<sup>2</sup> and other revolutionary tendencies on the European continent that gave birth to the French Revolution during this period. Ricardo himself, being a member of the new financial and business bourgeoisie was antagonistic to the landed aristocracy during the early period of his

life; although he grew older to become a substantial landowner himself. It has therefore been felt by some scholars that he developed his theory of rent as an attack on the landed aristocracy - as a distinct class from the peasant farmers.<sup>3</sup>

#### Derived Demand

Prior to the publication of Ricardo's work there was fervent discussion in intellectual circles that the high price of foodstuffs - especially wheat at that time resulted from the high rent that the aristocracy was charging tenant farmers for use of farmland in crop production. In other words, the prices of foodstuffs were thought to be originating from the high rent of farmland.

After rigorous research and analysis, Ricardo defined rent as a payment for the "original and indistructible powers of the soil".<sup>4</sup> He also asserted that high rents were "not a sign of the bounty of nature....(but)....an indication of the niggardliness of nature"<sup>5</sup> that had caused land to be scarce and unable to expand according to the demand for it that was occassioned by the need to use it for food production. Consequently, he believed that the price of wheat was high because of the high demand that existed for it at that time under Napoleonic war conditions; and not because of anything else. This, in turn, created a high



demand for the land that was suitable for wheat growing; and caused the tenants to attempt to outbid one another for the purchase of wheat farmland. This land "scramble", in Ricardo's opinion, is what caused high agricultural rents in England at the time.

Ricardo's findings were first published in 1815 bearing the title Essay on the Influence of the Low Price of Corn on the Profits of Stock; and were later elaborated in 1817 within a larger work called the Principles of Political Economy and Taxation. In both works Ricardo brought out clearly, and for the first time, the principle of derived demand through his argument: namely, that factors of production are not demanded for their own sake, but because of the demand of the goods that they are used to produce. This means that agricultural land is demanded because it is used for growing wheat, and not because of itself. Consequently, the price of agricultural land is likely to be positively correlated with that of the commodities that such land is used to produce. Ricardo was therefore able to explain that a rise in the demand for wheat would lead to a rise in the demand for farmland, and therefore to the high prices of farmland in the form of the high rent that would be charged by the landlords for use of this land - as a result of peasant farmers trying to outbid one another for scarce agricultural land.

### Ricardian Model of Land Rent

In his Principles, Ricardo, like the physiocrats before him, was basically concerned with the determination of those laws which regulate the distribution of the produce of industry between different social orders of society - like aristocratic landowners, bourgeoisie 'capitalists' and labour. His approach was by means of a theoretical model which he constructed to simplify the complexities of the actual economy - in order to be able to explain the nature of the major variables that influenced the economy of his interest; and therefore ~~the wealth-distribution mechanism within such an economy.~~

- He assumed that his economy was predominantly agricultural, because even during his time urbanization had not become a significant feature of any economy.
- He ~~father~~ assumed that (a) there were many grades of land qualitatively within this agricultural economy; (b) that land was put to one use only - agriculture; (c) that land was arranged by quality, acre by acre, from the poorest quality to the richer quality - and vice versa; (d) that all factors of production used in conjunction with this land for crop production were homogeneous in quality with the exception of land itself; and, (e) that the supply of land was limited and finite in this economy for each qualitative category.

Under these assumptions good land would be cultivated first; say - the best hectare,

using the homogeneous constant amounts of other factors of production. As demand for agricultural land increased, all good land would be exhausted. Poorer and poorer land would be cultivated in succession (if demand continued to increase) until there would be no cultivable land remaining. Since, according to him, rent was payment for the "original and indistractable powers of the soil", land that yielded no agricultural produce (revenue) was not entitled to rent; and in fact did not receive any rent. The amount of rent payable increased according to how capable land was in yielding food for the farmer. Richer land would command higher and higher rent; and the richest land would have the highest rent in the economy.

Figure 3-1 illustrates the rent model where the horizontal axis represents all land arranged qualitatively from zero to  $N$ . The  $N^{\text{th}}$  hectare manages to produce only that amount that would just be able to pay for the cost of other factors of production that are used in conjunction with this land; leaving no surplus "profit". All other hectares above  $N$  qualitatively and to the left of  $N$  in the diagram can pay for the costs of other accompanying factors  $O-C$ ; and in addition can earn some surplus, whose magnitude would depend on the quality of this land. The best quality land earns

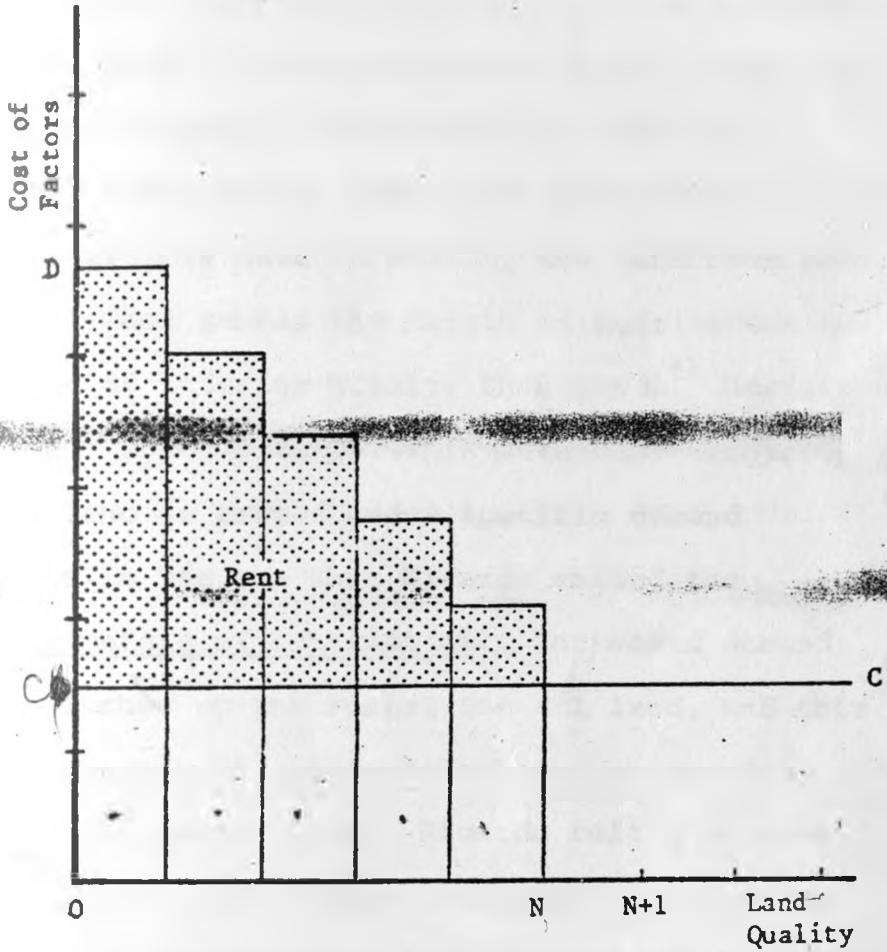


FIGURE 3-1: Ricardian Model of Rent.

(SOURCE: Graham Bannock, et al. A Dictionary of Economics, London, Penguin, 1971).

the maximum rent or surplus payable for land in this economy, as shown by amount C-D in the diagram. An increase in demand for land; and therefore to higher earnings from land. Assuming that the price of other factors remains constant, all land in this hypothetical economy is able to earn more money if the demand for foodstuffs increases. Consequently, even the previously sub-marginal land earns some surplus after the other factors used in working the land have been paid for. This pushes the margin of cultivation to other land of inferior quality than the  $N^{\text{th}}$  hectare - say to  $(N + 1)^{\text{th}}$  hectare. This outermost margin up to which land is farmed under specific demand conditions is the one that Ricardo called the extensive margin of cultivation. Increased demand for land pushes up the rental for all land, and this extensive margin of cultivation keeps on receding to poorer and poorer land. Ricardo felt that some of the 18th century farmers in England were paying rent even for poorer wheat land because the extensive margin of cultivation encompassed the quality of land these farmers were occupying.

#### A Simplified Model of Scarcity Rent

The Ricardian rent model has received considerable attention from economists since the publication of his Principles in 1817. The modern rent theory is now partly based on this model; and

has been elaborated from various viewpoints by various scholars. For the purposes of this discussion, one of the most comprehensive explanations of the rent theory is found in the work co-authored by Alfred Stonier and Douglas C. Hague. In their work, these authors have developed the Ricardian approach to provide the economic rationale for the model that fits the late 20th century neo-classical economic thought. They offer simplified, but then comprehensive, explanations of some of the concepts that are encountered in the neo-classical discussions regarding the rent theory. This chapter therefore

owes much to their explanation.<sup>6</sup> The following sections attempt to explain the meaning of some of the commonest concepts of rent theory.

### Extensive Margin of Cultivation

Assume that there is one island made of homogeneous land, equivalent in fertility and all other productivity attributes. (This implies a fixed supply, infinitely inelastic, of the land in this model). Then, all land can be used to grow any kind of crops; and there is no inherent difference between the situation or location of one acre of land and the other. These assumptions are unrealistic, but are useful in the early stages of model formulation - using them, the differences in location of different places on the island that are real life realities but may complicate the model are eliminated. In addition,

assume that all land in this island is used for growing only one product - maize - and nothing else.

Also, assume that all the land in this island is owned in equal identical sub-divisional parcels (plots) by a tribe comprising a large population - each tribal inhabitant owning only one parcel. This assumption eliminates the monopoly aspect of land ownership that would complicate the argument. Therefore, we reiterate that each parcel - say hectare - on the island is assumed owned by a different person.

Ownership is obviously different from occupation. In this hypothetical island, land is not occupied for some reason. Stonier and Hague assume that "..... the ancestors of the present landowners came to the island centuries ago. They were then granted (these) pieces of land which have remained in the hands of the same families ever since, though none of the descendants actually live on the island." This makes it easy to postulate that none of the owners wants to farm the land himself, to buy or to sell their land plots on this island. Therefore, land is assumed to be unutilized; and the market for land on this island is non-existent.

If any member of this tribe now wanted to begin farming activities - growing maize - on this island he would perhaps bring with him a simple plough to help him work the land. He therefore becomes the labour factor, and his plough becomes the capital.

Then, he settles on the first hectare of land. Demand for agricultural products is introduced in this model by the assumption of a perfectly competitive world market for the maize grown on this hypothetical island. The Islands' individual maize farmer then becomes a commodity price taker; and has no influence on the situation of the world market for maize. Therefore, even if the island as a whole is cultivated, its entire maize output is not enough to have any influence on the world price for maize.

When the first farmer arrives, he is unlikely to ~~occupy the whole island. He has to start somewhere.~~ Since all land in this island is homogeneous; and there is perfect competition between landlords, the first farmer will pay no rent. This is because if any landowner tries to charge him rent he would move to the next identical piece of land. Therefore, all land would be available at no rent. If this farmer is rational, and has a profit maximizing motive, he will go on extending the area under cultivation, until the last hectare that he cultivates produces no additional revenue from his maize growing activity. This, in economic terms, means that he can extend his production until his marginal product equals his marginal cost - KAP: 140 i.e. zero; because he pays no rent. Thus, he will be maximizing profits; and will have reached the extensive margin of cultivation when the last hectare that he cultivates produces the revenue that equals what it costs to hire that hectare. If



it costs nothing, then that revenue is zero.

Figure 3-2 shows the demand and supply curves for land on this island as lines DR. and SMR. The Demand curve for any factor of production is identical to its marginal revenue product curve. So this farmer faces the falling marginal revenue product (demand) curve for land. The curves have been made straight for simplicity's sake. The supply curve for land in this island - part (a) of the diagram - is SMR. It is vertical and straight, showing that there is only a fixed amount of land available for maize ~~cultivation in this island - i.e. 0M hectares.~~

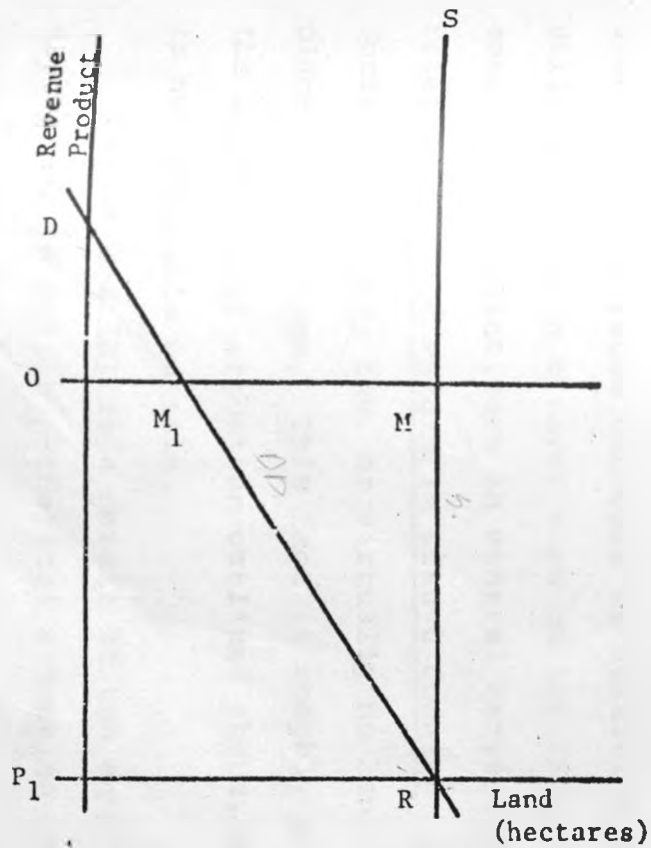
In diagram (a) there is no positive price for land at which demand equals supply under the above assumptions; because land is not for sale on this island. The diagram illustrates that the first farmer cannot possibly farm all land in this hypothetical island under these circumstances. If he did so, he would incur losses because farming beyond  $M_1$  yields marginal revenue products that are below zero. If all land in the island were to be cultivated by this farmer all the landowners would have to reimburse this single tenant farmer the losses he incurs beyond his extensive margin of cultivation - beyond the point where he obtains zero marginal revenue;  $F_1 - O$ . Because his technology or ability would not allow him to undertake such a great task; and because no landlord would be willing

to pay anyone for farming his land without any benefits, the single peasant farmer uses  $O-M_1$  hectares of land shown in parts (a) and (b) of figure 3-2. Part (b) is the same as part (a) but at different vertical and horizontal scales. As long as he uses this amount of land he would pay no rent.

Although this is purely a hypothetical situation, it is not unlike what it might have been in Kenya about 160 years ago when tribal land was plentiful, and the sparse tribal populations were not able to farm all the available land. Little food sales took ~~place at that time through barter and other customary~~ systems. However one could hypothesize that the use to which food cultivated on these tribal lands was put is approximately identical to the commercial and private use of food at the present time. The few tribal members who worked on the tribal lands (sometimes mixing pastoralism with agriculture and other subsistence land use) farmed up to their extensive margins of cultivation - where their marginal revenue products were equal to their marginal costs of cultivating their latest hectare.

Since the food market, and the market of other farm products was largely undeveloped at this time we can theoretically ignore its existence, and hypothesize that the farmers' marginal revenue product was mainly identical to the marginal utility of food for feeding each individual peasant family; and the

(a)



(b)

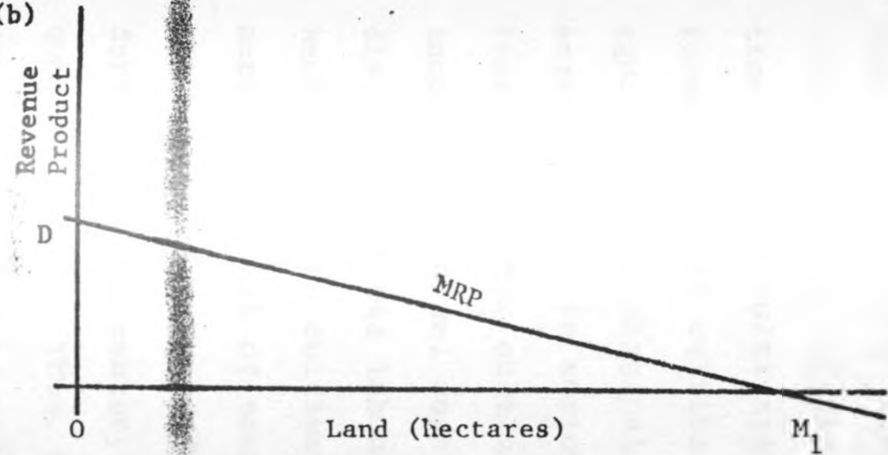


FIGURE 3-2: Extensive Margin of Cultivation when one farmer utilizes the land alone in a hypothetical island owned by many hypothetical absentee landlords.  
(SOURCE: Alfred Stonier and D.C. Hague, A Textbook of Economic Theory; p.314).

other members of the extended polygamous families of the time. The marginal costs facing these farmers incorporated the marginal disutilities of and the time spent in cultivating each extra acre that each farmer opted to cultivate. These can be roughly equated to the marginal utility of leisure forgone to engage oneself in agricultural activity. This means that each farmer cultivated as much land as he could, incurring marginal costs in the form of marginal disutility of his labour while working on each additional hectare that he cultivated; and equating this to the marginal product of each hectare he chose to cultivate. The situation changed in the later 19th century and during the 20th century, when trade in foodstuffs was commercialized. Thus, marginal costs and marginal revenues can now be visualized in monetary terms instead of the vague concepts of utilities and disutilities. For a clearer view on the 19th century subsistence agriculture in central Kenya the reader is referred to Land Reform in Kikuyu Country by M.P.K. Sorrenson.<sup>7</sup> Very few, or virtually no land sales took place at this time. This fact is roughly parallel to the hypothetical situation outlined above, where land is not available on sale.

Figure 3-2 (b) is a detail of the equilibrium of the farmer in this hypothetical situation that could apply to the agriculture and sub-pastoral, subsistence farmer in these tribal economies of Kenya during the early 19th century and before. It illustrates

that the farmer paying no rent equates the marginal revenue from land with its marginal cost - its marginal disutility of cultivation.

Assume now that the success of the first pioneer peasant farmer has attracted new entrants into the island's farming industry, and that all the farmers are now equally efficient; then no rent will be payable as long as the new entrants are not such a large number that they can farm all land in the island. Relax the assumption of a single farmer, and allow for the gradual increase in population.

~~This situation is parallel to a growing tribal~~  
population; but in a case where the numbers are not large enough to farm all the available tribal land. This leaves the assumption of perfect competition among landowners intact; so that any landowner who charges any rent to any of these enterprising peasant tribesmen makes the peasant to move to land owned by another landowner or another clan where he would not have to pay any rent.

This situation changes when all the land in this hypothetical island or on the tribal territory has been occupied; and is effectively cultivated. There may still be farmers who may want to come and start farming on the island. Under these conditions the landowners may be unwilling to disappoint their existing tenants by terminating their tenancies and replacing them with aspiring tenants. Therefore, these

new peasant farmers may not be able to replace the existing tenants immediately. The new tenants may have to wait until the existing terms of tenancy expire to be able to start farming on the island. In addition, the landowners could be interested in farming the land personally. This implies that they may be reluctant to part with their land for one reason or another. This reluctance increases if members of their clans or families also need the land on the island; and it would be preferable to let the tenancy devolve to the members of the family or the clan of ~~the landlords rather than to total strangers.~~ Under these circumstances total strangers, and sometimes even members of the landowners' clans, find it necessary to give the landowners some kind of inducement so that the landowners can be willing to part with the use of their land for some time; and to allow the prospective tenants to use it. From this point onwards - as the population increases - some rent will have to be charged; and all the peasant farmers are faced with increasing rent functions over time as the demand for land use in the island increases.

Any increase in the numbers of farmers demanding land will reduce the amount of land available to each farmer because the supply of land on this island is fixed. It is at this time that the real marginal costs of land are visible in monetary terms as the rent for hiring an extra hectare of land. Each

farmer, besides having the disutility of hard farm labour to consider, has now to pay attention to the amount of rent he is paying for land; and whether he can afford it within the rational limit of the economic operation of his farming activities. Consequently, each tenant will use only those hectares of land on this island in which the yield of the marginal hectare in marginal revenues equals the marginal cost of hiring the same hectare; in the interest of profit maximization. However, they can only be able to afford a smaller area of land than when no rent was chargeable on the land of the island. Stonier and Hague conclude that:

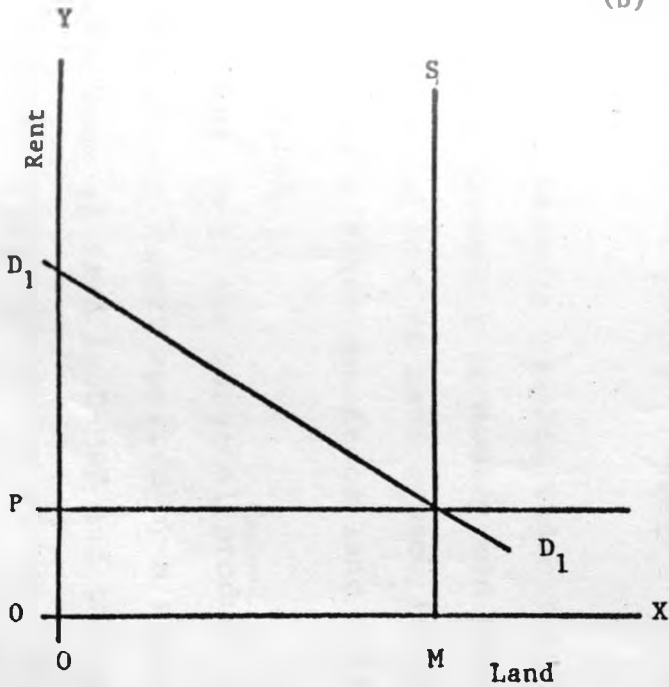
(t)he increase in the number of equally efficient farmers thus reduces the amount of land used by each. For each farmer the revenue product of his marginal ..... (hectare) ..... of land will be the same; for each it will be equal to the rent of an acre of land. All farmers, being equally efficient, will have the same (area) of land.<sup>8</sup>

The situation on the whole island's "man-land relationship" is shown in figure 3-3. In the diagrams (a) and (b) the total fixed supply of land on the island is still assumed fixed. It is shown as SM hectares in diagram (a); where also the demand curve for the island's entire farming industry is  $D_1 - D_1$ . However, there are a number of cultivators, and not merely the individual farmer as shown in figure 3-2.

Therefore, the demand curve represents the horizontal addition of demand curves for land facing all the farmers that now use the land on the island. It is negatively sloped because the number of these farmers is relatively large; given the universal price of maize. All land on the island is utilized and rent  $OP$  is paid, and reflects the market equilibrium between the demand for land on this island, and the fixed supply. In diagram (b) the position of an individual peasant farmer is illustrated. His marginal revenue product curve is the same as that of ~~the single farmer in figure 3-2; because of the~~ assumption that the farmers are equally efficient; and because we have not relaxed the assumption that each farmer in the island is a price taker of the world market price for maize. However, the rent per hectare has risen from zero to  $P$ ; and each peasant farmer now finds it profitable to farm only  $O-M_2$  hectares instead of  $O-M_1$  as in Figure 3-2. If the farmer is <sup>rational</sup> ~~is~~ rational and aims at profit maximization, <sup>SP</sup> he will farm up to the point where his marginal revenue product of the last hectare equals the cost of this marginal hectare. In the perfect competition assumed for this model the cost of this marginal hectare of land would also equal the going rent per hectare of all land in the island. The area cultivated by each peasant under these conditions still remains the extensive margin of cultivation;



(a)

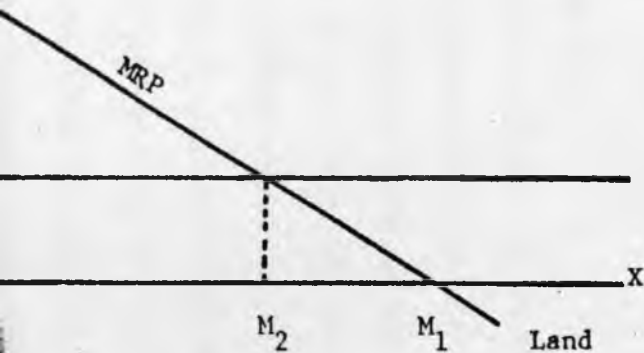


(b)



FIGURE 3-3: Extensive Margin of cultivation island is occupied by peasants

(SOURCE: Alfred Stonier and D.C. Hague p.315).



when all land in the hypothetical farmers, and rent is payable.

A Textbook of Economic Theory,

where the last hectare that is hired produces exactly what is cost to hire, i.e. OP shillings.

Intensive Margin of Cultivation

This concept is considered in the context of the cost of all the other factors of production that have to be combined with land for the production of food. The focus is also on the marginal productivity of additional "doses" of labour and capital applied to the land. Because the amount of land used by an individual farmer changes every time the land rent changes, the marginal quantities of labour and capital applied to land each time the land rent changes are necessary. This is caused by the fact that each time these other factors would have to be applied to different amounts of land in response to the changes in land rents.

The model becomes complex under these conditions, and it becomes necessary to modify and simplify it farther. This is done by having each individual farmer use only a fixed amount of land with a fixed amount of capital.

In Figure 3-4 the marginal <sup>Revenue</sup> product curve (MRP) of the amounts of labour applied by a single farmer to a given area of land is D-MRP and the supply of his labour is infinitely elastic as at M-S. The farmer is then in equilibrium when he applies OL hours of his own labour. O-M is the amount of money which he must be paid if he is to be induced to work for any

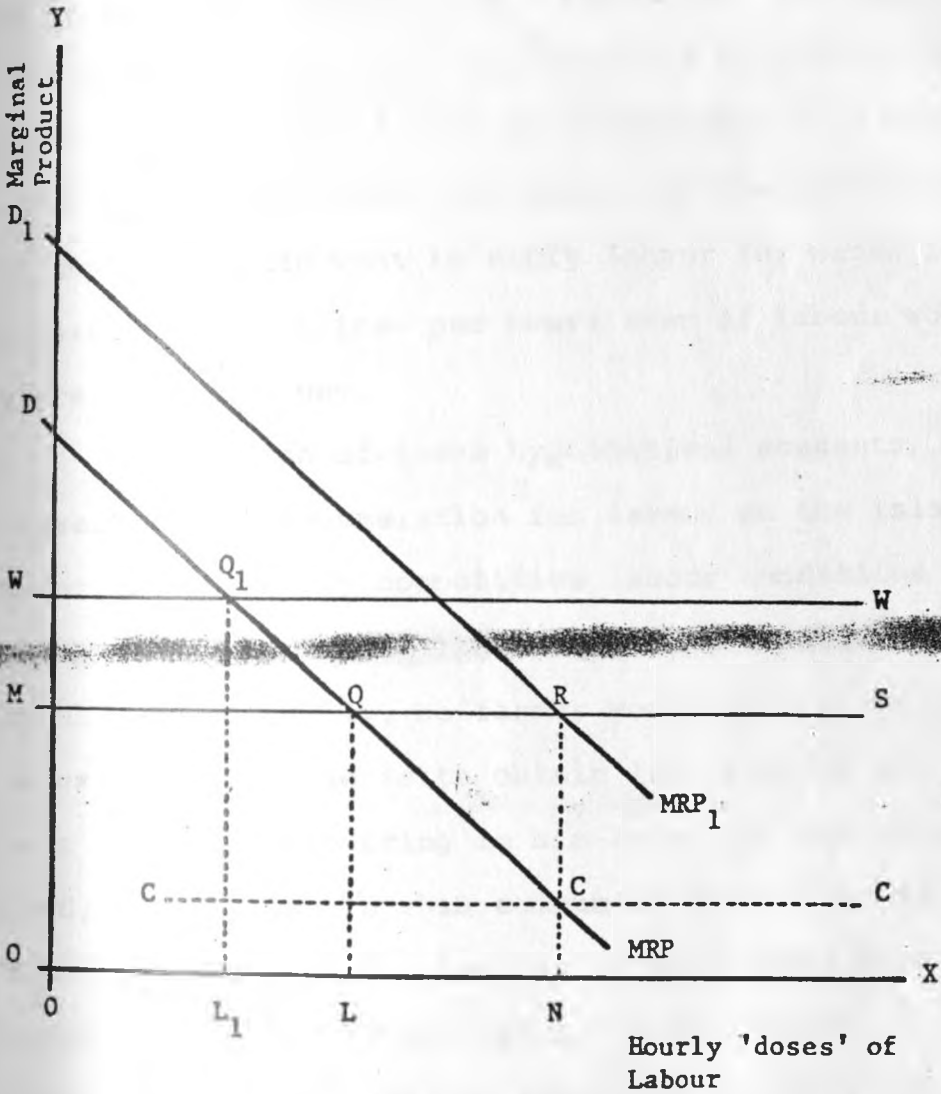


FIGURE 3-4: Intensive and Extensive Margins of cultivation.

(SOURCE: Alfred Stonier and D.C. Hague, A Textbook of Economic Theory, p.320).

given extra hour. In this model labour is assumed to be perfectly competitive. Therefore, all labour is available at the same wage-rate  $O-M$  on the entire island. Nobody would want to be employed at a wage-rate below  $O-M$  shillings per hour. On the other hand, no employer would want to employ labour for wages in excess of  $O-M$  shillings per hour; even if labour would appreciate more pay.

In the case of these hypothetical peasants, therefore, the remuneration for labour on the island under the perfectly competitive labour conditions also applies in a similar fashion, and is illustrated model. Consequently, no farmer would like to work for an extra hour if he is to obtain less than  $OM$  shillings as a result of labouring in his farm. On the other hand, nobody else in this community is willing to employ him as a farm labourer for more money than the going wage-rate:  $O-M$  shillings. Under these circumstances, each farmer equalizes his marginal cost of working on the land - his time spent and his marginal disutility of labour - to the going wage rate; or his marginal revenue that he can obtain for working an extra hour. The opportunity cost of working on the farm becomes the wages forgone each hour the peasant farmer is not employed as a labourer. This explains why his marginal cost of working on his farm equals the marginal wage-rate available to him in this hypothetical economy. This marginal opportunity cost must be

equalized to the marginal return that he obtains on his farm for working an extra hour. This means that under these conditions the peasant farmer can only earn a constant return of OM shillings per hour for his labour, whether or not he works on his farm.

The same argument can be advanced with regard to capital, assuming a perfectly competitive market for capital, and an infinitely elastic supply for capital as that of labour in figure 3-4. Any seller of capital goods at prices below O-M leaves the market because he is not getting enough returns for it; and any seller of capital for rates above O-M does not find any market for his capital because other capital is available in plenty at the pay-rate O-M. In a similar manner the cost of capital in this economy is assumed constant. To simplify the matter we may assume that it is equal to that of labour.

Using the demand curve D - MRP the farmer applies labour and capital until the marginal costs of the last units of labour and capital equal his marginal revenue product. The marginal revenue product for these factors happens to be the same as that of land; because land has to be combined with these other factors to yield this marginal revenue product. It is also the demand curve for other factors because it demonstrates his marginal return to every composite unit of the other factors that is employed on land.

The farmer's equilibrium is therefore at Q where his demand for all factors of production equals the supply for these factors. The level of factor employment is at L and the factor price level is M-S under the infinitely elastic supply conditions.

Any greater application of factors above quantity L means that the farmer operates at an inoptimal level where the supply of the factors is greater than the demand; and he obtains a smaller return than he requires at for example N-C shillings.

On the other hand if he employs less factors than the profit maximizing (or equilibrium) quantity L, he obtains a higher yield per unit factor than it costs to hire the factor. These marginal quantities which yield more to the farmer than the last dose at the profit maximizing quantity L are the ones for which the rent is payable. Each marginal factor input between O and L has surplus earnings above the market price M; which could be as high as M-D. Under normal conditions, in absence of peasant farmer competition, each farmer would keep all the surplus earnings of each of his marginal factor inputs between O and L; and the total would add up to a profit MQD over and above the total cost OMQL. However, if land is scarce these earnings from labour, capital and other factors will be used to pay the rent for the land. Competition among peasant farmers for the scarce land ensures that this surplus earning goes to the landlords;

because the peasant farmer will bid for the scarce land up to the time the surplus earning from these other factors is exhausted. If labour and capital are also scarce, this surplus will also be used to pay for their "rent" as well.

MQD in figure 3-4 therefore represents the rent paid to all the factors of production in this economy. Assuming that labour and capital payments are fixed, MQD could now be interpreted as land rent, given the price of labour and capital as O-M.

Quantity L is still the extensive margin of cultivation under these assumptions because at that quantity the marginal costs of all factors are equal and they are also equated to the marginal revenue.

A farmer who now applies more doses of labour and capital every hour raises the supply curve to WW. He still aims at equating his marginal costs to his marginal revenues but under these conditions his labour and capital will be employed up to quantity  $L_1$  where  $L_1Q_1$  equals O-W. He also will not work his land farther than  $L_1$  because by doing so he will obtain less marginal revenue of both labour and capital than their marginal costs. When these marginal limits of other factors (except land) have been reached; and as long as the margin for land is not yet reached, we say that land has been cultivated by this farmer to its intensive margin of cultivation. One can therefore conclude that intensive margin of



land cultivation is reached when the marginal revenue for every other factor used in conjunction with the land equals the marginal costs of these factors.

This can happen under three circumstances:

(a) Where the marginal cost of hiring land could be lower than the marginal cost of the other factors. In other words there is still room for expansion if other factors are not scarce; and (b) land could be available at higher rentals than other factors and (c) land rent could be equal to the marginal costs of other factors. In the first and third cases the ~~extensive margin of cultivation is equal to the~~ intensive margin; while in the second case there would be a tendency to utilize more of the other factors and less of land. This is a situation which is identical to the colloquial phrase intensive farming - where less of expensive land is used; with a lot more of the other cheaper factors.

If the intensive margin of cultivation is reached sooner than the time the marginal revenue of land is equated to its marginal cost the total land rent is  $WQ_1D$ ; obtaining when the supply cost of the marginal doses of other factors is higher. A rise in the price of other factors restricts the amount of land that can be worked; and reduces the demand for land and the total land rent payable to  $WQ_1D$  instead of  $MQD$ . On the other hand, if  $W-W$  indicates a rise in land rentals the total wage bill for other cheaper

factors will have fallen, and can equally be indicated by  $WQ_1D$ .

If the marginal revenue productivity of the farmer rises to  $D_1 MRP_1$ ; either because the farmer becomes more efficient; or because his product per unit factor rises; he can then apply  $O-N$  doses of other factors; which will be larger than the original  $O-L$ . The marginal cost is still at the level  $O-M$  for the marginal factor; but some factors can be able to earn up to  $M-D_1$  as surplus earnings. This increases the level for which they could bid for land rent to

~~$MRD_1$ ; and the intensive margin of cultivation is~~  
pushed outwards by this increase in marginal revenue.

"A farmer will (therefore) push the intensive margin of cultivation up to where the marginal 'dose' of labour and capital brings a return just equal to the payment demanded by it - to the point where the marginal productivity of labour equals the marginal cost of labour."<sup>9</sup> When land is scarce, the intensive margin is where the marginal cost of land equals its marginal revenue product.

Given the supply curves of labour and capital the farmer adjusts his level of production until the intensive margin of cultivation is reached. The scarcity of land determines whether this is the same as his extensive margin of cultivation. The adjustments of both these margins takes place simultaneously to meet the changing conditions; and they form the basis

of the decision-making of the farmer at any one time.

### Scarcity Rent

In the above models the supply curve of land is infinitely inelastic. Secondly, all land is homogeneous, and perfect competition prevails amongst the tenants, and amongst the landlords. This means that land is available at the same rent, which is determined by the supply and demand for land at any one time. Therefore a rise in rent may be caused by an increase in the price of the farm product, maize which causes higher demand for land, and greater bidding competition for the existing land amongst the tenants. If land becomes more productive, and yields much more of maize per hectare - assuming the market for maize is unaffected - this land will be preferable to other land elsewhere. Bidding for the same land will also cause an increase in rent. This occurs even if the price of the product has not increased - because the farmers are bidding for a unique scarce factor; the land that is superior to other land, and that can yield higher output, and therefore higher profit. The type of rent arising out of these two situations is called Pure Scarcity Rent. It obtains only in a situation when the homogeneous commodity land becomes scarce. This happens because a rise in the price of land does not cause a physical increase in the amount of land available. The high

earnings of land that result from this scarcity can persist for some time and can continue to increase as land becomes more and more scarce relative to an increasing population. This fixity of supply is the distinguishing criterion between scarcity rent for the homogeneous factor land and the price of other factors of production.

Figure 3-5 shows this scarcity rent under conditions of fixed land supply. In diagram 3-5 (a) a rise in the price of land does not cause an increase in the commodity land that would be available in the market because of the inelastic supply  $S_1-Q_0$ . The increase in price from  $P_0$  to  $P_1$  is greater than that of other factors and commodities with elastic supply  $P_0^*-P_1^*$ ; as shown in diagram (b) - which is at the same scale as (a). This increase due, in these diagrams, to identical vertical shifts of the demand for both commodities from  $D_0$  to  $D_1$  causes only an increase from  $P_0^*$  to  $P_2$  in diagram (b). Any farther increases in demand for land to  $D_2$  still would not induce any increase in the quantities of land supplied. Thus land earns scarcity rent, as compared to other factors and commodities, whose supply can easily respond to demand. It must be noted here that any farther increases in demand for other commodities should be able to induce movements along the supply curve as shown; and then shifts in the supply curve to the right.

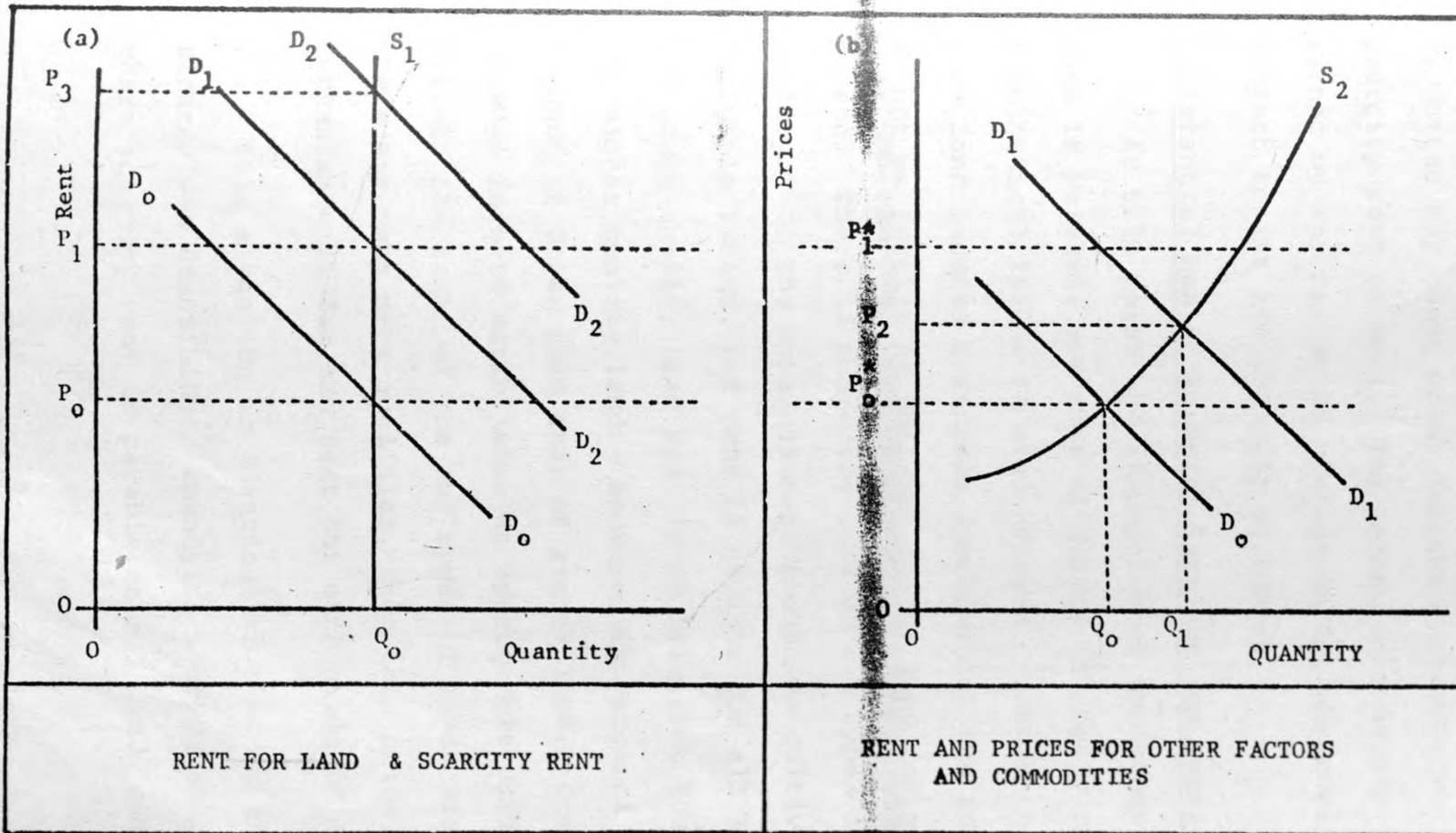


FIGURE 3-5: Scarcity rent for land and that of other factors of production.

Any inelasticity of supply resisting either movements or shifts may cause other factors to earn some scarcity rent as well. The amount of scarcity rent earned by any factor of production is, obviously, subject to its inelasticity of supply.

Differential Rents, Transfer Earnings and Quasi-Rent

At this point the assumption of homogeneous land is relaxed; and that of fixity in supply on the hypothetical island is also relaxed. Assume that more land becomes available somehow, but the new land is not as fertile as the rest of the land for some reason. There is therefore land of two types in quality. If the population is enough to cultivate the whole island, and rent is payable for all land the lower quality land will fetch less rent than the higher quality land - because its marginal product is lower than that of richer land. Competition between farmers establishes an appropriate difference between the rents of the two types of land. If there are many more qualities, then this price mechanism will fix the rent for each grade of land.

This situation is identical to the one that Ricardo was describing; embodying a complex scenario where scarcity rent is payable to all land, but at

different levels due to the different qualities of land available. The situation that allows for differing land qualities yielding different returns, and inviting different rents according to each individual return for each land quality is said to cause differential rents. The decreasing returns from poorer and poorer qualities of land drop to a point where return from land of the poorest quality can just afford to reimburse other factors of production. Land yielding less than this would not be worth cultivating. At this point the extensive margin of cultivation described above is reached for the farming industry in this multi-quality farming land situation. Increased demand for foodstuffs causes increases in areas of all land put under cultivation because it guarantees an increase in the price of food, and a higher return per hectare of every land of every quality. This means that the D-MRP curve shifts to the right, and the extensive margin of cultivation would now incorporate land of poorer quality than before.<sup>10</sup>

It must be emphasized that rent is not merely due to the existence of land of differing quality and fertility. It is caused, as we have seen above, by the scarcity of land. Therefore it can be payable even if land is of homogeneous quality, as long as such land is scarce. However, differences between qualities that in real life may be caused by factors like location, differing soil fertility, legal factors

and similar things, will cause differences in rents payable to different types of land. Rent will be lower on poorer quality land, or land encumbered by these other factors and will be higher the better the land is. Some qualities of land will be so inferior that they are incapable of any kind of production, and they will earn no rent at all - hence the term differential rent as defined above.

Ricardo examined this kind of situation, and in his analysis he was able to show that the poorest lands would fall beyond the extensive margin of cultivation. This kind of land is what he called no rent land.<sup>11</sup>

If, on the other hand, the price of maize were to increase it may pay to develop some artificial methods, or technology for working these lands. By means of this technology the extensive margin of cultivation is able to spread and to include the formerly no rent land.

### Transfer Earnings

By restricting our focus on the payment accruing to one-crop land only, we have been able to examine the question of scarcity; and to treat all the rent earned by land by virtue of its scarcity. Land is not reproducible by virtue of its being a "free gift of nature", and therefore no costs are incurred to retain land in its physical existence. In our earlier assumptions, land was presumed suitable for only one use. This implies that there is no need for farmers



to make any payments so that land can be kept suitable for growing maize as we assumed above; and to retain it under the land use of maize growing. Of course, fertilizers may be added, but the land use to which this particular land is put according to the assumption will always be maize growing.

The assumption of a single - crop land is, however, unrealistic. Under normal circumstances, most land is capable of supporting more than one kind of crop. In other words, maize land could have alternative use like growing beans, or potatoes or cabbages, and so on. Therefore, in view of these alternatives, if land is devoted to growing maize it means that the other alternative uses to which land may have been put are forgone. It means that the opportunity cost of growing maize is the revenue that should be earned if land was put to any of the other alternatives. The revenue earned from maize growing must therefore be at least equal to the revenue earned by the most lucrative of all the other land use alternatives. In other words land will shift to other uses if it can earn higher revenue there - leaving the land use of maize growing. To keep land devoted to maize growing or to any other specific crop, that land must be paid enough to prevent it from leaving the industry of the specific crop it is devoted to; and from shifting to other land use. Land must therefore be capable of earning

at least the equivalent of the revenue forgone by not growing alternative crops as land is put to the specific use in question.

Take an example of a marginal hectare of maize that earns 60/- in rent and that produces 60/- in revenue from maize sales. Such land will remain under maize cultivation as long as no other land use is capable of earning more than this revenue for the marginal hectare. If, on the other hand, growing coffee on this marginal hectare can make it earn 80/- as marginal revenue the maize producer has to be able to raise 80/- in rent to be able to prevent the land from transferring from maize growing to coffee growing. This payment is the marginal cost of acquiring the marginal hectare, and of keeping this marginal hectare under maize cultivation. This means that inevitably the rational maize farmer has to equate his marginal cost with his marginal revenue; and it puts an obligation on him, that this land should now be able to earn at least 80/- from maize growing, otherwise it changes its use into coffee growing.

The amount of money that is therefore the next best revenue that could be earned by any land under an alternative land use from that one earning the highest revenue is therefore called transfer earnings. This is the minimum revenue that the current land use must be capable of earning so that the land can remain employed in this current land use. Land can

earn higher revenue than this minimum, but it must be capable of earning at least that minimum. In our example, if the marginal hectare has to be attracted to coffee growing the coffee farming tenant must be able to pay at least 60/- in rent for this hectare; otherwise the land would remain under maize cultivation. 60/- is now the transfer earning of land under coffee. The difference between the marginal revenue accruing from coffee farming (80/-) and this transfer earning (60/-) is the "true rent" of the land under coffee cultivation (20/-). This rent is what is known as economic rent in neo-classical economic theory.

Economic rent can therefore be defined as the payment for any land, or any other factor of production that is earnable over and above the transfer earning of that factor. Transfer earnings for any factor is that earning by that factor that is enough to keep the factor in any specific use or employment; and to prevent it from being induced to move to alternative employments.

#### Quasi-Rent

Any factor that has inelastic supply both in the short and in the long run like land earns pure scarcity rent as defined above. Pure scarcity rent can now be said to be the difference between the highest revenue that any factor can earn and its transfer earnings; and we have equated this above to economic rent. For example, natural ability which cannot be reproduced

even if earnings rise is found in people like musicians, artists, etc. A musician can command very high pay because of his talented performances. We can divide his high remuneration into two parts: the salary that ordinary people of his age and education can earn; and the surplus over and above this salary level of ordinary people of his age and education. His transfer earnings is the salary that he could earn like ordinary people in alternative employments that are not musical performances. His scarcity rent - analogous to his economic rent - is ~~his other earnings above his transfer earnings.~~

Other factors whose supply is inelastic in the short run but elastic in the long run, such as machines and appliances that could be manufactured<sup>12</sup> have high rents in the short run that can be divided into the two parts that are discussed above - scarcity rent, and transfer earnings. However, they are not fixed in supply like for example land and natural talent; and their supply can be increased in the long run. Another characteristic of these factors is that they are also relatively durable in use. The earning of these factors that is analogous to scarcity rent changes over time as their supply increases. It cannot therefore be regarded as economic rent in the strict terms outlined above. It is also not interest or profit, but some kind of rent. Marshall attached great importance to the analysis of the earnings

from this kind of factor or appliance, and coined some special term for these earnings - quasi rents. He did not define quasi rents explicitly or formally, but the term has been popularly applied to scarcity rents or economic rents payable above the transfer earnings of these kinds of factors. The quasi rent of a machine or an item of real capital is its total short-period receipts, less the total costs of hiring the variable factor inputs used in association with the machine and the cost of keeping the machine in running order during the short run.<sup>13</sup> This is translated as the payment for the machine over and above the costs of keeping the machine in its current employment; and from shifting to alternative modes of employment.

### Summary

We can therefore conclude that all the payments to the factors of production have the same economic characteristics in their response to the supply and demand of these factors. The payment for land is called rent in colloquial terms; but can be divided into two - economic rent (or scarcity rent), and transfer earnings. Some types of labour could also earn scarcity rent and transfer earnings. Real capital earns quasi rents and transfer earnings. The term 'quasi rent' is necessary to distinguish real capital whose supply can be increased in the long run - from

land and talented labour and similar factors with infinitely inelastic supplies. It can also be concluded that some skilled entrepreneurs earn profits which are analogous to quasi rents (because in the long run entrepreneurial ability can be acquired) and transfer earnings that keep their management techniques hooked to the present enterprise; and prevents them from trying alternative ventures.

Liquid capital earns interest which is some kind of a quasi rent (because some liquid capital can be obtainable given a sufficient span of time) and ~~transfer earnings that prevents such liquid capital~~ from being invested in alternative ventures to the present investment. The discussion on interest and rates of return will constitute some of the content of chapter five.

FOOTNOTES

1 William Alonso, Location and Land Use: Toward a General Theory of Land Rent. (Cambridge, Mass; Harvard University Press, 1968), p.2.

2 Graham Bannock, et al. A Dictionary of Economics, p.17.

3 Alfred Stonier and Douglas C. Hague, A Textbook of Economic Theory. (London, E.L.B.S. and Longmans, 1976), p.310.

4 David Ricardo, Principles of Political Economy and Taxation, (ed. Piero Sraffa), (London, p.67; as cited by A. Stonier and D.C. Hague, pp.311-312).

5 Alfred Stonier and Douglas C. Hague, A Textbook of Economic Theory, p.310.

6 Ibid: pp. 312-334. I am deeply indebted to both authors for the following analysis of modern economic concepts of rent. I could find no other textbook that gives better treatment to these concepts. Therefore, the analysis of these concepts (unless otherwise indicated) follows very closely the arguements advanced by them in their authoritative textbook. I am, however, fully liable for any textual distortion or misinterpretation of their fine work.

7 M.P.K. Sorrenson, Land Reform in the Kikuyu Country, (Nairobi, Oxford University Press, 1967), chapters 1 and 2.

8 Alfred Stonier and D.C. Hague, A Textbook of Economic Theory, p.315.

9 Ibid., p.318.

10 Ibid., p.320.

11 David Ricardo, Principles of Political Economy and Taxation, as cited by A. Stonier and D.C. Hague, pp.315-329.

12. Alfred Marshall, Principles of Economics, (London, Longmans, 1926), p.74: as cited by A. Stonier and D.C. Hague, Ibid.

13 Alfred Stonier and D.C. Hague, A Textbook of Economic Theory, p.329.

## CHAPTER FOUR

### LOCATION, LAND RENTS AND LAND VALUES

#### Introduction

The foregoing discussion on land rent has been going on with one assumption, that it did not matter where one farmed on the hypothetical island. Land was assumed to be homogeneous, and no parcel was supposed to be located in an inferior place to the other. The basic determinant of differences in rent has been the quality and the productivity of land. The rent on the most productive land has been based on its advantage over the least productive land. Competition among tenants has ensured that the full advantages go to landowners in the form of rent.

However, Ricardo recognized that land has another factor influencing the reward payable to it as a factor of production. He understood that land which is nearest the market bears lower transport costs on its produce than more distant land, and that this advantage also accrues to landlords in the form of rent as a result of competition among the farmers. In spite of this Ricardo devoted his attention primarily to fertility and quality differentials. The theory relating to rent with respect to location from a market centre was developed a few years later in Germany by another economist who was working independently - J.K. Von Thunen,<sup>1</sup>



The Von Thunen Model of Land Rent

Johann Heinrich Von Thunen: 1783-1850.

Von Thunen was born in East Friesland, N.W. Germany, a member of the Prussian land-owning aristocracy, the Junkers. He attended an agricultural college in Holstein prior to enrolling for a degree course in agriculture at the University of Gottingen. After graduation he spent most of his life on his 475 hectare estate "Tellow" which he purchased in 1810; while trying to investigate on the methods of improving agriculture through the application of some English agricultural methods, mathematical analysis, and experimentation. His investigation also touched on what determined the most profitable location for various agricultural activities.

In 1826 he published Der Isolierte Staat in Beziehung auf Landwirtschaft und NationaloKonomie : or The Isolated State; in which he built a general model that would be useful in explaining what causes the spatial distribution of agricultural activities. The domain of the model consisted of an imaginary landscape over which certain specified conditions or constraints prevailed. The agricultural patterns that resulted from these conditions were then hypothesized. Later in this chapter it is acknowledged that the real agricultural patterns are extremely complex; reflecting a variety of economic,

climatic and cultural conditions that influence the assumptions of the model to give the real world agricultural pattern its complexity.

His assumptions included, first of all, a single market occupying a point in space (punctiform market) which is analogous to a central place, or a city; but then, to simplify spatial analysis, this near homogeneous market-place was assumed to be a point in space. This market centre was in an isolated, isometric planar surface. This meant that this point was deemed to be in the middle of a plain of featureless terrain, flat and accessible in all directions - unitropic. Thus, all the surplus commodities from the surrounding areas were sold into this market.

In addition, the tributary area of the punctiform central place - or this unitropic space surrounding the punctiform market - was considered to be homogeneous in terms of environment, and in terms of productivity per unit of land for any given crop. The next assumption involved transportation - that this agricultural hinterland was traversed by only a single mode of transportation. During his time (early 19th Century) the ox-cart was the most popular and affordable mode of transport available to most farmers. Von Thunen was thinking in terms of this mode of transportation by which most farmers took their produce to the market. Using this mode of transportation, all areas

within any distance from the market had equal accessibility to this market. This implied that all transportation lines within this uni-tropic plain were radially focussed on the market town. Moreover, transportation costs, which were assumed equal per unit distance travelled in all directions, would vary directly with the distance from this punctiform market; and would be borne directly by the farmers, who had to ship all their commodities to this punctiform city in their fresh conditions: suitable for sale and consumption.

His other assumption was that of an economic man in the agricultural industry of this uni-tropic plane. Each farmer would be rational in his economic operations, and would aim at maximizing profits. In so doing he would be completely flexible in the type of the crop he produces; so that he could change production at an instantaneous notice (depending on the conditions of the commodity market in this punctiform marketing centre); in order to maximize profits. The last assumption involved excluding the influences of any other market centre, or any other economic influences of other agricultural landscapes. He assumed that this fertile agricultural plain was surrounded by a desert; i.e. isolated in all directions. However, this isolation would be such as to allow uniform distribution in the location of numerous farmers over space.

These assumptions are, of course, premises that do not hold in the real world. However, the importance of market accessibility is of such great significance for most crops that if one examines them within the framework of this model examples relating to the model can be discerned in actual crop patterns of the world; as will be seen later.

Using the above assumptions Von Thunen proposed that each agricultural activity (managed by each rational farmer) would try as much as possible to locate nearest the market in order to minimize transportation costs. Transportation costs, being some of the fixed costs facing each farmer depending on his distance from the market, would eat considerably into the gross income the farmer obtains in the market from selling his produce. This means an 'erosion' of the profit obtainable from the agricultural activities. Each farmer would therefore try as much as possible to avoid paying any transportation costs, or to pay as little as he could possibly manage; in order to avoid this depletion of his profits. This cost minimizing motive would unleash competition for space adjacent to the market among the farmers located on this unitropic plain. Each farmer would try his best to bid for land nearest the market, so that he could base his activities there.

If all the land on this plain were available

for sale, then each farmer would offer to purchase it. The magnitude of his bid would depend on the money he could make from his activity after having paid all the other factors of production, except land. This, of course, would depend on his production technology - the differing combinations of labour, and capital (carts, hoes, etc) with his land - and how much he paid for this combination, excluding land. He also made sure that he, as the entrepreneur, was remunerated. It therefore followed that people with the highest financial surpluses from their agricultural enterprises could afford to bid highest, so that they ended up occupying land nearest the market. These would tend to be homogeneous in terms of the crops they grew, and in terms of the methods of factor combinations that they employed in the production of these crops.

This group would also include that kind of farmer whose very existence depended on being nearest the market centre. For example, all sellers of perishable commodities would fall in this category. For these people any increase in the distance from the market meant increase in the time taken to travel to the market; and therefore, greater danger of their produce going bad on the way to the market. In addition to meeting the transportation costs, they would be in danger of facing also the losses of their produce in case the produce arrived at the market

place in any other condition, but fresh.

Von Thunen observed that other products were bulky, and difficult to transport. They required close location to the market in order to minimize the pain and financial costs of transporting them. Any increase in distance from the market meant risking dangers in breakages, or incurring excessive prices per unit distance for their safe transportation to the market.

These two groups would therefore offer to pay the highest rent for the land nearest the market, otherwise they could not expect to survive away from the market. If they did, they would not <sup>be</sup> behaving in a rational profit maximizing manner. The general result of these premises was such that the number of profitable crops which could be grown was found to decrease as the distance from the punctiform market place increased. Thus, there was an outer limit beyond which any crop could not be grown, because it would be unprofitable in view of the production technology and perishability considerations. Also there was an inner limit for any particular crop, because more profitable alternative land uses for land closer to the market were assumed to exist. These more profitable uses would have <sup>competed</sup> ~~competed~~ this particular crop off from the inner "circle" of land nearest the market.

## Rent Bid Function

### Model for a Single Crop

In order to appreciate the rationale for the arrangement of land uses around this punctiform market as outlined by Von Thunen, it is important to explore the nature of the returns receivable by any farmer of a single crop around a punctiform market place. Since the returns will determine his ability to pay rent, or to bid for land, the model that comes out is, in effect, a rent bid function, showing the ability of this farmer to bid for land at all distances and in all directions around the punctiform market.

Figure 4-1 shows the return conditions faced by farmers of any one single crop, say maize. All the assumptions held by Von Thunen are assumed to apply to this graphic model, but then each individual farmer's return with respect to transportation costs is analysed in this way.  $D-D_3$  shows the returns accruing to this farmer the farther away he is located to the market; assuming the punctiform market is at distance zero in the left hand corner of the diagram. If this farmer is located exactly at zero he will be able to sell his entire crop, pay for his other factors of production except land, and be left with 45 units of net income. He will not be liable to pay any transportation costs, because he is situated right at the

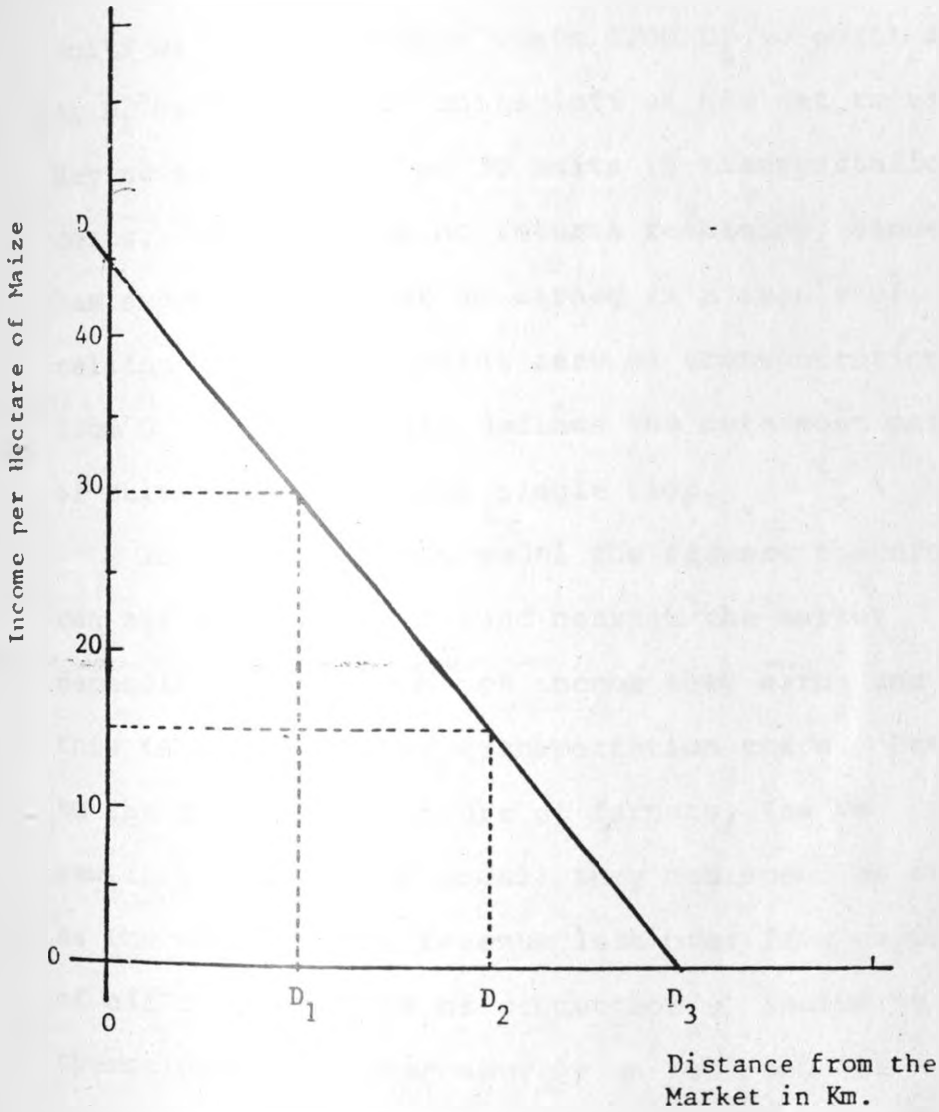


FIGURE 4-1. A rent bid function facing a farmer of one crop only. (SOURCE: J.B. Foust and A. de Souza Economic Landscape, p.36).



market. However, his net returns decrease the farther away he moves from the market; so that at  $D_1$  he will only be able to get 30 units of currency. At this point, he has had to pay the 15 additional units as transportation costs from  $D_1$  to point zero. At  $D_2$  he has only 15 units left as his net returns, having paid as much as 30 units in transportation costs. At  $D_3$  he has no returns remaining, since he has expended all that he earned as a result of selling his crop at point zero on transportation costs from  $D_3$  to zero. This defines the outermost margin of cultivation for this single crop.

In the Von Thunen model the farmers therefore can afford to bid for land nearest the market depending on how much net income they earn; and this is a function of transportation costs. Due to the competitive nature of farmers, (as we saw in the Ricardian model) they can spend as much as the whole of the revenue left over from payment of all other factors of production - including themselves as entrepreneurs - on rent and the transportation costs. The latter are a function of the distance the crop producers are located from the market. This would reflect the economic rent; and the transportation costs then become the main variable determining economic rent. The curve which graphs the net income earned by any farmer of any individual crop located at any distance from the

market as a function of this distance is called a rent bid function.

The curve was given that name to reflect on the fact that individual farmers are actually <sup>competing</sup> competing for accessible space to locate their land-using activities. The "bidding" part of the term connotes passive landowners who have land for sale or rent in a specific location and are eager to maximize return or rent accruing from their land. Thus, they tend to hold their land (despite offers to rent or purchase it from other individuals) until the highest bidder comes along - the person who offers them the greatest amount of money in return for using that land. Some text-books may refer to the function as a rent gradient, but most call it a rent bid function to emphasize this aspect. The logic of its derivation also emphasizes on the bidding aspect; and Von Thunen himself called it by that name.

#### A Multi-crop Situation

Figure 4-2 shows the rent bid function for two crops. The basic assumption in this graphical model is that different crops have different technical production requirements. For example, different amount of capital may be required for producing a maize crop than those required in the production of ground pea nuts. In addition, the market for different crops differs at this punctiform position. In the latter case the word "market" means the demand and supply relationship

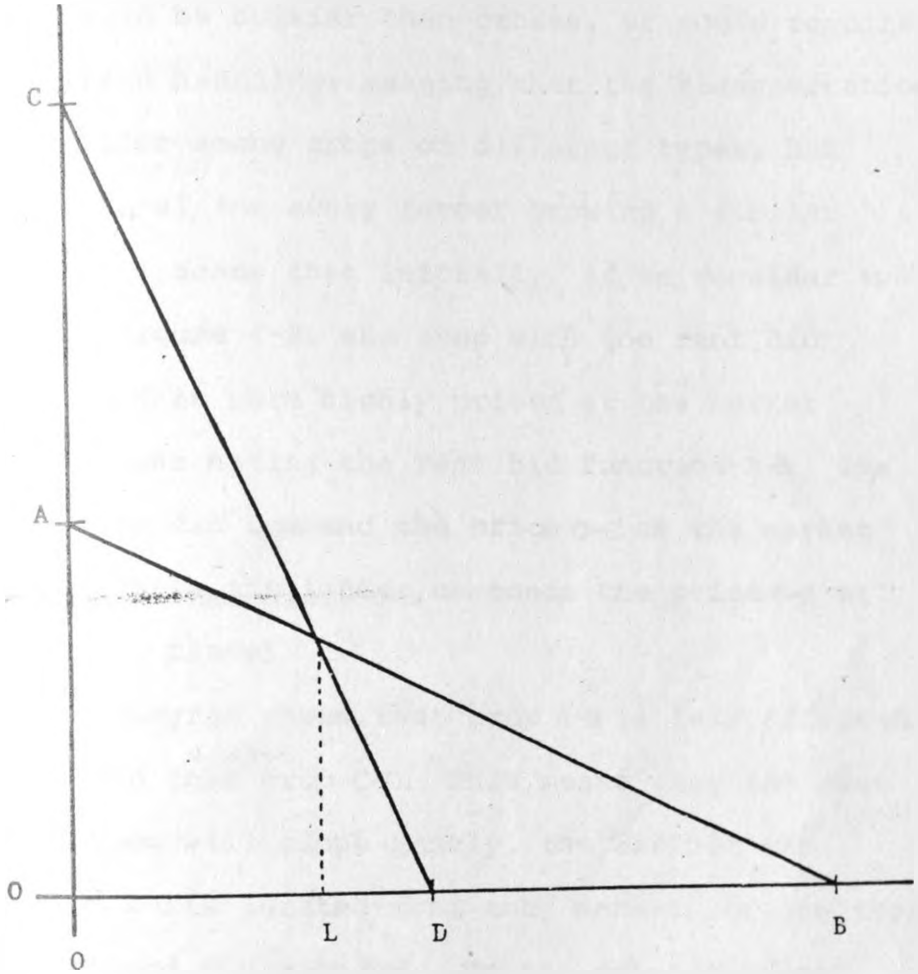


FIGURE 4-2. A rent bid function for two crops.

that influences the price each crop will sell at this locational market-place. The price payable per bag of each crop will vary at the market place among crops, but will be the same for each crop sold by perfectly competitive farmers of the crop. Some crops could be bulkier than others, or could require specialized handling; meaning that the transportation costs differ among crops of different types, but are identical for every farmer growing a similar crop. This means that initially, if we consider two crops on figure 4-2, the crop with the rent bid function C-D is more highly priced at the market than that one having the rent bid function A-B. The former crop can command the price O-C at the market place O; while the latter commands the price O-A at this market place.

The diagram shows that crop A-B is less affected by distance than crop C-D. This means that the rent bid function will slope gently, the farther the grower of A-B is located from the market, giving the gentle sloped function A-B. On the other hand any grower of C-D is affected considerably by distance from the market, He pays more per kilometre for shipping his good from any production around the market place to the market place. His returns, although initially higher than those of A-B are 'eroded' faster than those of A-B through paying for the transportation

costs. The rent bid function is therefore steeper than that of A-B; and his outward margin of cultivation is nearer the market place than AB and lies at D.

Both rent bid functions intersect at distance L. Nearer than L the farmer with function C-D earns more economic net return (after paying for other factors of production except land) than the farmer with function A-B. He will therefore be able to bid higher for land near the market place than the farmer A-B. Beyond L, however, A-B has higher returns than C-D because he has a wider outward margin of cultivation: and his rent bid function is flatter than C-D; meaning that he is facing less transportation costs than C-D. This means that A-B is able to outbid C-D beyond L because of the relative natures of their production technologies and the relative magnitudes of their transportation costs per unit distance. It follows then that land occupation around the market place O is going to be determined by the bidding power of each producer. All land around O up to L will then be occupied by the farmer with the function C-D; and from L onwards, the farmer with the function A-B will occupy the outer space. The situation will prevail all around the market-place O since each rent bid function forms a "demand cone with its apex over O when viewed in 3 dimensions; as in Figure 4-3.

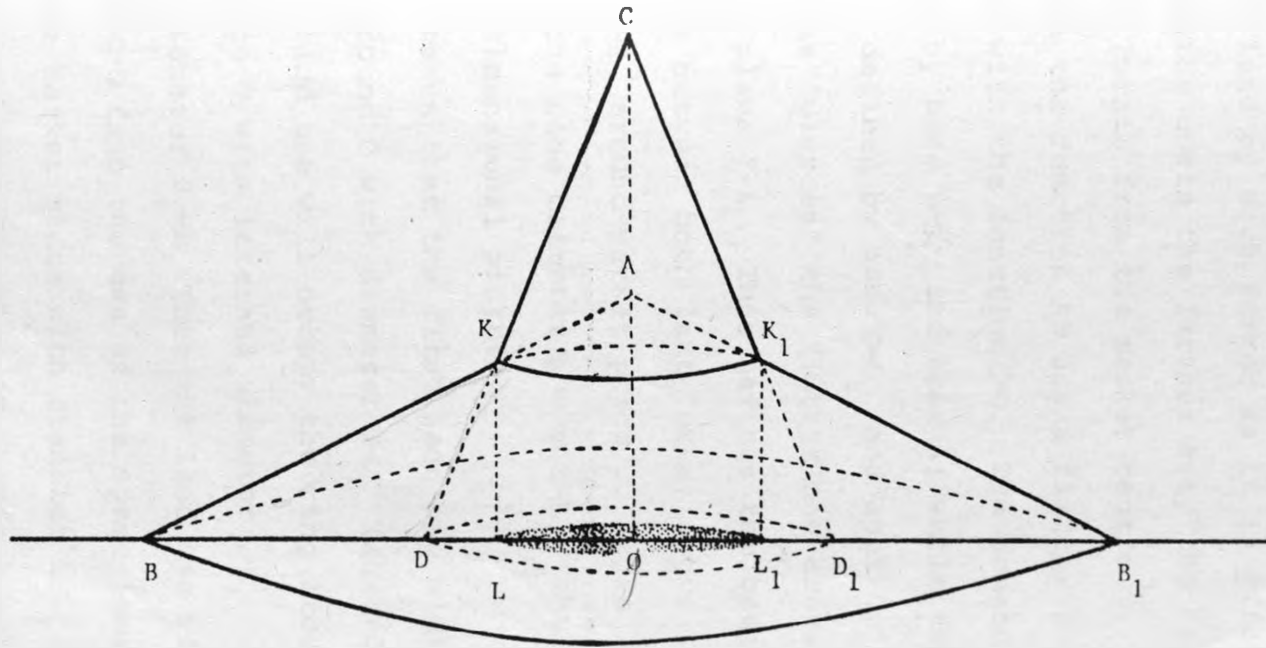


FIGURE 4-3. A three dimensional view of rent bid functions around a market centre revealing a system of two rent bid cones going through one another.

In Figure 4-3 the rent bid function for each farmer slopes uniformly in all directions around the market place O. The cones determine the effective demand for land by each farmer as it is affected by transportation costs the farther away the farmer decides to locate from the market centre O. The farmer with the function AB has a flatter cone than the farmer with the function C-D. The demand cone AB is defined by base  $B-B_1$  and apex A; while the demand cone C-D is defined by base  $D-D_1$  and apex C. The steeper cone "pierces" the flatter one around the horizontal plane  $K-K_1$ . This defines the boundary of cultivation between both land uses; above the locus of radius  $O-L$ , around market place O. This locus intersects the cone diameter  $B_1-B$  at  $L-L_1$ ; thus completing the three dimensional picture.

This means that the first land use will occupy a circle around O with diameter  $L-L_1$  (shaded); and the other land use will occupy the ring around the market place O with internal diameter  $L-L_1$  and external diameter  $B_1-B$ . Thus the land use A-B will be outbid by C-D from the use of the space immediately next to the market place with diameter  $L-L_1$  and radius  $O-L_1$ . Land use with function AB then can only manage to acquire land outside this inner perimeter for its use.

If more than 2 crops are considered, the situation is identical to this 2 crop case. Demand cones of

more profitable land uses will be 'piercing' those of less profitable uses as the more profitable uses bid off the less profitable ones out of land nearer the market place. This describes in model for an open market situation, where land goes to the highest bidder. The resulting land use pattern is a concentric arrangement of land uses 'rings' around the market place as shown in figure 4-4. In this diagram land uses a to d are seen arranged in concentric rings around point O. Land use 'a' outbids all the others and takes the nearest place to the market, followed by b, c and lastly by d. A kinked multi-crop rent bid function is the result, as the distance increases from zero in all directions. The resulting rent bid function is a cross-section of cones of different gradients and diameters arranged inside one another in the order of steepness; i.e. according to how each land use's earnings are affected by transportation costs. If viewed from above, a circular annular land use pattern, occupied by homogeneous land uses is visible, as shown in figure 4-4.

#### Land Value Gradient

For the benefit of surveyors interested in land valuation and estate appraisal it is necessary to point out that the composite of rent bid functions shown in figure 4-4 is also the Land Value Gradient.<sup>2</sup>



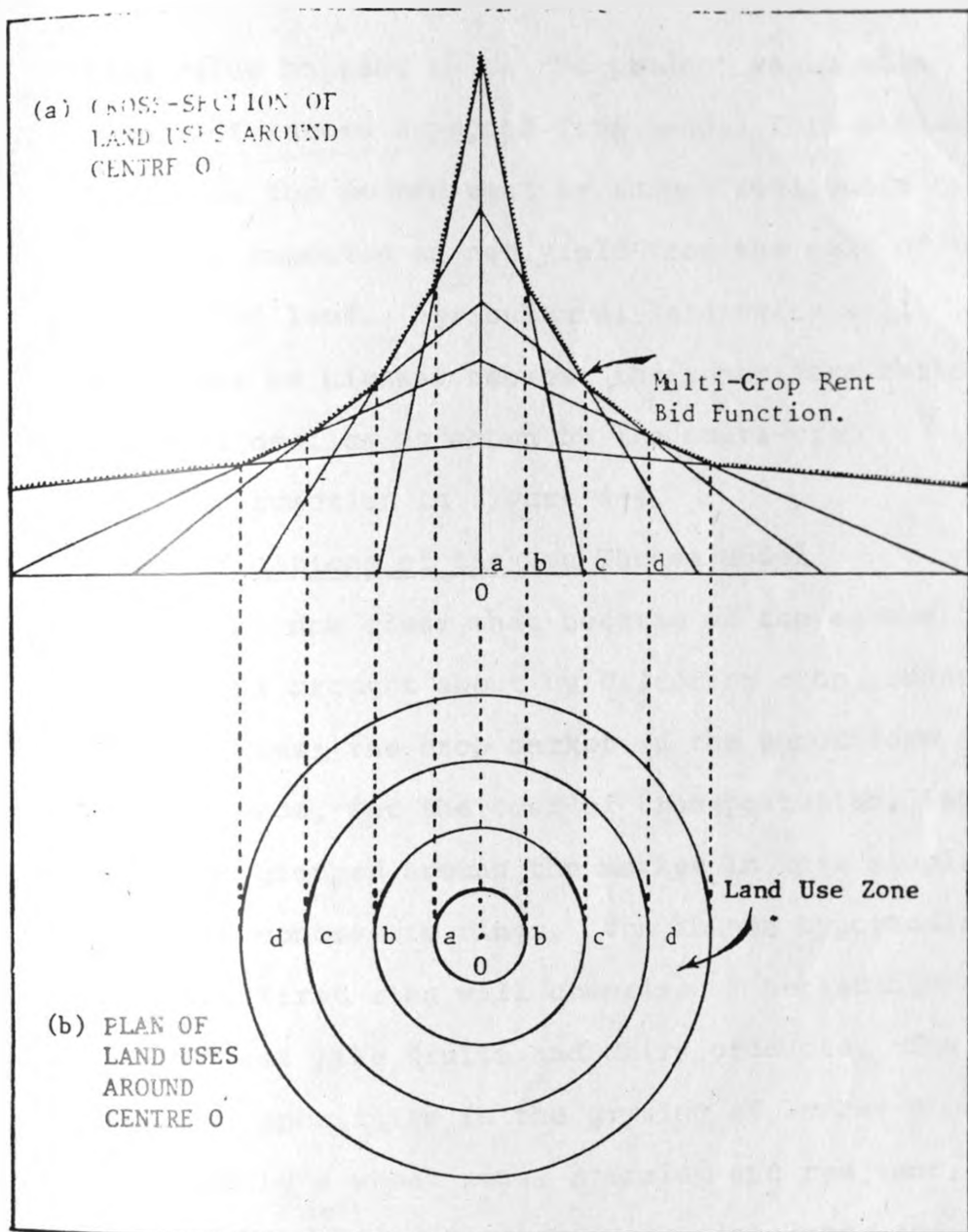


FIGURE 4-4. A composite rent bid function; and a plan of concentric land use zones around a market centre.

Land value happens to be the present value of a stream of income expected from land. This stream of income is the periodic rent or income receivable from land; or expected as net yield from the sale of the produce of land. Agricultural land value will therefore be highest nearest the punctiform market; and will decline as shown by the multi-crop rent bid function in figure 4-4.

#### Modifications of the Von Thunen Model

It is now clear that because of the economic variations brought about by differing crop production technologies; the crop market in the punctiform market-place, and the cost of transportation, land uses are grouped around the market in this simplified model in concentric rings. Von Thunen hypothesized that the first ring will comprise perishable commodities like fruits and dairy products. The next one will specialize in the growing of lumber products; followed by a wheat zone, a barley and rye zone; followed by a ranching zone; marginal land, and lastly, followed by the desert surrounding the Isolated State; as shown in Figure 4-5.

It must be borne in mind that this is not necessarily the modern order of arrangement. This is because transportation technology has changed since the days of Von Thunen in the early 19th century. At this time, the order of arrangement took the

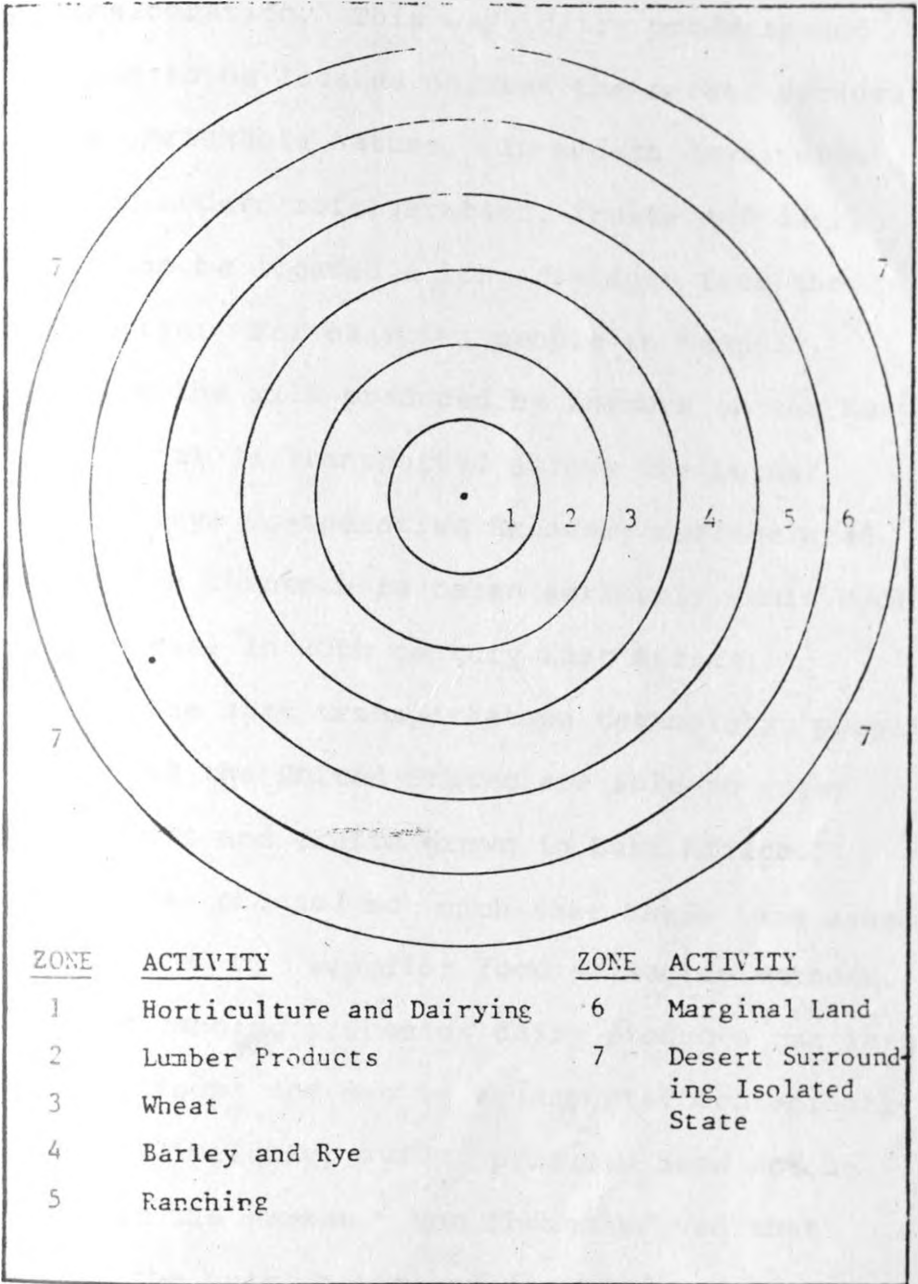


FIGURE 4-5. Von Thunen's rings of concentric land uses around a market centre.

prevailing transportation technology of the ox-cart into consideration. This way, dairy products and fruits had to be located nearest the market because of their perishable nature. In modern days, with the aid of modern refrigeration, fruits and dairy products can be located a long distance from the market centre. For example, people in Kampala, Uganda, use the milk produced by farmers on the Kenya highlands that is transported across the border using the Kenya Co-operative Creamery refrigerated cars. If Von Thunen were taken seriously, this could not be the case in 20th century East Africa.

Using the same transportation technology, people in Europe and the United States are able to enjoy dairy products and fruits grown in East Africa. Technology has changed so much that these land uses are even influenced by superior food packaging methods. Through the canning processes dairy products can last for long periods; and can be transported conveniently over time. Similarly, lumber products need not be located near the market. Von Thunen argued that because of the bulky nature of firewood and timber the transportation costs would increase tremendously the farther this land use is located from the market. In modern times, however, although the products are bulky - as will be examined later when considering the location of industry in chapter ten - the modern trucks can haul semi-processed lumber products cheaply

and at economic rates from long distances to the market. Nairobi market is served by the lumber products from Mt. Kenya, Aberdares, Mau Hills and Mt. Elgon forests. So the necessity of lumber products being located second closest to the market has been modified by the improved industrial and transportation technology. Land uses around the market places are likely to be more complex than those hypothesized in the Von Thunen model that was built in the early 19th century. We should not forget, however, that this situation was approximately true in the real life of the time across the flat plains of northern Europe that he was describing.

Von Thunen was not adamant that his model would apply 'at full blast', and in its unrefined, unmodified fashion to the real world situations; even the word that he was familiar with in Northern Germany. He therefore relaxed all the assumptions in the original model to approximate a real life situation. One of the first relaxations of these assumptions that he made was (as we have seen) the introduction of different types of farmers, each using a different production technology to grow a different kind of crop from the others - hence the different rent-bid functions and the concentric zonation of land uses around the market place.

The next assumption that he relaxed was to do with the mode of transportation. He introduced a

bi-modal transportation system; one mode of which was cheaper and faster than the oxcart. This was water transportation, because the temporal domain of his model was in the early 19th century. Von Thunen ran a river through his isolated state; and connected the two opposite sides of the homogeneous plain with the punctiform place; as shown in Figure 4-6. In this diagram, the cheap mode of transport is seen to disturb the regular concentric zone pattern. Its existence makes it economical to grow crops farther away from the market than without it; because the farmers need not be located near the market for their operations to maintain the high net revenues. A cheap mode of transport means that the farmers can afford to locate farther away from the market, and yet have equal accessibility to the market place (in terms of the time and the cost of transportation per unit distance) with those other farmers who are located nearest the market place. Land uses will therefore take elongated patterns along the cheap mode of transport - this navigable river.

In figure 4-6 a farmer situated at C incurs the same cost in transporting his produce to the market place as that located at D although the diagram shows that he is located about twice the distance from the market as his 'friend' at D. Cheaper transportation costs make the rent bid functions along the axis of their occurrence flatter.

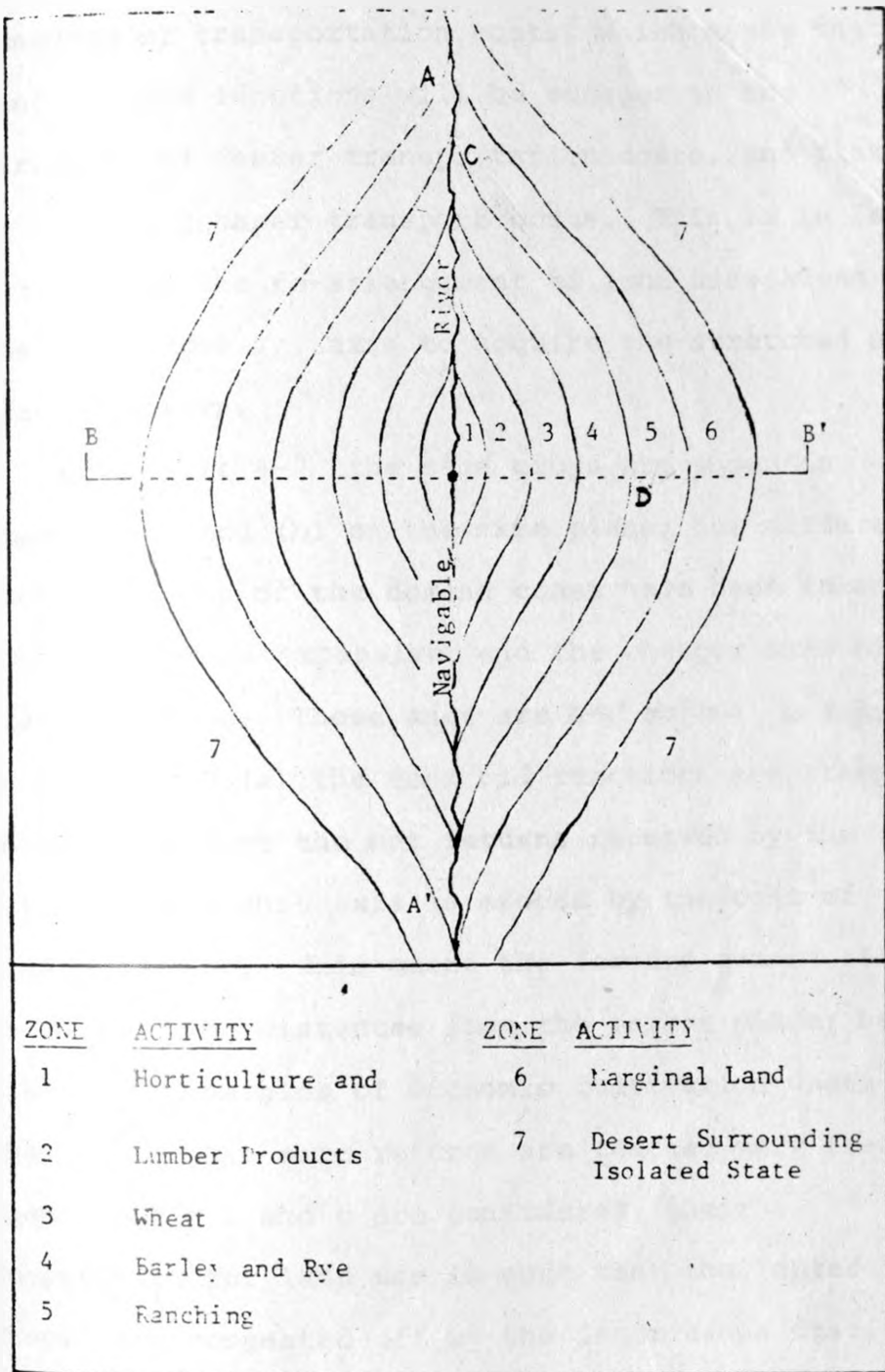


FIGURE 4-6. Von Thunen's rings as distorted by a cheap mode of transport - e.g. a river - that runs through his 'isotropic' plane and the market centre.

This is because the slope of these functions is a function of transportation costs, which means that rent bid functions will be steeper in the direction of dearer transportation costs, and flatter in that of cheaper transport costs. This is in fact what causes the re-arrangement of land uses along the cheaper axis to acquire the stretched out planar pattern.

In Figure 4-7 the same crops are shown in diagram (a) and (b) on the same plane; but different cross sections of the demand cones have been taken across the more expensive and the cheaper axes of transportation. These axes are A-A' and B-B' in figure 4-6. In figure 4-7 (a) the rent bid functions are steep, showing how fast the net returns received by the farmers along this axis is eroded by the cost of transportation. This means the farmers cannot afford to locate long distances from the market place; because their outer margins of economic cultivation where they would earn zero returns are reached very fast. When crops a b and c are considered, their competition for land use is such that the 'outer crops' are compeated off by the inner crops fast, and land use rings change more abruptly, causing the concentric rings to be thinner across the dearer axis of transportation.

The reverse is true about 4-7 (b); where the returns of the farmers are 'eroded' at a slower rate



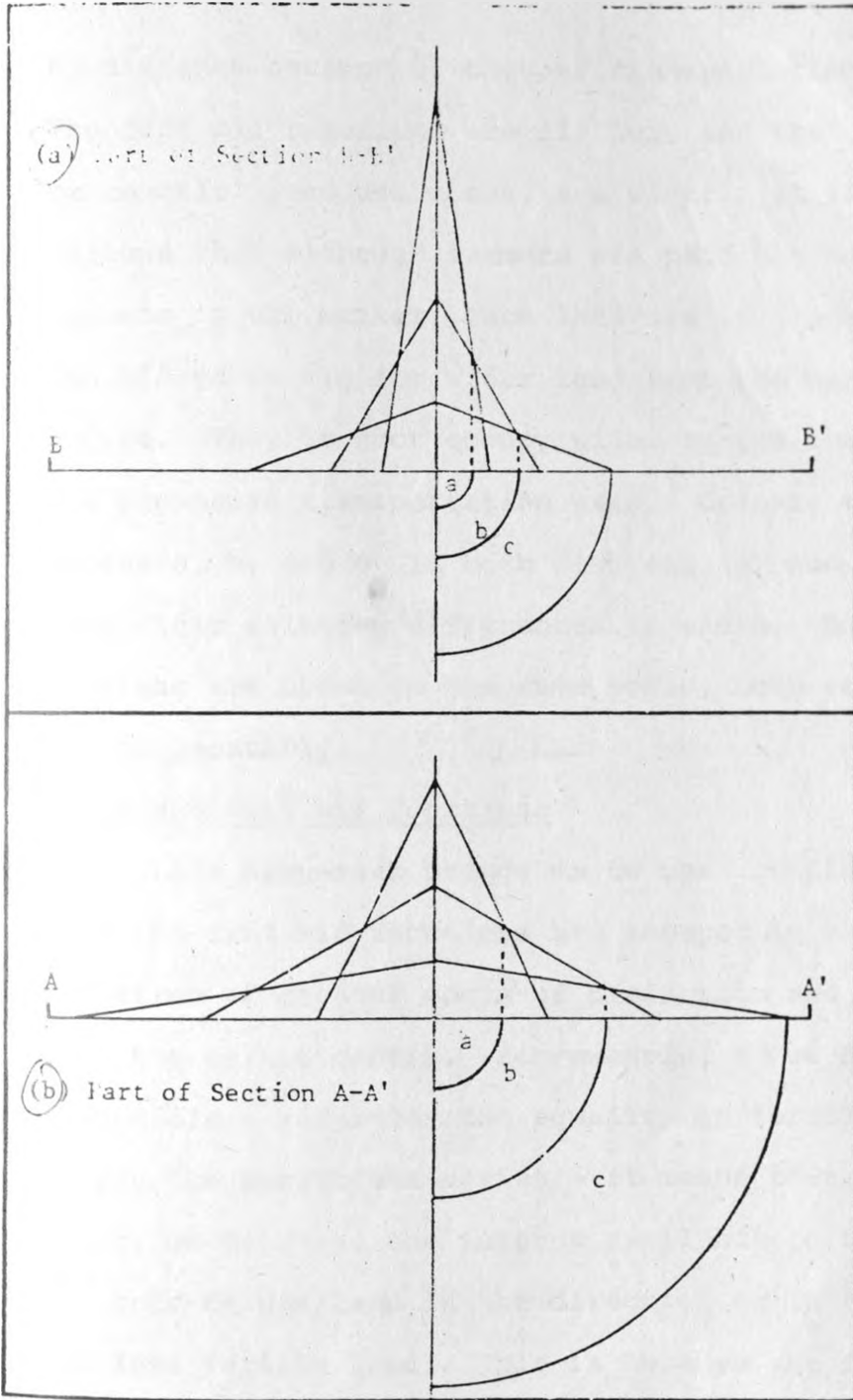


FIGURE 4-7. The effect of cheap transportation in one direction, on rent bid functions; and on the comparative width of Von Thunen's rings in the direction of cheap and dearer transportation costs. This diagram is a cross-section of Figure 4-6, A-A' and B-B' are as shown in the plan - Figure 4-6.

by distance because of cheaper transportation costs. The rent bid functions are flatter, and the 'concentric' land use zones, are wider. It therefore follows that although farmers are paid the same amounts in the market, each land use in diagram (b) can afford to bid for wider land from the market centre. They in fact occupy wider spaces than across the expensive transportation axis. Compare the spaces a, b, and c in both diagrams (a) and (b) and note their relative differences in width. Both diagrams are drawn on the same scale, both vertically and horizontally.

#### Costs and Rent bid functions

This argument brings us to one conclusion; that the rent bid functions are steeper in the direction of greater costs of production and transportation from the market centre. For example, if we do as Von Thunen did - and relax the equality in fertility around the punctiform market - it means that by so doing, we decrease the returns available to the farmer per acre of his land in the direction or in the area of the less fertile land. This is because the farmer will have to incur greater costs in making his land more productive, by say - buying fertilizers, or investing more in labour and working capital. This reduces his net returns - hence his ability to bid high for land at all locations from the market centre. He therefore uses less land, and

faces a steeper rent bid function, which means that whereas (assuming the fertile land spreads all the way out from the punctiform market place) the land uses will be nested together in the usual Von Thunen pattern, each of them will however have closer spatial margins; so that the pattern of arrangement becomes analogous to that of closer contours in the up-hill direction of a topographical map. The "up-hill" reflects the increase in costs with distance at a faster rate on the axis of infertile land than on the axis of normal land. In figure 4-8, land uses on the right hand side have closer margins than identical land uses on the left hand side - meaning less fertility on the right.

Thus, according to Von Thunen, different thicknesses of the annular land use rings would result. The kinks and the hills on the rent bid function would also be noticeable - according to the returns obtainable from land at different positions from the punctiform market place. Pockets of infertility as shown in figure 4-9 would be evident. This relaxes the assumption of homogeneity of land in all directions.

Land use would be modified farther if one direction of travel from the market is uphill, and the other one is down-hill. Differing costs of transportation would cause the same effect as for those of the land where superiority in fertility exists in one direction.

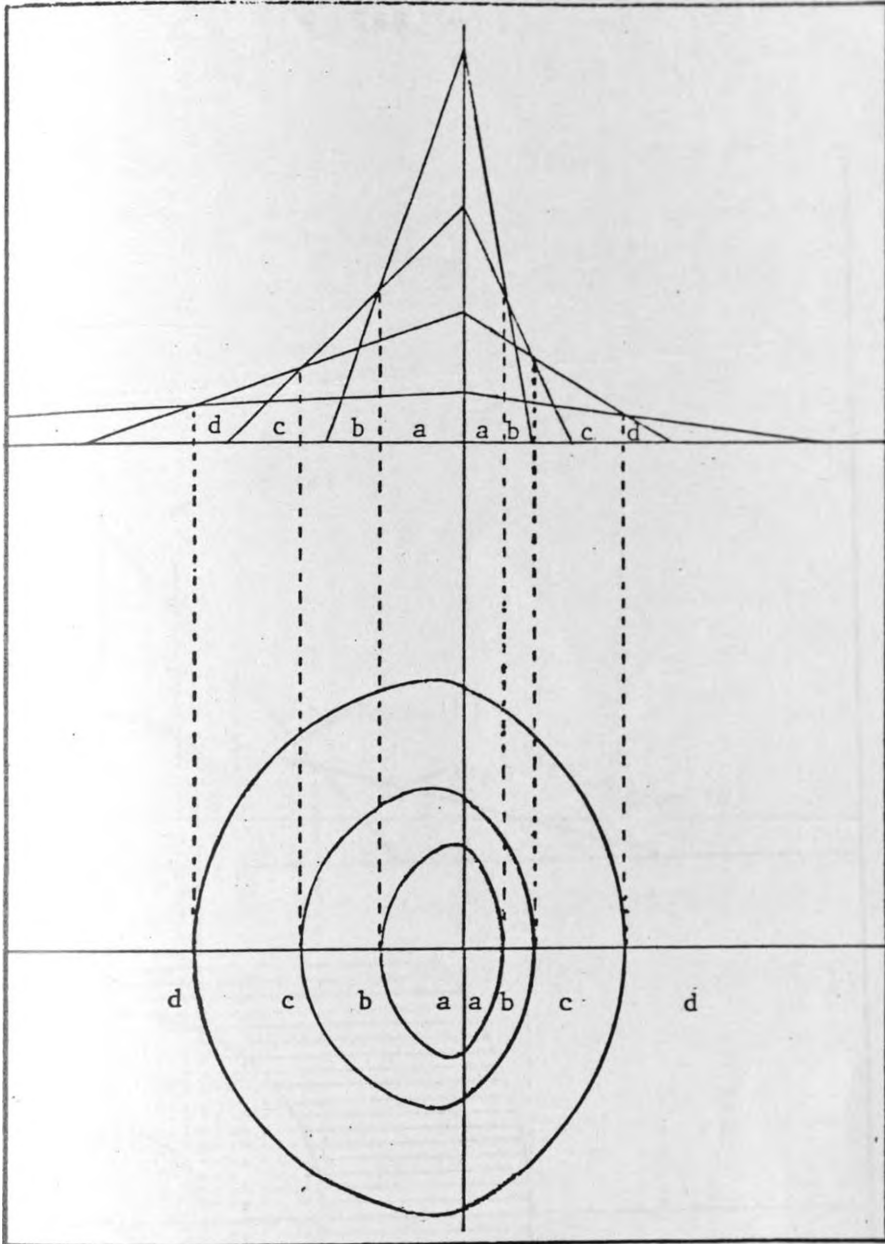


FIGURE 4-8. The effect of reduced fertility on the width of land use rings and the gradients of rent bid functions.

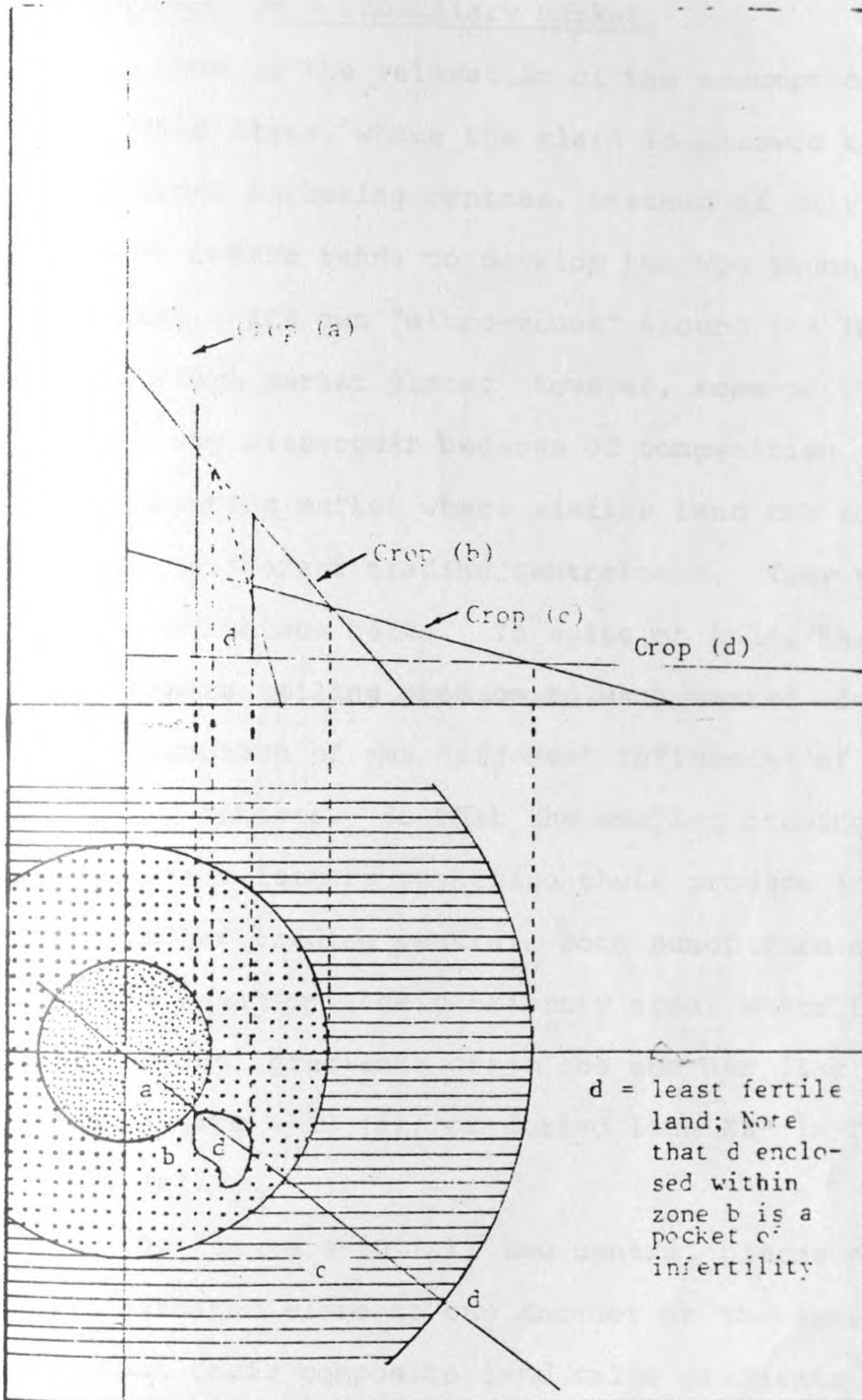


FIGURE 4-9. A pocket of infertility and its effect on land use rings and the rent bid function.

Influence of a subsidiary market

This is the relaxation of the assumption of an isolated state, where the plain is allowed to have different marketing centres, instead of only one. Each market centre tends to develop the Von Thunen land use pattern - its own "micro-zones" around its individual punctiform market place. However, some of these micro-zones may disappear because of competition from the neighbouring market where similar land use zones (but from a different trading centre) meet. They tend to form continuous belts. In spite of this, the number of farmers selling produce to each market tends to be a function of the different influences of the two trading centres. So that the smaller trading centre has lesser farmers marketing their produce in it than the larger trading centre. Both punctiform market places apportion their tributary areas where their land value gradients cross one another like at Z in figure 4-10 (a); or dotted line ZZ\* in figure 4-10 (b).

In figure 4-10 (a); two central places A and B are situated close to one another on the same plain, so that their composite land value gradients meet at Z. This point forms the boundary of their trade areas along the axis Q-Q' which is represented in cross section by shown demand cones. In this diagram each trade area has its own land uses arranged from their

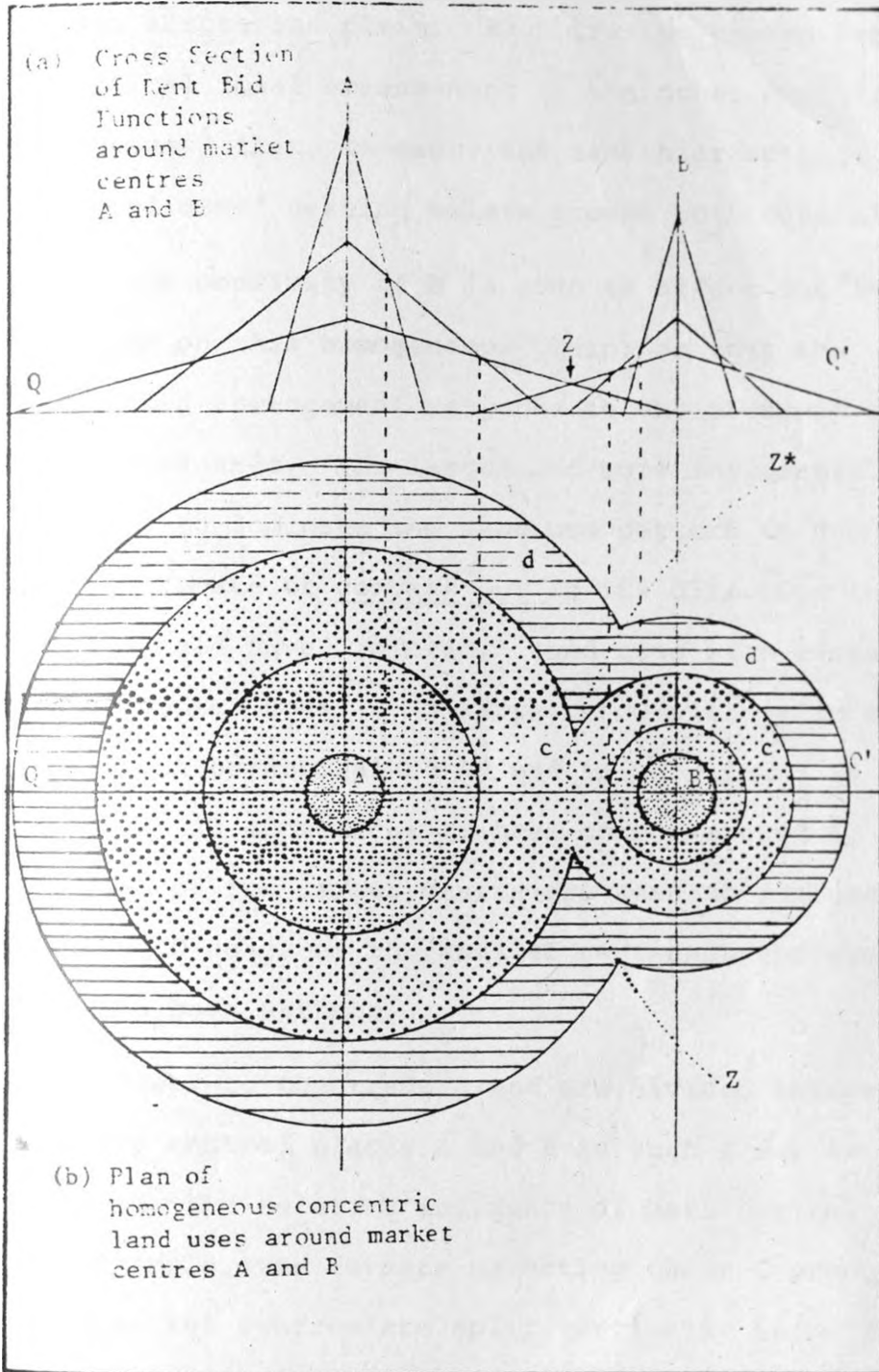


FIGURE -4-10. Effect of a subsidiary trading centre on the land use rings around the main trading centre and around the subsidiary trading centre itself. (SOURCE: H.W. Richardson, *Regional Economics*, p.27).

punctiform market places in concentric homogenous zones across the plain. Each trading centre has identical zonal arrangement to the other one. It is assumed that, in each, the same hierarchical order of land uses' nesting exists around both central places.

The proximity of B is seen to affect the land use pattern on this homogeneous plain; so that the resulting arrangement responds to the presence of two market centres. The larger and more influential centre A is seen to dominate the land use pattern in such a way as to obliterate or compeat<sup>SP</sup> out in its direction those areas that should have 'inferior' land uses with respect to B. For example, zone d disappears completely in the direction orthogonal to A, and is only found in the areas where it is economical to have zone d around A. C<sub>s</sub> and D zones of the larger centre are seen to coalesce with C<sub>s</sub> and D zones of the smaller centre in the areas between both markets.

However, the trade areas are divided between the two central places A and B in such a way as to indicate the relative influence of both central places. For example, the farmers marketing their C product to both market centres are split vertically below Z; where the composite land value gradients from the two central places intersect. This intersection is continued along the locus joining the points of intersections of the margins of homogeneous land uses around the two



market places as indicated by dotted arc shown by Z - Z\*.

Land use would be more complex if market centre B were closer to market centre A; or if there were more than one market centres surrounding centre A. This complexity, brought about by different market places of differing sizes, adds to that brought by fertility, by differences in transport costs, and by the influence of many variables - to bring about the complex looking land use pattern over space as it exists in the real world situations.

#### Empirical Examination of the Von Thunen Model

The Von Thunen model has been examined by many regional analysts extensively; especially in the last four decades (1940s, 1950s, 1960s and 1970s). In the western world it has been difficult to obtain situations approximating the early 19th century, when the model was proposed. However, in most cities there is a tendency for land uses to be influenced by transportation in the fashion proposed by Von Thunen.

One of the most significant researches in this direction was done around Addis Ababa, Ethiopia by R.J. Hovarth and published in 1969.<sup>3</sup> The area around Addis Ababa at this time had a similar predominant economy to that found in Northern Germany at the time when Von Thunen was writing. The Ethiopian society at the time Hovarth was investigating it was feudal,

and largely agrarian. Apart from the few affluent people owning cars, most of the farmers transported their produce to Addis on donkey and ox carts - a mode of transport not very much dissimilar to the one witnessed by Von Thunen.

Hovarth was able to compare Von Thunen with the reality as it manifested itself around Addis Ababa. Although the study did not meet all the assumptions set forth in Von Thunen's model, several significant parallels were found which the author felt warranted farther investigation due to their striking similarity to Von Thunen's "rings".

Before examining the parallels it must be pointed out that climatic zones, soils and the topographic nature of the landscape that play an important role in the geometry of spatial distribution of land uses were not homogeneous around Addis Ababa. Secondly, the culture around this city was not homogeneous because of the feudal stratification that existed among ethnic groups living around it. Thirdly, Hovarth found many eucalyptus forests around Addis Ababa but he dismissed them as not being sufficiently similar to the forest zone in the Von Thunen's model.

Hovarth found the vegetable cultivation zone that was located very close to the city intermingled with this eucalyptus forest. The vegetable gardens tended to be situated athwart the main roads and near small rivers. The second zone around Addis Ababa comprised

high bulk, low value grass crops - thatch, barley, and wheat. Beans were also found to grow in this inner zone. The wedge-shape pattern was seen around the cheapest axes of transportation - i.e., main roads - with respect to all land uses. The dairying zone was also clearly defined before the UNICEF introduced modern transport technology in early 1950s. This zone was originally confined to a 2 hour travel radius from Addis Ababa by oxcart; because of the perishable nature of the dairy products. With the introduction of the UNICEF dairy product collection and transportation programme incorporating technical expertise, transportation network, and refrigeration equipment, the original pattern of nearly annular land use pattern changed to that of wedge shapes along the road network. This is an illustration of innovations which change the time-distance gradient, creating an "octopus" arrangement of land uses along the main roads - identical to a relaxed Von Thunen situation discussed above.

Around Addis Ababa, small trading centres were reported by Hovarth to elicit a similar pattern of land use around themselves as expected using the Von Thunen analysis; and to interact with Addis Ababa in a similar manner; in so far as the land use analysis is concerned. He found the land use pattern in the study area being influenced by fertility; especially in the black cotton soil zone East of Addis Ababa.

Hovarth concluded that although several theoretical expectations were not met exactly as described in the Von Thunen model, circular patterns of activity existed that resembled those hypothesized in the Isolated State by Von Thunen.

A similar study was done by Robert Sinclair<sup>4</sup> in the United States. He reviewed several studies that had been done in the immediate past before him; and found that increasing transport costs caused the rent per unit area of land for any specific use to decrease with distance from the market centre. He found that different land uses are affected differently by changes in distance from the market centre; because each commodity produced by each land use has different transportation costs due to the peculiar characteristics and production technology of the commodity. The rent bid functions that had been confirmed by these studies resembled the Von Thunen arrangement. However, Sinclair shows that land uses around modern metropolises in the United States and the western world display significant differences from those postulated by Von Thunen; because of the changes in transport technology; and also because of the speculative thinking of land owners in anticipation of urban expansion in their direction - hence the higher rents associated with the peri-urban land uses. He maintains that since urban land uses today are more valuable than agricultural land uses the

former eventually take over the land around metropolises. Land need not change hands, but it rises in value in these peri-urban areas. The landowners carry out their activity over land with a feeling that "something is going to happen". Gradually they phase out agricultural land uses and replace them with urban and suburban activities.

Another significant study that needs to be mentioned here is that of Peter Muller<sup>5</sup> who studied the land use pattern around the American North Eastern Megalopolis. Muller was interested in seeing how economic rent varied with distance from the major trade area of the U.S.A. However, he avoided tackling the economic rent directly because it was a variable with many difficulties in identification. He chose a surrogate of net income per unit area, and studied its variation with distance over 1376 counties covering a wide belt from the Eastern coastline to the mid-western U.S.A.

Using a powerful tool of trend surface analysis - a kind of multiple regression technique - he used his data to show Iso-rent lines surrounding the main megalopolis and the local market. He found a sloping land value gradient around the North Eastern Megalopolis. He was able to map iso-rent curves all over U.S.A. using his data as shown in figure 4-11.

In conclusion, the real life land use pattern is subject to the influence of very many variables, but

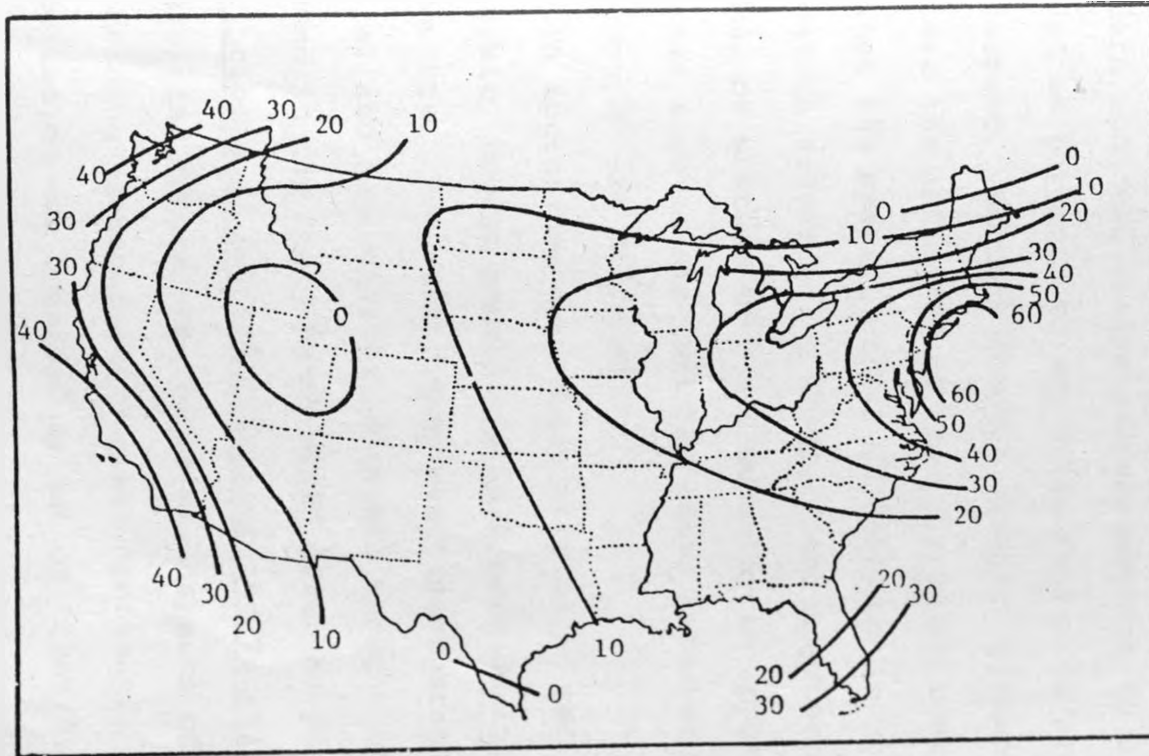


FIGURE 4-11. Iso-rent lines around the Eastern Megalopolis of the U.S.A. (SOURCE: Peter Muller, "Trend Surface of American Agricultural Patterns: A Macro-Thunen Analysis," Economic Geography, vol.45, 1973; pp.228-42.

it is not without an economic explanation. The Von Thunen model has therefore been able to stand the empirical tests over time.

"Von Thunen meets Ricardo"<sup>6</sup>

In chapter 3 the Ricardian model is highlighted, and modern economic analysis (where payment to land is viewed as payments to any other factor of production) is discussed. In this chapter another approach to rent where the influence of transportation costs determines the spatial rental differences is presented. The question arises as to whether both approaches are the same, or whether they are mutually in opposition; or whether some of the cardinal ideas expressed in each approach are different.

Both approaches owe their origins to two schools of economic thought prevailing in Europe during the last century. Ricardian ideas were incorporated into classical and neo-classical economic thought that was published in the Anglo-Saxon world after he published his Principles of Political Economy and Taxation. The resulting theory considered all aspects of land rent; holding transportation costs constant. In fact transportation was regarded as one of these disturbing irregularities that would interfere with the working of the Ricardian model; and was introduced only when the assumptions of the model were relaxed. This often came in areas that were strictly out of context with rent theory - surfacing often in

International Economic Theory, and inter regional trade flow considerations.<sup>7</sup>

However, this does not mean that the classical and neo-classical analysis was necessarily different from the rent analysis presented by the German historical school, as pioneered by Von Thunen. The difference lies mainly in emphasis. This is because all main economic principles of rent keep on cropping out in classical and neo-classical writings of Mill, Marshall, Chamberlain and others but are presented with a slightly different emphasis from that of the German School.<sup>8</sup> However, both approaches tended to represent different streams of thought on the same subject - albeit unsynthesized - and aimed at the one direction of ascertaining what caused land value differences over space.

The Von Thunen approach was, however, over-shadowed by neo-classical literature in the English speaking world for some time, until the advent of Land Economists in the United States and Western Europe during the 1920s. At that time the authors examining the city structure and the urban rent patterns began reviewing Von Thunen as a starting base for formulating their theories or for starting their empirical observations. This is when transportation costs came under serious review. However, both approaches remained essentially different until in the late 1950s when they were synthesized by Edgar S. Dunn, Walter Isard, and William Alonso.<sup>9</sup>



As a result of this later work; especially that of Alonso,<sup>10</sup> it is now clear that both theories are not different - that nothing in each is mutually in opposition to one another. In fact they are complementary. Alonso employs a rigorous mathematical analysis and the principle of substitution to synthesize the urban land value theory with the agricultural land value theory. He demonstrates that urban land values are in fact a continuation of the same phenomenon of land values over space as in agricultural areas; and that the spatial distribution of all land values is determined by the economic desire of all firms (urban as well as agricultural) to maximize profit. The urban firm will therefore locate in such a way as to take all the other costs of inputs into account including the costs of land; and at the same time in order to minimize transportation costs. Profit is maximized subject to a budget constraint. The household would also follow the same analogy in the choice of his location; but this time the household would be maximizing its utility - subject to its budget constraint. It would consider all the other necessities, transportation costs, and the quantity of land that it should purchase. In all the three cases - agriculture, residence, and the urban firm - location about an urban area would be taken by the highest bidder; and the resulting location pattern all over space about an

urban area (including the agricultural peripheral areas) would resemble that of Von Thunen as discussed above. When this condition prevails a state of equilibrium land use and land values is reached over the space around a central place.

Cardinal to Alonso's land rent theory synthesis is the concept of bid price curves. These are loci of all prices faced by urban firms; residences and agricultural land uses; such that when all of them are occupying optimum quantities of land they expect constant levels of profits (Urban firm and agricultural land users) or utility (residences) at all locations. When the bid price curves of any use come into contact with the price structure, the location of that particular land use is determined. The theory is an admirable extension of the substitution mechanism in economics. The bid price curves are analogously derived.

The basic difference between Ricardo and Von Thunen (as hinted earlier on) is the fact that Ricardo concentrated principally on fertility differences, and neglected distance, assuming that it is one of the complicating factors. Von Thunen on the other hand emphasized on transport costs, and made fertility a complicating factor in his model.<sup>11</sup> In accordance with modern synthesis both factors have been taken into account, but at different levels of

of "resolution." If Ricardo is incorporated in Von Thunen he will have his theory cast in one of the Von Thunen zones; where land is theoretically the same distance from the city; but where it could vary in terms of fertility. Differential rent would result in this homogeneous crop zone because parts of the land would be better yielding than the rest within this equidistant zone. Thus the Von Thunen analysis becomes a large scale model, where rents would vary with distance, and different land use zones would therefore result. Within these Von Thunen land use zones the Ricardo model would operate; and differential rents would result depending on the varying amounts of yields as resulting from varying fertility within each Von Thunen crop zone. Thus differential rent would result from the distance from an urban area as demonstrated by Von Thunen; and from the yield expected in any one Von Thunen homogeneous land use zone that has been demarcated in a macro-sense by the rent bid functions and the highest bidder. These differences in yield would be explained by the Ricardian model. It can therefore be said that Von Thunen's transport/rental model is a macro/meso view; incorporating the Ricardian micro view of land rents.

A rigorous article by Donald W. Jones<sup>12</sup> has represented a demand and supply comparative statics analysis in both the Von Thunen

and the Ricardian model. Jones first develops an algebraic model based on the familiar Von Thunen diagram; and demonstrates that the diagram and its "mother" model possess normal economic properties. He then examines changes in rent and land use arising from different sources like variations in tastes, income and technology; while noting that in the traditional Ricardian model pure increases in land supply will decrease rent per acre; while pure land demand increase will increase the rent. In his analysis he derives the same results from the Von Thunen model and proves that both models have the same economic properties and are therefore equivalent. This gives support to the fact stated above - that both models are views of the same subject matter at different levels of resolution.

FOOTNOTES

- 1 William Alonso, Location and Land Use, p.3.
- 2 H.W. Richardson, Urban Economics. (London, Penguin Books), 1971; pp.49-64.
- 3 R.J. Hovarth, "Von Thunen and the area around Addis Ababa, Ethiopia," Annals of the Association of American Geographers, vol.59, 1969; pp.308-23.
- 4 Robert Sinclair, "Von Thunen and Urban Sprawl," Annals of the Association of American Geographers, vol.57, 1967; pp.72-87.
- 5 Peter Muller, "Trend Surface in American Agricultural Patterns: A Macro-Thunen Analysis," Economic Geography, vol.45, 1973; pp.228-42.
- 6 Donald W. Jones, "Rent in an Equilibrium Model of Land Use," Annals of the Association of American Geographers, vol.68, 1978; pp.205-213.  
I am indebted to Dr. Jones for this attractive sub-title which appears in the form "Von Thunen Meets Ricardo" on p.211 of his article. The order of who meets the other 'one' in my opinion does not matter.
- 7 Walter Isard, Location and Space Economy (Cambridge (Mass).), M.I.T. Press, 1956)  
The whole work makes interesting reading on regional economy and interregional trade flows.
- 8 William Alonso, Location and Land Use, p.4; and pp.42-44.
- 9 Ibid chapter 1.  
Walter Isard, Location and Space Economy, chapter 2.
- 10 William Alonso, Location and Land Use, whole work.
- 11 Ibid, p.42.
- 12 Donald W. Jones, "Rent in an Equilibrium Model of Land Use." The entire article is a very interesting comparative statics analysis of both the Ricardian and Von Thunen models.

## CHAPTER FIVE

### THE ECONOMY, LAND VALUES AND INVESTMENT

#### The Economy and Land Values

In the earlier chapters we have discussed the theories of land rent as they were advanced by the classical Economists, Von Thunen and Ricardo. Land has been viewed by these people and later economists as a factor of production, and its supply and demand have been seen as affecting the rental or capital value of land. It is in this context that the theory of land rent as viewed from the Ricardian and the neo-classical view was discussed in chapter three. In addition differential rent, both as affected by fertility and transportation costs has been discussed in chapters three and four. It is now obvious that land must be paid as a factor of production. The amount of money payable will (in addition to being influenced by derived demand and the scarcity or specificity of the factor), depend on the quality of land, and the location of land from urban market centres or central places. Both transportation costs and the quality of land have therefore been found to influence the supply of land available for various purposes. These factors are also considered by prospective land buyers; whose revenue is usually affected by the quality of land and transportation costs if they decide to locate their economic activities on any specific location

from central places; or in the countryside. In any case, the equilibrium rental (or capital) value has been found to be largely a function of both land quality and the location of the subject parcel of land.

In the following discussion other factors that affect land values are explored with an aim of introducing the reader onto a more comprehensive view of land rentals, values and their major determinants. This chapter attempts to explain some of the broader economic factors that affect the supply and demand of land and landed property other than those considered in chapters three and four. It is hoped that in the end certain questions will have been answered that are asked in every-day real estate analysis; and that are the source of so much confusion (and jargon) to the layman, real estate professional, and even to a trained economist. Some of these questions seek answers as to why land rents - and therefore land values - are affected by the general economic climate of a particular country in market economies. We have all heard real estate practitioners talk of how credit squeeze, the monetary policy, and the fiscal policy (budget, etc.) affect property market; so that real estate transactions are either slowed down, or accelerated by government action in these economic policy areas; This chapter seeks to provide some answers as to why this happens; and when

such impacts are expected to be felt. Effective demand for land is brought into focus as it is affected by economic forces, the availability of alternative investment, fiscal, and monetary policies. In addition, effective supply is considered under the same light; and in view of what has been discussed in the earlier chapters within this work. In the end there is an attempt to analyse the reality and causes of the state of equilibrium in land and landed property markets; as these are affected by economic forces.

This state of equilibrium is not different from that discussed by Ricardo, Von Thunen, and the later classical and neo-classical analysts. The state of equilibrium can be regarded as being the same as that one proposed by Alonso in different landed property situations. Therefore, the discussion of this chapter will focus on what affects the price structure; by discussing those things that affect that structure that are exogenous to the Ricardo-Von Thunen - Alonso rent theories. The impact of the level of effective demand through its effect on locus of opportunities, price of other goods, etc., on the bid price curves will be examined. They are expected to cause the bid price curve to be either depressed or to be shifted above certain levels. This shift in bid price curves ultimately determines the price level of land; through its influence on the effective demand for land.



## The Process of Investment

### Rate of Interest

J.M. Keynes thought of investment as expenditure on real capital goods.

When a man buys an investment or capital asset, he purchases the right to a series of prospective returns, which he expects to obtain from selling its output, after deducting the running expenses of obtaining that output, during the life of an asset. This series of annuities  $Q_1; Q_2, \dots Q_n$  it is convenient to call them prospective yield of the investment.

This statement was given in his famous book published in 1935. This book, popularly known as The General Theory<sup>1</sup> appeared during the dipression and provided the rationale for all investment - to achieve economic recovery. The statement was made to prepare the readers to the theory of investment that Keynes had re-modelled to suit his economic analysis. Although expressed about a half a century ago, this view is still upheld in contemporary neo-classical theory. This theory defines investment as purchase of any asset, or indeed the undertaking of any commitment which involves initial 'sacrifice' followed by subsequent pecuniary benefits. For example, one may speak of the purchase of an ordinary bond or share belonging to a local brewing company as an investment; or the decision to finance one's education through a university as an investment.

In this text investment is also made to include the process of employing factors of production in the productive process in anticipation of economic returns from this process.

The money used to purchase assets or to purchase factors of production is regarded as circulating (liquid) capital for the purpose of the forthcoming discussion.<sup>2</sup> The process of investment (by investors) is therefore that process whereby investors, through restraining from immediate consumption, commit the liquid capital available in the present time to some production process in return for a stream of income spread over time - just as Keynes explained.

In committing their versatile spending power, (or money) that is available at the present time, investors are usually uncertain of what is likely to happen to this money or the expected stream of income in the future. The process of production they will have committed themselves to is open to many risks and dangers, and it may "collapse", spelling doom on whatever amounts of money was tied to it. Literature and everyday experiences are full of tales and misadventures wherein large sums of money are committed on massive projects that eventually result in yielding less returns than that was expected at the inception; or no returns at all. This often results in tragic financial catastrophe wherein the money invested cannot be available any longer either for immediate present day spending on other investment, or for present day consumption.

In a similar manner we can view committing money for investment like keeping it somewhere it cannot be obtained for consumption now, so a stream of income

could be realized from it for the same goal of satisfying future consumption. Any money kept somewhere inaccessible, and payable only at a future date is exposed to risk, because intervening events can make such future payment/s impossible; and cause a loss in satisfaction that may have resulted if such money were spent immediately. It is for this reason that a shilling that is available in 5 years, for example, is viewed by people (anybody) as being smaller than that which is available now. On this same principle the discount theory and theory of interest are based. Any money left somewhere overtime and not spent at the present time is not guaranteed from risks, because the investor is not sure whether such money will be there in the first place, or whether the stream of income is guaranteed.

Since no future payments are certain the person leaving his present day consumption power in some place is committing his liquid assets to the process of investment, and has to be rewarded somewhat; to encourage or induce him to part with his money. Something has to be done that will make this owner of present day spending power indifferent-between spending his money later (either through a stream of income or as a lump sum); and using this money in the present time for other immediate benefits or pleasures. The owner of this money must be renumerated for taking the risk of leaving his money tied to some investment.

One method which has evolved throughout history as a result of financial practice, and with the development of western economies is the remuneration through interest rates. Persons holding money are convinced or induced to part with it by being offered binding promises by the borrowers that their money will be able to "earn" for them a specific income in relation to its quantity: i.e. that income or interest calculated as a percentage of the lump sum deposited (the premium). This percentage is the so called rate of interest; and is promised to individual owners of cash by commercial banks and other financial institutions to induce them to invest their money in these institutions.

The rate of interest is therefore the price of borrowed money. Thus, if shillings 100/- is lent, and shs.105/- is payable at the end of the year the yearly interest rate is shs.  $\frac{(105 - 100)}{100} = 0.05$  or 5%. It would be an oversimplification to talk of "the" rate of interest. At any one time there are a whole set of different interest rates, each associated with a different form of lending; i.e. with the place wherein money is being deposited as premium to yield an income flow, so that this premium can be obtained in future. The reason for such differences will be time preference as discussed above. The lender is, in effect, postponing consumption from the present to the future; and consumption in future is preferred

to present consumption because of some inducement; the Rate of Return.

Interest rate is the term describing the price of lending money. On the other hand, when money is committed to the purchase of real capital or other investment, the remuneration for the lump-sum forgone (premium) is the so called rate of return. This rate is analogous to the rate of interest, because the investor in any project compares the periodic remuneration from his investment to how much he could earn if he were to leave his money in a commercial bank. The rate of return is usually defined as net profit from an investment after all expenses have been deducted from the gross income of the investment - including depreciation, if real capital is under consideration.<sup>3</sup>

Whether one is considering the rate of interest, or the rate of return to investment the analogy is the same - namely, one has to expect a certain percentage return on his premium that makes him indifferent to the time that he spends the premium; and therefore willing to tie his lump sum amount to the subject investment.

One basic assumption in economic theory about a rational individual's behaviour (or a firm's behaviour) is that they operate in such a way as to maximize profits. This motive is maintained in their choice of the investments in which to commit their funds; whether it is having the money in a savings

bank, any financial institution like insurance firms, building society, etc., or indeed, purchase of capital goods. The choice of 'an investment' will depend, therefore on its proposed returns. Only those investments that are consistent with the firm's profit maximization goal - hence the maximization of the rate of return - will be chosen. This implies that the firm will have perfect or real perfect knowledge of all investments open to it; so that it can be in a position to compare, and to choose the best rate of return.

In choosing this rate of return, even the interest rates offered by financial institutions come into picture. We shall see later how these are affected by the action of governments' fiscal and monetary policies; either directly through taxation; or through the working of the central bank mechanism. At the moment we shall only observe that the Central Bank fixes the Bank rate which governs the lowest level of interest - rates offered by commercial banks. The latter is about 1% or 2% more than the Bank Rate; and is usually called the market rate of interest. This is meant to be of such a level as to be able to induce the small saver to leave his small money deposits in the savings banks as savings. Various savings banks have their own rates of interest. Therefore when one talks of the "market rate of interest" (especially when comparing it to the rate of return

available in different investments) one usually is referring to an average rate of interest offered by banks. In Kenya today (1985) this is about 14% per annum. Other investments have to have equal or higher rates of return than this if they are to induce the small investor to consider them as viable alternatives to leaving money in a savings bank. These other investments include investments in land and real property, which are central to the theme of this work.

It must be noted here that the same profit maximizing motive obtains even in the decision making of large firms that have large financial reserves which could be used for investment. Any such firm could always leave its money with a savings bank; or it could alternatively consider the thousand odd investment options available in the capital and real property; all of them capable of yielding specific rates of returns. Some of these are comparable to or higher than the market rate of interest. Each investment will be considered on its own merit.

### Investment and Cash Flow

#### Concepts of Discounted Cash Flow

In the present age of accurate financial analysis, an average firm employs financial analysts to help it in making investment decisions. These could be economists, real estate appraisers (valuers), engineers, estate agents, stock brokers, insurance agents, etc. Alternatively, the investor himself

could be a proficient financial analyst or a capital budgeting expert; and he may be in a position to utilize some of the modern techniques available for comparing the returns of various investments. Despite these techniques, there is an important limitation which requires re-emphasis: namely that any of these analysts has imperfect foresight into the future. Economists have not yet devised really effective methods for taking uncertainty and risk into account; and predicting the future with any degree of accuracy.<sup>4</sup>

Bearing in mind these risks and uncertainties, the analysts consider whether or not to give up their money that is available to them at present in return for a stream of income accruing to them in a succession of future times. When a present value is given up in preference for a future value or for a stream of income, this means that the present value has been discounted in favour of the stream of income; or a future value. This latter meaning is the commonest use of the word discount; and the rate of interest or return used to arrive at the present value is the rate of discount. Consequently, one could prefer present value to a stream of future income, or a lump sum payment due in future. This time one can say they discounted future value for present value.



At this point it is necessary to describe the procedure which must be employed to compare present and future receipts of outlays. First of all, the investment analyst needs to know the amount of money at his disposal at the present time - the premium. With respect to investment, he needs to know either the amount of money receivable at a future date, or the amount of each payment which is a part of a stream of income; and the dates at which such payments are made. If the stream of income is not payable in uniform amounts, all the details of the magnitudes of payment, and their dates should be available. He needs to fix his rate of return - which he does according to his perceptions of the risks to which the investment is open. This rate must not be below the market rate of interest. It must be mentioned here that since the risk-rate or the rate of return is based on his perception of the lucrativeness of the investment, it is not something which is uniform among all investors - or to all investments. The rate of return on each investment depends on each investor's insights, fears, expectations, and personal circumstances.<sup>5</sup> From an observer's viewpoint, this rate is somewhat arbitrary, but the investor has serious reservations about it, because unless the investment offers a rate of return higher than his perceived risk rate for that investment he is not prepared to part with his present spending power in return for any future cash-flow, or lump-sum. In effect, there is

no economic yardstick for measuring the individual's perception of risk on the rate of return for any investment, except the wishes and preferences of this particular individual or firm. The rate of return that he fixes for any investment based on his psychological criteria is his internal rate of return; that makes him indifferent between having command of his premium for present expenditure; and having to wait until some future date when he would begin to receive a flow of income, or when he will be due to receive his lump sum amount. Remember, the sooner he can re-coup his money the better for him; then he can put that money to some other use that can earn him some more rate of return; or he can use it for satisfying his immediate personal needs.

Suppose some money *is* available to the investor now; and is invested so that each interest payable for this premium to the investor acts as a flow of income from this investment as it is paid after every end of year. In other words; the money is invested at a rate of return, *i*; which is compounded annually. The present value of this cash-flow is found as follows:

$$P_v = \frac{R_1}{(1+i)^1} + \frac{R_2}{(1+i)^2} + \dots + \frac{R_n}{(1+i)^n}$$

Where  $i$  = Rate of interest

$R_1, R_2, \dots, R_n$  = Nett annual revenue (net annual return)

$P_v$  = Present value

This formula applies when the cash flow from investment receivable periodically (annually) is not regular.

In case the stream of income is regular at each period end (year end)<sup>6</sup>; then  $P_v = \frac{R}{(1+i)^n}$ .

Having calculated the present value of his cash flow, he will then go on to examine whether the figure obtained is equal to the amount of money he is "ransoming" to yield the cash flow - or his present value (Premium P)

P must equal  $P_v$ ;

or  $P \equiv P_v$  (Premium must equal Present value)

If as a result of his calculation the above equality (or identity) is not obtained he revises his expected rate of return upwards, and the acceptable rate of return is that which at least equates the cash flow resulting from its application to the present money value or premium being invested.

The investor of course would not hate having a bigger  $P_v$  than P; but he must equate the two in order to accept the investment. The rate of interest that at least equates the present value of cash flow to the premium is the investor's internal rate of return.

The external rate of return is what it would cost

that firm to borrow money from sources outside its establishment. This rate of return can be said to be the market rate of interest referred to above.

### Marginal Efficiency of Investment

We have noted earlier on that the motive of most firms is maximize profits. We have assumed that a holder of funds that are available at present, and that could be put to investment in return for cash flow is a firm, or an individual, whose aim is to maximize the returns from his financial outlay - the cash flow from the premium. As long as he can realize a larger internal rate of return from his investment than the external rate he will continue milking the last cent of returns from investment. If he is rational he is not going to stop investing when he knows that some farther investment is capable of earning him some additional returns. In this connection, the external rate of return can be interpreted to mean the marginal rate at which additional investment funds may be borrowed.

In the case of the holder of investment money, the external rate of return can be said to be the marginal rate of lending extra money at the market rate of interest. In both cases, when one is considering investing in any enterprise, the rate of return of that enterprise is likely to yield extra money above that which is offered by the market rate of interest. Under profit maximizing conditions

therefore, the investor will continue investing in the enterprise of his choice as long as he can earn something above the market rate of interest.

The investor's profit maximizing rational behaviour will make him choose the parts of the investment of his choice that are most profitable first; and continue investing on the poorer and poorer sections, as long as there is something to earn above the market rate of return (the external rate). Bearing that fact in mind, and due to diminishing returns on whichever investment he undertakes we can conclude that the internal rate of return on each additional investment (ceteris paribus) will be declining. Therefore, a rational firm will undertake all investments up to the point where the value of the marginal unit of return from his investment equals the marginal rate of borrowing/lending: i.e., the external rate of return. In the neo-classical sense the firm will have milked every little benefit from that investment that is available in the market. It will have maximized its return from that kind of investment, and reached its investment equilibrium; and then there will be no tendency to invest in that kind of enterprise any more.

This means that a rational firm cannot lower its internal rate of return more than the external rate of return. If it did, it would be getting less return from the investment than it can get by lending its money to commercial savings banks. Matters are

worse if this firm is a borrower of investment funds from commercial lending bodies. A lower rate of return in the proposed investment would then mean that the investment is capable of yielding less than it takes to service the borrowed premiums. The firm that undertakes this investment would risk operating at a loss. External rate of return is not always constant. It keeps fluctuating (as we shall see) in response to exogenous parameters that are not under the control of the firm. If it rose above the point of the equilibrium of the firm it means that the firm would be operating at a loss, unless it dis-invested. On the other hand a lowering of this rate induces more investment until the internal rate of return is equalized to the external rate. This means that there are several points where the internal rate of return may equal the external for any firm; and the locus of these points forms a function or a scheme that has been defined as the marginal efficiency of capital function. This function is therefore the locus of all points at which the internal rate of return equals the external rate at different rates of interest and varying quantities of (capital) investment. It is the locus of all points of optimal investment for the firm at different rates of interest. It forms demand curve for investment for any individual firm. If the firm is a manufacturing concern the function becomes

the locus of optimal capital stocks at different rates of external return (interest). Also, a real estate investment firm specializing in land and building estate development would face a similar demand curve for investment at different rates of interest. This function therefore is the locus of optimal holdings in land and buildings at different rates of interest - optimal capital and land stock at varying interest rates.

Figure 5-1 shows this function, generalized for all investment firms in an economy. If all investment were at equilibrium at  $I_i^* = I_{e_0}$ ; and the external rate of return fell to  $I_{e_1}$  it would pay any firm to keep on investing until it equalises the external rate of return to its internal rate of return - at the point where  $I_i^* = I_{e_1}$ . Before adding on to its investment a difference would have to exist between the existing investment and the desired investment;  $\Delta K$ , or  $K_0$  minus  $K_1$ . It is the gradual addition of investment to cover this difference that introduces diminishing returns. These gradually eat into the internal rate of return until the difference between it and the external rate is zero. Thus, the desired investment stock will have been acquired to bring the firm to its optimum level of investment where it is maximizing returns.<sup>7</sup> This is how the internal rate of return follows the external rate of return along

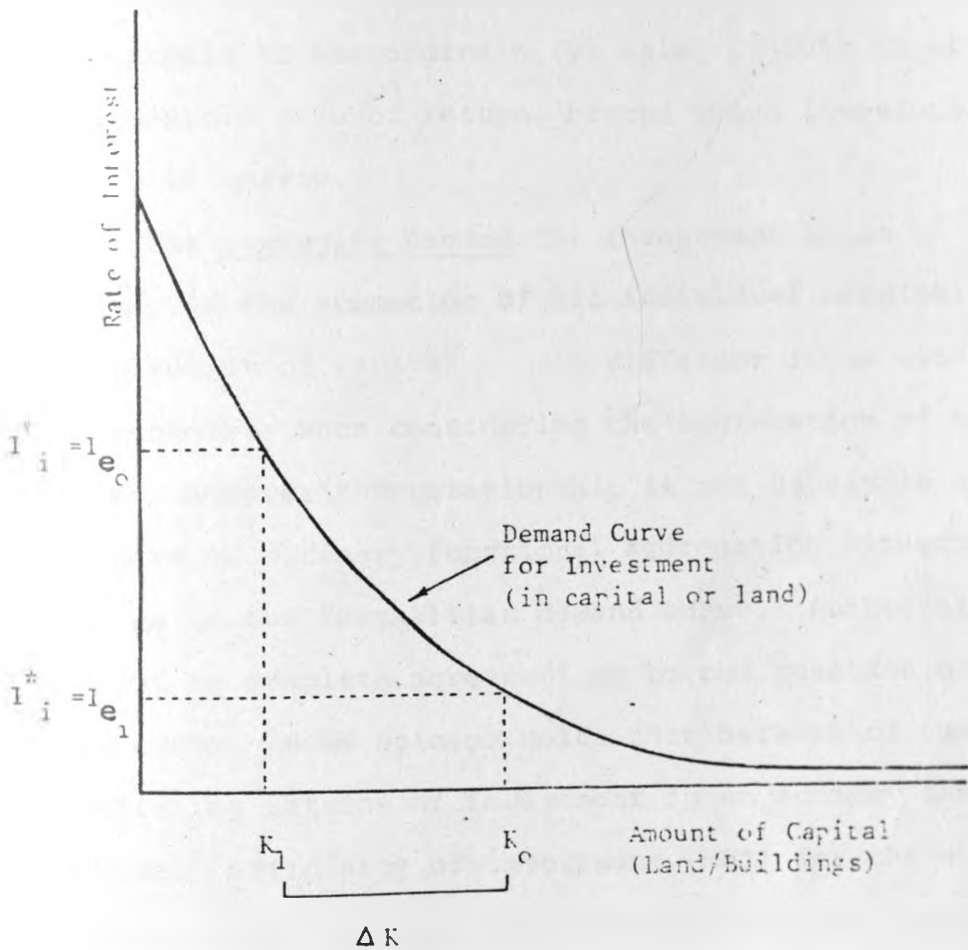


FIGURE 5-1: The marginal Efficiency of Capital Function.



a locus - marginal efficiency of capital - or the demand curve for more investment in the firm.

The flatness of this function at very low rates of interest in the above diagram implies that investors can afford to borrow infinite amounts at these rates. At very high rates of interest investors cannot afford to borrow anything, so the function is not asymptotic to the ordinate (y) axis; it cuts it at some maximum rate of return, beyond which investors cannot afford to borrow.

The aggregate demand for investment in an economy is the summation of all individual marginal efficiencies of capital for different firms within the economy. When considering the aggregation of these curves, however the relationship is not as simple as it looks in ordinary functional aggregation situations, such as in the Marshallian demand curve. Authorities are not in complete agreement as to the position of this curve. Some opinion holds that because of the diminishing returns of investment in an economy the marginal efficiency of investment (MEI) for the whole economy would lie below the expected position occupied by a simply aggregated MEI function for all firms. Other economists stop the analysis where MEI for all firms is considered simply as aggregate of the MEI functions for all ordinary firms. The analysis is detailed and cannot be carried out in this elementary work. Readers are however requested to consider

ordinary (introductory) texts on macro-economics for detailed analyses.<sup>8</sup> It is enough for our purposes to assume that the MEI for the whole economy is the aggregate function of all firms.

Equilibrium for Investment in An Economy.

Investment Equilibrium in an Economy

In order to see how equilibrium for investment comes about and can be illustrated, it is necessary to bring in the supply function of investment - now that we have identified the MEI function in the economy as the demand function for investment at different rates of interest. This equilibrium model, and the resulting rate of return (or price level of investment) will later be used to demonstrate how government action, the action of the market, and other macro-economic exogenous variables affect the demand and supply for investment. It is intended to show that this analysis will lead to useful conclusions in connection with the demand and supply for land and real property. This kind of analysis is meant to show why, sometimes, due to macro-economic conditions of the economy the market for real property stands either to gain or suffer. Real estate men speak of the credit squeeze, the recession, government taxation, the onset of a new industry, the boom in the whole economy generally, etc., and say that they affect the real property market. Using these functions it is hoped to demonstrate how the real property market -

the market for land - is affected by exogenous economic forces. This will then be related to the Ricardo-Von Thunen rent analysis through Alonso's price structure - Rent bid function analysis.

The cost of investment, or the return paid to the suppliers of investment at differing prices is mapped by the average factor cost function. Suppliers of factors of production will manufacture factors of production, or will invest in response to the price being offered in the market for such factors or investment.

This fact is easily understood if we consider real capital for some specific purpose as any other good that is produced in response to the price being offered for this good in the market. The Marshallian supply function tells us that the producers will be willing to supply more of this good the higher the price of this good prevails at its market. This analysis is generic - and applies to the supply of any good in an economy. According to this analysis, the market supply curve is the aggregate of supply curves for all producers in an economy; and that the overall equilibrium price is determined by the intersection of aggregate supply and aggregate demand. The supplier of any good - and for that matter capital - will therefore respond to the price prevailing in the market.

In the earlier discussion we have identified the supplier of capital as an investor, and that he

invests in response to the rate of return that he expects; so that he can equate the present value of his investment to his cash flow. It therefore follows that in the short-run (*ceteris paribus*) a high rate of return will induce the persons with cash surplusses to leave them invested in capital goods. Higher and higher rates of return would attract more and more investment activity in capital goods supplying industry; so that the supply curve for capital is not unlike that proposed by Marshall for ordinary goods.

It should be noted, however that the rate of return is being considered as the average factor cost; or the market price of the factors. The rate of return in this case prevails at the market like in the case of the Marshallian price that attracts suppliers. A farther investigation of the nature of the rate of return in relation to the rate of interest reveals that it is a mathematical transformation of the prevailing unit cost of capital in the market. It happens to be a percentage of the capital value of the investment payable periodically to the lenders of investment premia in the capital investment market. It is therefore a generalized function describing the periodic return of the unit cost of capital. If a specific investment were considered it would be found that this percentage of the actual cost of investment, when calculated, equals a particular price. This

transformation can be done for several prices or values of the investment; and a supply curve with the real prices on the ordinate can be drawn, instead of the one with interest rate on. The rate of interest is therefore analogous to price in the Marshallian supply and demand when considering market analysis for investment.

The more the rate of interest - hence the rate of return for investment - therefore, the more capital formation takes place. It must be borne in mind that this rate of return is the market rate, and that **single investors are assumed to have no influence** over it. They will therefore be perfect competitors in the investment market; and will sell their capital good at the prevailing price in the market. We are also assuming that at each point on this capital supply function these competitors are rational profit maximizers, who will leave no profit untapped in the market. Each point on the function therefore becomes an equilibrium point where each factor producer maximizes his profit; equalizing his marginal revenue (expected return) to his marginal cost (that of borrowing investment funds from the market). Higher or lower rates of interest therefore induce the changes in this equilibrium, and a movement into a new one - continuously, all along the curve. At each point  $MC = MR$ . The marginal revenue = Price, because of perfect competition in the investment market.

Elementary price theory tells us that Price = Average cost under perfect competition. The locus of different rates of investment at different rates of interest therefore depicts the locus of a generalized (mathematically transformed) average factor cost function. This is in keeping with the price theory - that the supply curve of capital function is the same as the average factor cost function. Figure 5-2 therefore depicts the average factor cost function as the supply curve of capital. At a low rate of interest  $I_0$  only a small amount of investment  $K_0$  is made. However, with the increase in average price of capital offered in the market (or AFC) more and more capital investment is injected into the market, so that it is clear from the illustration that at a higher rate of return (interest)  $I_1$ ; a greater amount of capital investment  $K_1$  is made.

If there is a lot of money in the economy, and it is cheaper to borrow and to invest, the supply curve of capital investment shifts to the right, signifying that more investment like  $K_3$  can be made at the same rate of interest  $I_0$ . A shift to the left would demonstrate the opposite effect, where less investment,  $K_4$  is made, signifying that less investment (only) is available at the same rate of interest. (Note the vertical analysis where  $K_0$  can be made cheaply at  $I_0$  or dearly at  $I_2$  depending on the position of the supply curve).

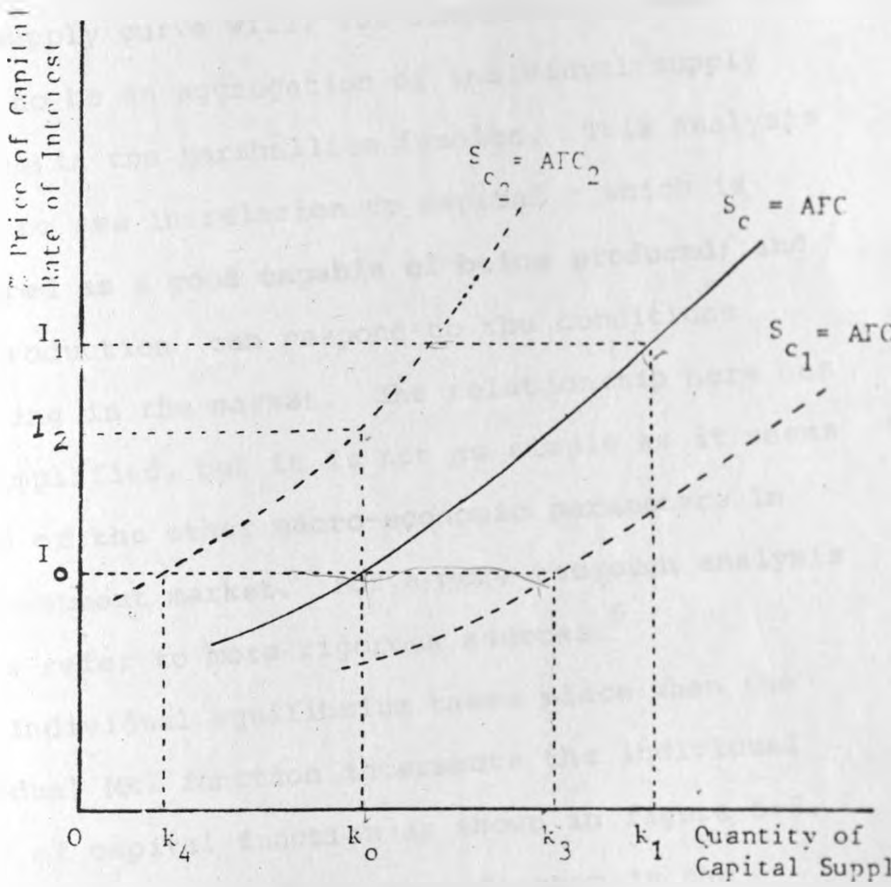


FIGURE 5-2: The Average Factor cost Function.

Higher prevailing rates of interest will therefore lead to shifts in supply curves. These are, of course influenced by other exogenous factors that are not part of this model, but that will be explained later in this chapter.

The supply curve of one individual investor in the capital market behaves in this manner, and the market supply curve will, for simplicity's sake, be assumed to be an aggregation of individual supply functions; in the Marshallian fashion. This analysis is easy to see in relation to capital - which is **considered as a good capable of being produced; and** whose production can respond to the conditions prevailing in the market. The relationship here has been simplified, but it is not as simple as it seems because of the other macro-economic parameters in the investment market. For a more thorough analysis of this refer to more rigorous sources.<sup>9</sup>

Individual equilibrium takes place when the individual MEI function intersects the individual supply of capital function as shown in figure 5-3. The demand for capital in this diagram is the individual MEI function described above, and the supply curve is the AFC function. In this case the individual investor is in equilibrium at capital quantities  $K_1$  when the rate of return is  $I_0$ . Aggregate capital market equilibrium is the summation of the individual demand curves for capital and the supply



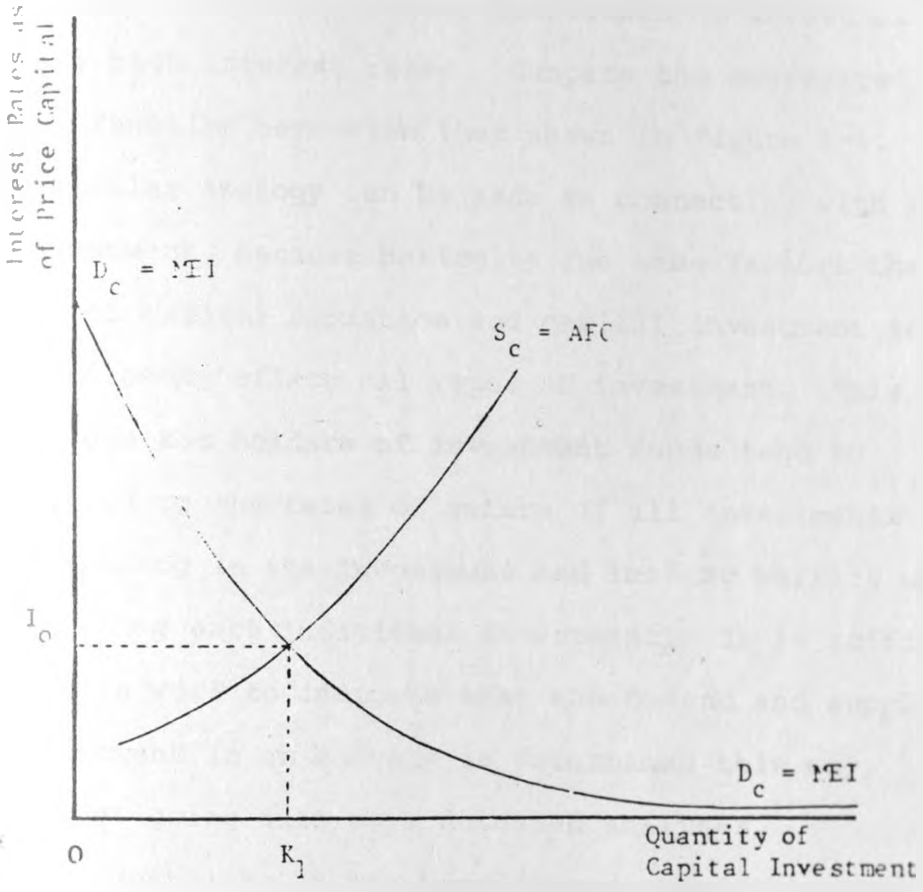


FIGURE 5-3: Equilibrium in the Capital Market.

curves of capital, and the intersection of both resultant functions. Figure 5-4 shows the simplified market equilibrium for capital investment. Here, the MEI function could be asymptotic to the ordinate because the whole economy can afford to invest at very high interest rates. Compare the aggregate MEI function here with that shown in figure 5-1. A similar analogy can be made in connection with all investment, because basically the same factors that affect capital formation and capital investment in the economy affect all types of investment. This is because the holders of investment funds tend to respond to the rates of return of all investments prevailing in the investment and lending markets when analysing each individual investment. It is sufficient in this work to indicate that the demand and supply of investment in an economy is determined this way, without going into more detailed analyses.<sup>10</sup>

Just like it has been demonstrated that the supply curve for investment will shift, so will the demand curve for investment, the MEI. The shift will occur if the investors expect a rise in the level of sales of the goods they are supplying - i.e., if they expect that a great demand for the investment of their choice is going to take place. Since the demand for investment is derived from the demand for consumer goods, any anticipated increase in aggregate demand is likely to shift the MEI function. If it shifts to

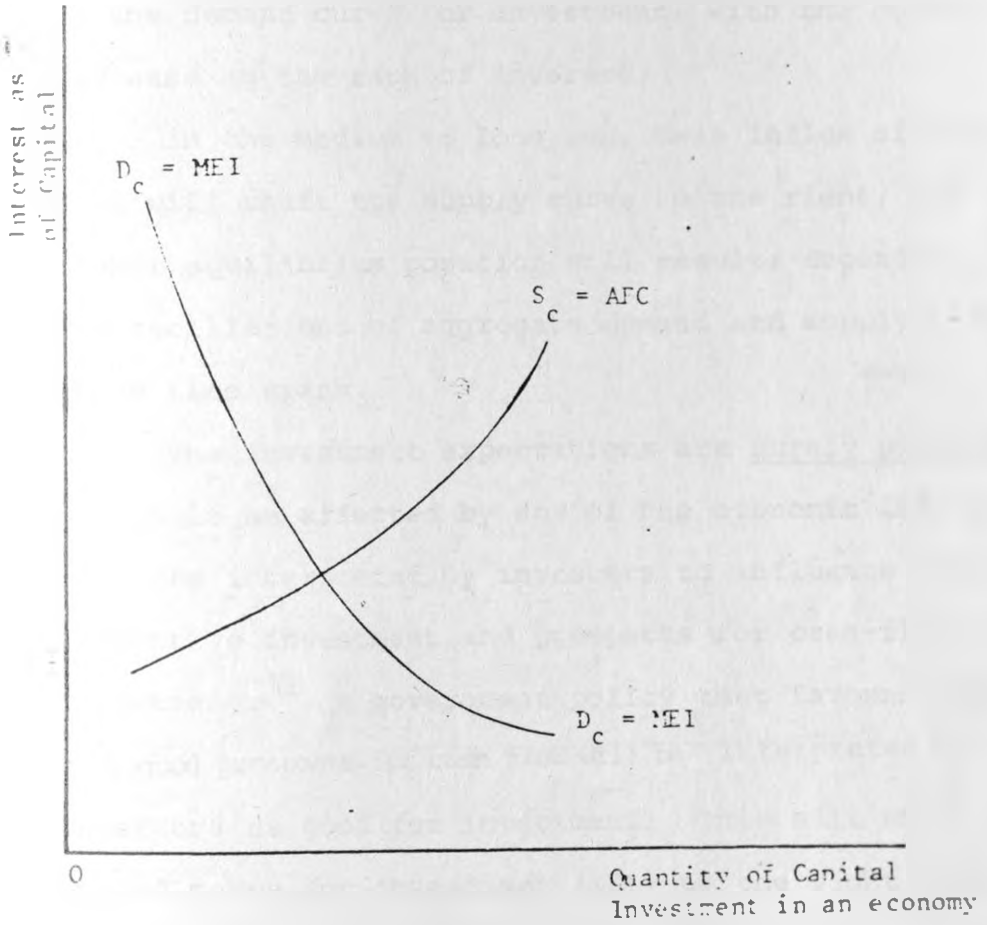


FIGURE 5-4: Aggregate equilibrium in the Investment Market.

the right (like it will when the expected demand rise is positive) it influences the rates of interest upwards in the short run; assuming the supply function remains the same. An expected decrease in aggregate demand for consumer goods causes a shift to the left of the demand curve for investment, with the concomitant decrease in the rate of interest.

In the medium to long run, this influx of investment will shift the supply curve to the right; and some higher equilibrium position will result; depending on the oscillations of aggregate demand and supply within these time spans.

The investment expectations are purely psychological and could be affected by any of the economic indicators that are interpreted by investors to influence their respective investment and prospects for cash-flow from investment.<sup>11</sup> A government policy that favours investment and good prospects for cash flow will be interpreted by investors as good for investment. This will shift the demand curve for investment (MEI) to the right - meaning that more investment is demanded. If the supply curve remains the same, this means that prices for investment - rate of return - will rise. This induces suppliers to supply more funds or more investment to meet the new demand - and a short term movement along supply curve. Further supply in the medium and the long run will cause a shift in the supply of investment. Political climate, change in social tastes and preferences will have similar

effects on the demand and supply functions for investment. Technological growth - or growth in efficiency can cause the shift in demand and supply functions for investment.<sup>12</sup>

### Investment Market and Real Property

Investment in land and real property is just investment like other types of investment. Anybody who commits his money for investment in real property as an investment is also considering the stream of investment expected when an investment in real property is undertaken. Those who are familiar with real estate appraisal (valuation) will in fact remember that the contractors' method of valuation aims at finding the present value, or present cost of investing money in land and landed property. This is some kind of an assessment of the amount of money that can be used to replace the investment if the investment were "damaged" at the present time. The investment method of valuation, on the other hand, considers the cash-flow from the investment and finds its present value.<sup>13</sup> A prudent real estate man will always compare values obtained by both methods; and their equivalence indicates accuracy in valuation. Equivalence or near equivalence of capital values derived from both valuation methods indicates to the valuer that the rate of return or the risk rate<sup>14</sup> that he has used in the investment method of appraisal is the appropriate one for the particular investor.

Failure to equalize the present value of cash flow with the contractor's method makes him manipulate the risk rate until equivalence or near equivalence is obtained. The resulting risk rate is the appropriate investment risk rate. This search for an appropriate investment rate is parallel to equalizing the internal rate of return to the external rate of return in the appraisal technique.

Valuers will remember that the residual method of valuation also takes into account the expected cash-flow from an investment. After deducting the costs of buildings, the investor's risk and other capital sums from the capitalized value of cash-flow the residual value of land is obtained.<sup>15</sup> The method of valuation involves subjective choice of risk rates by the valuer, taking all the circumstances of the investment, and the investor's aversion to risk into account.<sup>16</sup>

Although the valuation methods involve rules of thumb and heuristic approaches, they amount to equalizing internal rates of return to the external rate in real property; because they ascertain that the investors do not incur any losses - that investors must be able to meet their expenses of borrowing investment funds. If the investors own the funds, these funds must be capable of earning at least as much money as they can fetch in savings banks or other alternative investments. The rates of return adapted

seem higher than the external rates of return as determined by the banking system, because each one of the investors is also rewarding himself for his risk in investment - over and above the most secure cash-flow that they can obtain in the open market.

\* Therefore, the external rate of return for investment in real property is - like in any other investment - the rate of return obtainable from the banking market. The internal rate of return takes into account the risk factor of all the firms investing in the complex real property market.

Assuming the supply of land is as elastic as that of capital goods, the MEI analysis could be extended to investment in land where the demand curve for such investment would be the MEI function - when it is plotted against the rate of return. In actual terms this function would be a mathematical transformation of the marginal revenue productivity function for land - which would be plotted in real value terms instead of the percentage rates of return.

Later in this work (chapter seven) building and development activity will be likened to capital creation.<sup>17</sup> The supply function of real property (i.e. buildings and land) is therefore the AFC function which is actually the cost of borrowing money for real estate investment at different rates of interest, Using this approach, real values are mathematically transformed to interest rates. In absence of this

transformation, a similar function could be obtained by means of a similar method, this time using real values instead of interest rates.

Consequently, the demand curve for real property will shift outwards with increasing expectations; when more investment is demanded at the same rates of return. Suppose investors expect a new government taxation policy will influence the economy in such a way as to create a high demand for office spaces and residences in Nairobi or any other city. This will cause all those who have money to invest it in real estate, because of the expected demand for space - which alternatively causes demand for land on which to build the space; and in the last resort, increasing demand for vacant construction land will be realized. On the supply side the builders of apartments, flats and office complexes will not be able to build them to meet the rising demand unless they can be financed by banks and other financial institutions. This means that they will take the market rate of interest, (which we identified as the average factor cost) as their marginal cost of borrowing; and therefore the marginal cost of supplying the extra space. In the final analysis, it will be found that demand and supply of any homogeneous type of land is similar to that of any other investment. Those factors that influence investment cause increases in demand or decreases in demand for space; and therefore increased



or decreased demand for land on which to provide this space. Supply and demand mechanism - shifts and movements up and down - will determine the market price; which, when mathematically transformed, will yield the market rate of return for real property. Therefore, those factors that cause the shift in MEI functions and the AFC functions in the general investment market will also operate in real property. The limitations in their perfect operations will be related to the inelasticity of supply for land - actual land - as considered in chapter 2. These influences are to be discussed in the following section.

#### Rent Theory and Investment Theory.

##### Ricardo and Von Thunen a re-examination.

We have mentioned in chapter four how Alonso, other modern urban-regional analysts, and agricultural economists have managed to synthesize the theory of rent from the two main services to one stream of thought that culminates in Alonso's work. In urban regional economics it is now an accepted view that the bid-price curves and rent bid functions that are a result of these analyses delineate the locus of declining rents from city centres to peripheral agricultural areas and beyond. This author is not aware of an instance where general investment theory has been related to spatial differential rent theory; although much of the work in economics so much anticipates this idea, that the relation seems obvious.

In chapters three and four we noted that given the firms' desires to maximize profits, and given the Von Thunen assumptions on the uni-tropism the uniformity of land, and definite prices at the market, land values tend to arrange themselves in homogeneous zones around a market centre where prices of commodities are determined. We also saw that this theory can be extended successfully to include urban land use through Alonso's substitution analysis and his bid-price curves. In effect, a land value gradient is formed, which is actually a locus of those rents charged to the highest bidders of the land from the city centre to the periphery as demonstrated by Alonso, Richardson and others.<sup>18</sup>

In addition we noted in chapter four that if Ricardo were incorporated in Von Thunen he will have his theory cast in one of the Von Thunen zones; and covering one of the homogeneous zones. Differential rent results in this homogeneous zone because of a slight relaxation of assumptions - that there is a slight difference in fertility between land parcels within these homogeneous zones of land uses. For example, if a zone was meant or hypothesized to be optimally suited to the growth of maize in accordance with the Von Thunen rings; then we are assuming that slight fertility differentials will make some of this land better suited for maize growth than other land in the same zone. According to Ricardo, differential

rent will arise where the highest yielding land within this same zone gets the highest rent.

The Ricardian model cannot be stretched to the limit in the combined Ricardo-Von Thunen model, because the marginal land yielding no rent according to Ricardo would be non existent - as the next land use zone is taken by the next most profitable user available with a flatter rent bid function. Therefore a case of zero rent at specific distances from the city cannot arise in a Von Thunen situation when all land has been taken up, cultivated, and is capable of earning rent (chapter 3).

Figure 5-5 shows the usual succession of the rent-bid functions in the usual Von-Thunen - Alonso arrangement. We shall assume in this case that the variations in fertility in accordance to Ricardo are variations in suitability for land in a specific Von Thunen zone for the land use within that zone. Therefore, the assumptions of the Ricardian differential rent will operate in any one of the homogeneous zones, such that differential rent will accrue to different parts or sections of the homogeneous Von Thunen's transportation zone. If one piece of ground in any one zone is not suitable for that zone so that its rent is lower than the general rent level indicated by the rent gradient in the homogeneous zone, it will remain physically in that zone, as long as it is capable of commanding a higher level of rent than all

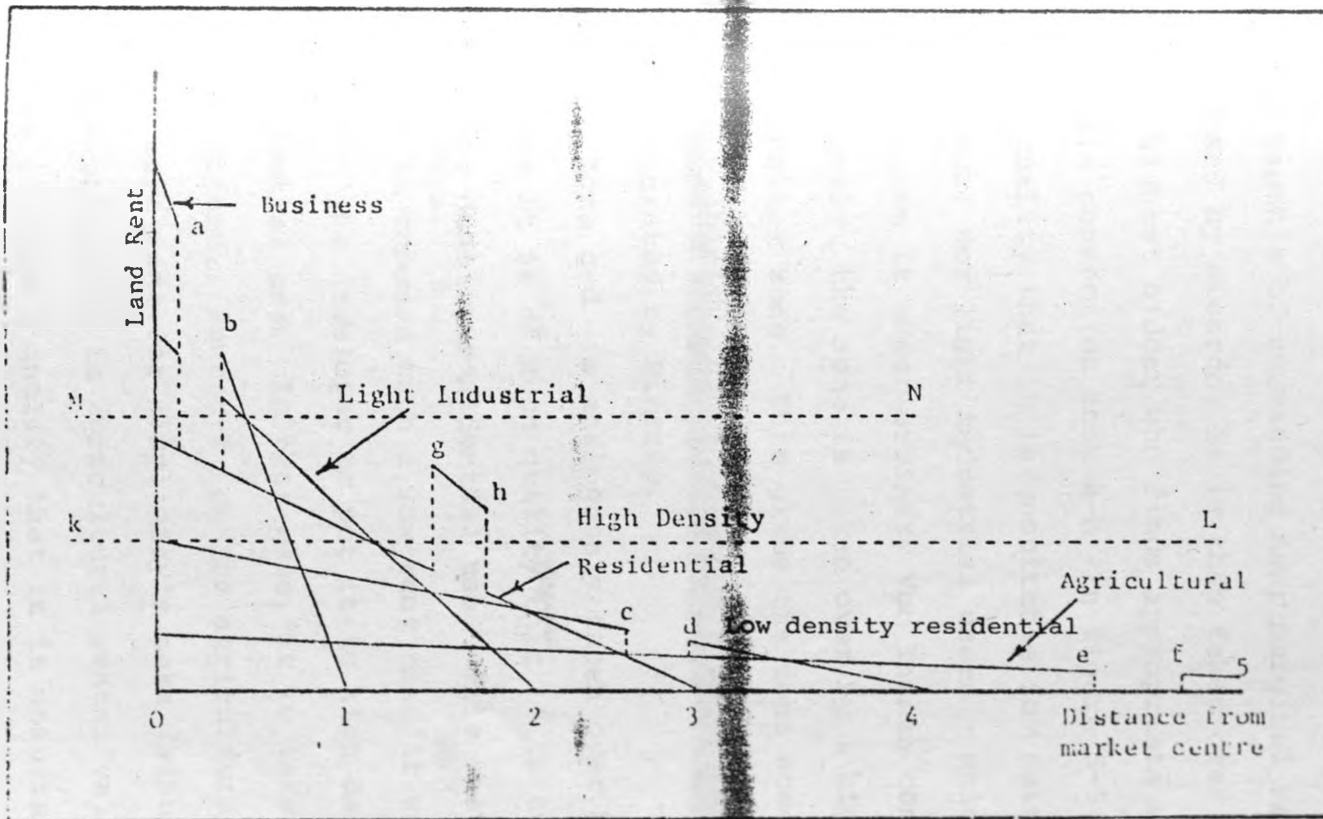


FIGURE 5-5: A Simplified hypothetical illustration of how the Ricardian Model would function within on Thunen Land Use Framework.

the other land users bidding for its location. However, if it is of such poor quality that it is only capable of commanding near marginal rent as proposed by Ricardo, it is then taken over by the next highest bidder who finds appropriate use for it. In this connection zone a-b in figure 5-5 is of such quality that it is unsuitable for neither business, nor light industrial users - which would have taken it under ordinary Von Thunen conditions. Ultimately, the zone is taken over by a high density residential zone. This gives the zone some rent-earning ability instead of the "No rent" proposition as elaborated by Ricardo.

Zone c-d is analogously taken over by Agriculture because it is of such quality that it is unsuitable for low density residential use. This unsuitability makes it command such a low rent that it would not benefit the developer to put it to high density residential use. In that case, it is taken over by agriculture. Zone e-f on the agricultural zone can earn zero rent for simplicity's sake (assuming no differentiation in agricultural rental values) because it is of such a quality that it is unsuitable for agriculture which is the land use with the flattest rent bid function. If, on the other hand, we had a succession of agricultural rent bid functions, the same analogy would apply to rent bid functions of different crops. The analysis, if rigorously

undertaken - "a-la-Alonso" - could be more difficult than this; but it is hoped that this simple conceptual model is sufficient for an elementary work of this nature. In the same diagram the reverse is true as in zone g-h; which is of such a nature that it is far much favoured by other factors (except transportation) as to be able to command a higher rent than that prevailing in its Von Thunen homogeneous land use area. g-h is above level K-L; the highest level that a high density residential user can afford to bid for land at that distance from the city. This makes the rent level in this zone be commensurate with the one commanded by light industrial users (whose rent bidding ability is below M-N), although these are a substantial distance nearer the city than the location of g-h. The most profitable use for g-h is therefore light industry. In plan an island of light industrial user surrounded by high density residential use will result.<sup>19</sup>

Ricardo, Von Thunen and Investment Theory.

Earlier in this chapter it was shown how the rate of return from an investment is merely a mathematical transformation of income from investment. Following the same analysis, then, the return from investment in land is its periodic rent. This, compared with the premium invested in land can be reduced to a rate of return, by simply computing a percentage of rent to the initial premium

We have seen how expectations cause an increase or a decline in MEI functions for various investments; depending on whether they are positive or negative. We can therefore generalize and say that any positive increase in the demand for space influences the rental levels because this creates an increased demand for land. This has a tendency to shift the rent bid functions outwards; and therefore the "rate of return" functions. In any one land use a rise in rent bid function (or its "shadow" rate of return function) is likely to increase its general bidding ability, and enable the land use to occupy wider space than usual. A general rise in all the functions will maintain the same zonation in land use, but at a higher rental - or rate of return level after some mathematical transformation.

Thus investment theory is really on the same plane as the rent theory. This is why anything affecting the level of investment in the economy generally will affect the demand for space; thus creating the demand for land, and accelerated investment in land and landed property.

In the next chapter we consider how investment in land is affected by changes in economic policy and the aggregate demand level in the economy. This will give us the ability to understand why the level of investment in land changes after certain government policies; and why such changes are being

committed to land or property investment. If all the rents available over space can be computed as percentages of capital values rates of return would result. A rent-bid function arrangement could then be easily converted to a rate of return bid function; and diagrams similar to figures 5-5 and 4-2 to 4-9 could be feasible, with the percentage rates of return to investment plotted on the ordinate. This extends the Ricardian-Von Thunen analysis to the investment theory where it can then be possible to consider MEI functions instead of rate of return functions in connection with landed property for investment. In this analysis it will be assumed that a rise in return for any landed investment implies the availability of greater financial surpluses to investors of that particular investment, making them able to bid higher than before for lands all the way from the market to the periphery.

Assuming then there is a rise in the demand for space throughout the economy, prices for land (capital values) will be high in the market. This implies higher financial rewards in rent, which when capitalized at the prevailing rate of interest (that is assumed constant) yield higher land values if all outgoings remain constant; and if there is a concomitant rise in the net income as a result of higher rents.



FOOTNOTES

1 John Maynard Keynes; The General Theory of Employment, Interest and Money. (London: Harcourt, Brace & World, Inc., Harbinger Edition, 1965), p.135.

2 Graham Bannock, R.E. Baxter and Ray Rees; A Dictionary of Economics. (London: Penguin, 1971), p.232.

3 Ibid., p.346.

4 William J. Baumol; Economic Theory and Operations Analysis; p.597.

5 Andrew Baum and David Mackmin; The Income Approach to Property Valuation. (London, Routledge & Kegan Paul, 1979); pp. 50-56.

6 Eugene L. Grant, W. Grant Ireson and Richard S. Leavenworth; Principles of Engineering Economy. (New York, The Ronald Press, 1976). Chapters 3, 4, and 5 give this formula and related interest formulae a detailed analysis, and are recommended for farther reading.

7 Fred R. Glahe Macroeconomics: Theory and Policy. (New York, Harcourt Brace Javanovich Publishers, 1977), pp. 73-77; chapter 5.

8 For example, Macroeconomics by Fred R. Glahe as referred to in footnote number 7.

9 For example, see Everett E. Hagen; The Economics of Development. (Homewood, Illinois; Richard D. Irwin, Inc., 1975), pp.250-267; and Donald S. Watson, and Mary A. Holman; Price Theory and Its Uses. (Boston, Houghton Mifflin, 1972); pp.376-396.

10 Fred R. Glahe; Macroeconomics, chapter 5.

11 John Maynard Keynes; The General Theory, pp. 147-164.

12 Fred R. Glahe; Macroeconomics chapter 5.

13 Andrew Baum, et al., The Income Approach to Property Valuation; pp.50-67.

14 This approach is only valid for properties from which some cash flow is expected; and may not apply for public buildings like temples, churches, civic buildings, etc. monitored constantly, and with great interest by real estate men.

15 William Britton, Keith Davies and Tonny Johnson, Modern Methods of Valuation of Land, Houses and Buildings. (London, The Estates Gazette Ltd., 1980), pp. 157-164.

16 Ibid.

17 In that case, capital - liquid, real, and building materials - are conceptualized as being combined with labour, entrepreneurs - architects and professionals - and land in the process of producing the consumer good housing.

18 Harry W. Richardson, Urban Economics pp.49-78; William Alonso. Location and Land Use; entire work.

19 J. Brady Foust, and Anthony R. de Souza; The Economic Landscape; p.40.

## CHAPTER SIX

### OPERATION OF THE PROPERTY MARKET

#### Financial Markets and Investment in Real Property.

The theory of investment, and its relation to rent theory - as summarized in broad schematic forms within the last chapter - is a simplified view of what actually happens to the economy, and how the market for land is lastly affected by changes in aggregate demand. The factors influencing investment operating within the economy are numerous, and form a whole body of study - macro-economics. Some topics come under the realms of micro-economic analysis, capital budgeting, operations research, and others. It is therefore difficult to imagine that the last chapter presented even a near coverage of the relationship between investment and rent theories. However for the beginner wishing to grasp the broad mechanism of this process the analysis provides an overview of what can broadly be expected to happen. This chapter is aimed at bringing the novice reader to the general conclusions that rent theory is one and the same thing as the theory of investment. In fact rent theory is one of the many parts of investment theory, because it concerns itself with those things that affect returns, and the rates of returns (cash-flow) in investment generally. In particular it describes returns within investment in landed property.

Before proceeding farther we need to reiterate that when the level of investment is high in an economy, this means a high level of economic activity; and a high level of aggregate demand. Any novice in macro-economic theory should be able to understand this. According to the Keynesian aggregate income function, an increased level of investment yields (through the operation of various multipliers) increased demand for all kinds of goods and services. This in turn yields an increase in the demand for space whereon to locate the firms that would manufacture the increased quantities (demand and services. Demand for industrial and business activity space is actually demand for land and real property.

Before the suppliers of this commodity (space) undertake to satisfy the resulting demand they view seriously the expected returns from their committing huge financial outlays on the investments. It was therefore discussed broadly in the last chapter how they examine the cash flow of every investment - and in this case investment in land - and how they compare it to that accruing from investments requiring equal financial outlays.

An ordinary investor may not have the benefit of accurate financial analysis or access to an analyst. If they had, there would be accurate discounted cash-flow analysis on investments, and accurate

comparison between investments. When they do not have the benefits of analysts, and they are thinking of alternative investments, they are actually unconsciously doing cash flow comparisons between the subject investment and alternative investments.

These comparisons, however accurate they are, often approach the psychology and the expectations of the investor as stipulated by Keynes;<sup>1</sup> because some of them cannot be quantified in monetary terms due to their abstract nature. However, real estate analysts have considered these investment comparisons ~~as being of cardinal importance before any investment~~ in real estate is undertaken.<sup>2</sup> This means that:-

(i) Potential investors in real property are likely to consider security of income before undertaking any investment in real property. They will consider such factors as how secure cash flow from the investment is, how regular, and whether there are items in the proposed investment, or risks that would interfere with the regular flow of cash flow. In case these things happen to be there, the investors would consider how pronounced they are in real property investment as compared to other investment. If conditions are better in other investments, then the investors would forgo investing their financial outlays in real property in favour of other alternative investment. ✓

(ii) Potential investors would also consider the security of capital or the amounts of money they have invested (premium). Their concern is whether the investment will maintain at least the same present value during the duration of the investment. In the extreme cases of "Acts of God" some expensively built industrial installation buildings may be destroyed by a dam breaking upstream - for example - if they are located in a flood plain. This would cause great losses of all the moneys that had been invested in the building construction and the purchase of the industrial installations in them. Security of capital therefore is the term that reflects the fear of the risks of investment (that may amount to the loss of the entire sums invested) by the owners of investable premiums.

(iii) Liquidity of Capital is also another consideration. Investors are bound to ask themselves whether indeed what they are buying is worth the money and how easily they can be able to dispose off it at any time they feel like pulling out of the investment. An example of a "liquid" asset is a stock that can be sold (disposed off) by merely ringing the stockbroker. Investment in real estate tends to be generally illiquid. However, other inherent properties such as the security of land (against the increasing population) tend to make investment in land attractive; because demand is unlikely to decline.

In economic terms this consideration is similar

to enquiring how easily factors purchased by use of liquid capital can be substituted with more efficient ones in the ordinary process of production as and when the need arises. The investor would, in the extreme terms, be happiest if he could convert the whole investment into money-when he notices the investment becoming inefficient - and switch onto alternative investments.

(iv) In (ii) above we discussed security of capital - where an investment would maintain its value during the period of investment. An investment would be more valuable if the investors understand that its value, apart from remaining intact, is likely to appreciate with time. This means that cash-flow from investment would be guaranteed over time, and would be likely to remain unaffected by inflation. This condition is known as possibility of capital appreciation.

(v) An additional criteria of some importance especially to the high income brackets is concerned with what amount of taxation the high income individuals may be liable to pay as a result of purchasing a particular investment. Therefore, investments that risk high financial outlays from high taxation are not preferred by the high income investors.

Demand for any investment among ordinary investors <sup>is</sup> fluxuates according to how far all these five criteria have been met. In the extreme cases where none of all these qualities is positive the investment will not be undertaken. On the other hand, demand for an investment will be high if all these

five conditions have been well met. Real property investment is compared to other investment with respect to each of these intuitive criteria. As we said, their intuitive nature is analogous to the concept of expectations in general investment as explained by J.M. Keynes.

#### Investment in Land

The amount of investment in land would vary with the prospects of such investment; and would be influenced by the relative pleasantness of alternative investments. Assuming the availability of money for investment - the existence of effective demand for investment - each investor would look at the prospective cash-flow of all alternative investments, and the attractiveness each investment as measured by the above criteria before committing himself to investment in land. In the condition where investment in land is not so attractive, investors will tend to invest in alternative investment; and the converse is true, where investment in land increases when investment in other types of investment has bleak prospects.

One example of recent times worth noting here is that these investment criteria in most ventures diminished in the expectations of the Kenyan Asian Community (especially of non-citizen allegiance) with the aggressive Africanization of business by the Kenya Government initiated around 1967. This meant that



those Asians who were not citizens were not assured of continued work permits if Kenyans competent of running their business were available. Businesses run by non-citizens were made to close, and the non-citizens were made to sell them to citizens. At the same time, the tight foreign exchange measures made it difficult for them to export large amounts of currency from the country. This meant that there were very few avenues through which these people could channel their financial reserves and savings. The political climate prevailing at the time was also not ~~very much in favour of the citizen Asian either.~~ He was no longer commercially comfortable in his old "duka" - which, to the ordinary people was the symbol of the so called "Asian exploitation". Therefore there was, (from 1968 - about 1978) a great demand among the Asian community for concealed types of investment where any premia invested would yield their returns without coming under strict social and political examination.

Since the non-citizen could not take his money out of the country very easily he looked in the direction of buying shares in public companies - which was in turn blocked by the prevailing wave of Africanization of commerce and industry. Some investment in shares and stocks took place, but it was not as noticeable or as voluminous as investment in real property - especially the purchase of the

residential units and the land formerly owned by the expatriate Europeans. Numerous real estate companies and holdings came into being - sometimes owned by the citizen Asians jointly with the non citizen.

Demand for landed property rocketed from the time of the "Asian Exodus" in 1968; so that a house that was formerly costing 120,000/- at the time was costing 1,200,000/- by December 1978. Matters were accelerated when the citizen Asians diverted their money in the direction of real property - neglecting the old "duka" which was so visible to the politically charged indigenous Africans. There was extensive speculation in land and landed property. Old single residential plots in Parklands and on the Hill were sub-divided, and multi-storey blocks of flats came up. The increase in population in the city, (about 7% p.a. during this period).accelerated the increasing demand for housing, and therefore increases in the rental and capital values of housing. This speculative aspect also brought the indigenous Kenyan novices in real estate into business. Up to the time of writing the price of houses and rental values are still on the increase. The author, in 1964 could afford to rent accommodation in Jamhuri Estate at a cost of 1,200/- per month. The same kind of residential unit was renting in 1980 at 3,500 to 4000/- per month.

Theoretically, land should be needed by investing firms so that it can be combined with other factors

within the production system. However, in a capitalist economy the firms requiring land as a factor of production to combine it with the other factors are not necessarily the landowners themselves. A legal system has evolved within this type of socio-economic system whereby those few people owning land can be able to rent the land as discussed theoretically in chapters three, four and five. Land is therefore an asset which, if owned by itself, (even when not combined by other factors) is capable of yielding a stream of income in the form of rent. Under the conditions outlined above, therefore, investors are likely to consider vacant land on its own merit as an investment; in view of its cash-flow potential. All legislation and socio-economic factors that can potentially affect this cash flow are considered by prospective investors in comparison with similar factors in alternative investment. Demand for land will therefore be affected by the responses of these investors to these stimuli; and will therefore be susceptible to changes in the economy that influence expectations of potential investors. This is why real estate investors view with keen interest any fiscal measures, any monetary measures, and any changes in the economy; and weigh the impact of these changes on the landed property investment. Consequently, they are quick in pointing out those economic trends and indicators that can

affect real property market.

We can therefore conclude that effective demand for investment in land fluctuates with the availability of funds for such investments. The external rate of return as set by the banking system is also likely to influence this demand. Such demand also fluctuates over time with the relative attractiveness of real property as compared to those of other investment, as explained. Despite the fact that real property is heterogeneous these broad facts apply; and are likely to influence the volume of transactions in the real estate market.

Effects of Government Economic Policies on the Property market.

Government Control of the Economy.

Money for any investment comes primarily from the commercial banking system. This system is "fueled" by the small deposits that come from the "small" savers in the economy. These savers - apart from being attracted by the nominal rates of interest and the prospects of cash-flow from their investment - have often no alternative but to resort to commercial bank systems so that their money can be guaranteed from other risks - loss by theft, fire, etc. Thus while the whole business of bank revolves nominally around attracting small depositors through the rate of interest, the presence of risks in the economic system really works

to the advantage of the wishes of the bankers. The small depositor somehow cannot help saving in the banking system.

The nature of the banking business is such that the money deposited is capable of being re-invested elsewhere so that it can earn the banks some income. The reinvestment takes place at higher rates of return. Alternatively, if the banks re-deposit these funds in other commercial banking systems they do so at higher rates of interest than the ones they promised to pay the small depositors. Once they have paid the small depositors their interest the bankers are left to make some profit that could sometimes be as high as two times the interest they pay to these small savers.

Therefore, when we talk of the investor in land we are talking of this person in the economy that has access to parts of the financial reserves of the commercial banks at whatever rates of interest they charge. He in turn would re-invest the money elsewhere at a higher rate of return, so that he can obtain a profit higher than the cost of his borrowing the money from the banks.<sup>3</sup> Some banks go directly into investment in land and real property; but others lend to private individuals, real estate firms, local authorities. Governments, etc; who in turn go into real estate or any other investment of their choice.

As we shall see presently, the Central Bank is the Government body that lends the commercial banks

money when they are in financial difficulties - a lender of the last resort. There is therefore considerable control of the commercial banks by the Central banks on behalf of the government. This in turn determines the lending policy of commercial banks; and in the other end. how much money is available for any form of investment - including real property. Thus, ultimately, the lending policies of commercial banks determine how much money is available in an economy for investment in real property.

The Government control of commercial banks through modern monetary tools dates from the early of the great depression, when bank failures led to the great Wall Street "crush" of 1929, and the resulting financial and economic crisis in the western world.<sup>4</sup> Since that time; and especially after the universal acceptance of the doctrine of J.M. Keynes; the amounts of money in circulation have always been monitored strictly by the government. The whole economy is closely monitored by the authorities so as to avert the prospects of other depressions. The level of labour employment, level of resource employment, investment level, level of the interest rates, and other economic indicators are monitored and manipulated by governments to achieve the desired economic goals.<sup>5</sup> A completely new economic discipline has emerged out of this - macro-economics. A new profession of economists has been born since the Great Depression - economic

planners.

Fiscal and Monetary Policy,

The Government controls the level of effective demand in the economy and the level of activity of the commercial bank system through two major tools.

(a) Fiscal policy and (b) monetary policy.

(a) Fiscal policy works through the impact of the budget and the taxation system. The government can decide to tax cash flow from investment to discourage investment in a particular sector or all sectors of the economy. Taxation reduces the amount of disposable income available to the consumer, and discourages consumption. In connection with investment, the disposable income affected is the cash-flow available from the investment. Any tax on this cash-flow means that the investor does not expect as much from investment as prior to the tax. This reduces the rate of return from the investment subject to the tax; and has a tendency of influencing potential investors here to consider investing in other investment, since the investment subject to the tax becomes relatively unattractive. One example worth quoting here is the capital gains tax, when it was introduced in Kenya in 1975<sup>6</sup>, tended to reduce sales transactions in land, landed property, or any capital appreciating kind of investment. This is because any capital gain would be liable to taxation.

On the other hand, governments can decide to

subsidize some forms of investment, including real property, by waiving any previously existing taxes thereon; or by actually channelling taxpayer's money towards financing such investment. This can be done through the availability of cheap loans or long term loans to encourage consumption of, say, landed property - especially housing, as we shall see later. Currently, since the Ndegwa Commission of 1971,<sup>7</sup> taxpayers' money has been channelled towards giving teachers and civil servants owner occupied house allowance; in an effort to save the government the money for constructing housing for these employees. In addition, it is envisaged that this would encourage them to own their own housing, and therefore increase the supply of housing in the country generally. This would alleviate the acute housing shortage in the country. Cheap loans are therefore available through the Housing Finance Company of Kenya and National Housing Corporation for anybody desirous of purchasing or constructing their own housing - This, as we shall discuss later in chapter seven is an example of a government subsidy.

General government spending itself is an input in the main flow of economic activity of the country. It has the multiplier effect that indirectly leads to the demand for investment by individual firms. This leads to demand for space on which to locate these investments, and in which to house employees.



Ultimately it leads to an increase in the demand for landed property. Therefore, any fiscal measures increasing government spending are likely to have a profound effect on the level of employment, level of income, aggregate effective demand, and thence to lead onto increased demand for land and landed property.<sup>8</sup>

Fiscal policies have also a psychological impact on investors. They influence their expectations on some investments or all investment. Therefore the MEI functions for some investment, or the aggregate MEI function as discussed above is affected. This leads to either more or less investment, depending on which way the investors' psychology on the perceived risks of investment has been affected. A fiscal policy favourable to one investment or all investment leads to a greater demand for that investment or for all investment. The converse is true.

Reservations have been voiced by J.K. Galbraith<sup>9</sup> on the effectiveness of the monetary policy; in view of the so called vested interests in the production mega-sector of the economy and the dependence effect. While noting his competent argument against the monetary illusion and the supposed effect of the policy, it is felt here that since this is an elementary text, the rudiments of the operation of the policy ought to be understood before going into the criticisms of the policy. As elsewhere in this text the reader is treated to what Galbraith calls conventional wisdom by the

way of introduction; before going into advanced work involving model criticism and comparative analysis.

Monetary policy operates through the direct control by the government over the commercial banking system. The government, through the Central Bank, controls the level of economic activity by regulating the money supply in the economy, and the rates of interest. Through this seemingly powerful policy<sup>10</sup> the government can control the level of effective demand in the economy by making it more or less expensive to borrow money; or by making available or unavailable moneys that can be advanced for credit by commercial banks to ordinary investors. This way, the government has an indirect control of the lending policies of the commercial banks almost automatically by invoking one of the legal instruments vested in the Central Bank that affects the monetary policy. This is very easily done in Kenya because the Central Bank of Kenya is a legal corporation with clearly defined powers.

Before discussing the operation of the policy it is necessary to explore into what the Central Bank does. According to Kenya law,<sup>11</sup> the Central Bank is the only body empowered by the Government to issue currency. It is empowered by the law to be a banker of all the commercial banks, and also acts as a governments' bank. Through it, the government can participate directly in the general investment market by sale of Treasury Bonds. It is also a lender of the

last resort to all the commercial banks in the economy. The processes or the instruments through which the bank controls the activities of the commercial banks are (a) open market operations, (b) bank rate, (c) control of deposit ratios and (d) direct control of commercial lending policies through official circulars and directives. The central bank also is responsible for controlling foreign currency coming into the country, and/or domestic currency being exported to outside countries. It regulates the balance of trade through controlling the import and export market. This, it does by regulating export and import of currency.

Through open market operations the central bank regulates the amount of money circulating in the economy - and therefore the effective demand - by trading in Treasury Bonds. These are stocks issued by the government having a financial money value accruing to the holder at a future date. For example a shs.100/- treasury bond can be purchased now at (to give an example only) shs.90/-; and it can be made redeemable in 5 years; whereupon the individual who pays 90/- now for it can reclaim 100/- back - thus earning some return from the holding of the bond. The sale of these contractual negotiable instruments to the general public make the buyers use the money that is already in circulation within the economy and pay it to the central bank in return for the treasury bond certificates. If many of these bonds are sold, money is taken from

circulation and paid to the central bank. A lot of money can be "sucked up" from circulation this way, and be stored by the bank at its vaults - thus reducing the effective demand (purchasing power) of economy.

On the other hand, when the central bank purchases the treasury bonds already held by business corporations and private individuals it does so using the moneys stored under its vaults. It can even print new money, and use it to purchase these stocks; thus releasing a lot of money in the mainstream of financial circulation within the economy. The bank can involve itself in the purchase of ordinary (and other) shares from the ordinary stock market, and payment for these negotiable instruments would be made using the central bank moneys - either printed or otherwise. This releases money into circulation and increases the effective demand of the economy. This stimulates trade and results in additional investments that go to supply the goods that would meet the additional effective demand or the additional purchasing power. This generates the increase in economic activity. consequently, the demand for space whereon to locate them increases - hence the increase in demand for land and landed property. New productive ventures would come into existence, and old ones would be expanded. This would create a demand for office space, land for office space, housing for the executives and employees in the new or expanded enterprises, and land on which to locate such housing; etc. A contraction of effective demand

would decrease investment and demand for space and land to locate economic activities.

Thus the supply of money - hence the effective demand for everything including land and landed property, can be regulated at the whim of the central bank through open market operations: depending on the state of the economy.

If the central bank is a lender of the last resort to all commercial banks according to the law, the bank is empowered to fix an interest rate below which no commercial bank can . . . lend any money, and at which it can lend all these banks the money they require. This rate of interest is called the Bank rate. It becomes obvious that if commercial banks can borrow only at a specified minimum rate from the central bank they do not want to place themselves in a situation where they incur losses as a result of they themselves lending moneys to their customers at lower rate than the bank rate. The bank rate then becomes the minimum rate of interest at any one time. Often the commercial banks will lend money at even more than 2% above the bank rate. Sometimes the lending rates of these banks could be even as high as 5% above the bank rate of the central bank depending on the risk rating of the loanee.

If therefore, by virtue of the legal powers vested in the central bank, the central bank were to reduce the bank rate; theoretically this would make it cheaper

for commercial banks to borrow from the central bank. This would increase the demand for borrowed money from the central bank by the commercial banks. This way the commercial banks would in turn have extra money available for reinvestment elsewhere. This increases the effective demand in the economy, and a multiplier effect may operate in such a way as to increase effective demand for goods and services. This increase in effective demand triggers the derived demand for space on which to locate all the goods making activities and other multi-dimensionally linked activities - hence demand for real property and land.

Because of the availability of easy money to the commercial banks they may find it difficult to stick on the previous rate of interest, and they may therefore lower their lending rates in order to be able to <sup>Compete</sup> compete with other banks for customers, and with and alternative investment. This makes it cheaper for everybody to borrow loans from commercial banks for investment and consumption activity. The effective demand so created triggers demand for space, and therefore, demand for land and landed property. An increase in the bank rate has the converse effect of reducing the effective demand through raising the lending rates of commercial banks, and through making it expensive for everybody to obtain credit. This theoretically can ultimately reduce the derived demand for space on which to locate new activities, and

therefore cause the reduction of demand for land and landed property.

The amount of money that is required by law to be deposited in the central bank by each commercial bank is called cash reserve. Cash reserve is calculated so that it is a specified proportion of the money from each commercial bank that has can be lent out as loans. This proportion can either be raised or lowered by the central bank by virtue of the powers vested in it. If it is raised it has the effect of swamping money from ordinary circulation by "imprisoning" more of commercial bank funds in the vaults of the central bank. This reduces the effective demand in the manner described above, and causes a contraction in economic activity - ultimately affecting the demand for land and landed property. An decrease in this proportion expands effective demand, ultimately up to that of land and landed property.

The central bank may influence the amount of credit by instructing or directing the commercial banks on whether to be easy in their lending terms - whether or not to lend any money to private individuals and investors. Credit Squeeze - as the negative aspect of this process is called - then decreases effective demand in the economy; and in times of such a squeeze demand for landed property is likely to be low due to lack of credit facilities with which to finance investment generally, and land purchases in particular.

When the squeeze is lifted the reverse process takes place ..... theoretically.

The central bank has powers of controlling foreign exchange transactions. More foreign exchange allowed in the country means an increase in the ability to purchase goods of the countries whose currency has been allowed easy influx. This tends to reduce the demand for domestically produced goods; and to generate multipliers with negative effect to domestic investment, in favour of the economies from where the goods are imported. It ultimately ~~reduces the desired demand for space, and hence land~~ and landed property. A decrease in foreign exchange flow would have the opposite effect, where demand for domestic products is increased; multiplier effects take place in the economy, investment activity rises through the operation investment multipliers etc. Ultimately demand for space and land is increased. Control of imported goods works in the same way. More imports mean a consequent decrease in local investment, and ultimate decrease in demand for land - while less exports theoretically usher in ultimate increases in demand for space, land and landed property.

There is also a psychological side on each act of the central bank that affects the economy. Acts favouring increased investment generate positive expectations on investors and private individuals and cause positive shifts in the MEI or the demand



curve for investment; while the ones favouring reduced investment decrease the demand for investment through negative shifts of the MEI. (See above chapter five).

## Investment in Real Property and Alternative Investment.

### A Simple Investment Model.

The amount of money available for investment in land is also affected by the availability of alternative investment offering comparable rates of return and similar investment securities to those of land.

Generally the investors need not invest in land if they could get better returns elsewhere. On the other hand the same investors can hold investments in real property, while at the same time they have other investments in land.

We have seen in chapter two that in general economic terms the process of production involves a combination of land and other factors of production with a view of producing consumer goods for the market. In combining these factors the investor, entrepreneur, or producer would aim at maximising profits through obtaining maximum product. So the investment in land and investment in other asset portfolios used in the profit maximization process can be deduced through a simple substitution model. It must be noted here that the process is much more complex.

In figure 6-1 we can imagine an investor aiming at maximizing profit which to him is qualified in terms of isoquants and the equation

$$\pi = f(U_1, R_1)$$

where profit  $\pi$  is seen to be a function of utility levels and rate of return levels.<sup>12</sup> At the Isoquant  $f(U_1, R_1)$  it is assumed that different amounts of land and other investment can be combined to yield the same level of utility and returns at any one time. In this case the investor is supposed to be indifferent to the different combinations of both land and other factors, as long as he can obtain the same utility level, and the same level of profit.<sup>13</sup>

Under these circumstances, and given his level of income Y-Y, as defined by the total amount of money available to him for investment, he can spend all his money on other investment, or on land, or on a series of alternative combinations between other investment and land - hence the budget line. The point of tangency between the budget line and the highest profit isoquant  $f(U_1, R_1)$  at P, would define his equilibrium. In this case, the investor uses  $I_1$  of other investment, and  $L_1$  of land to maximize profit. The slope of the budget constraint Y-Y assumes that other investment is cheaper than land, and therefore more money is spent on it than on land. In case land is cheaper, and more money is spent on land than on other investment, his

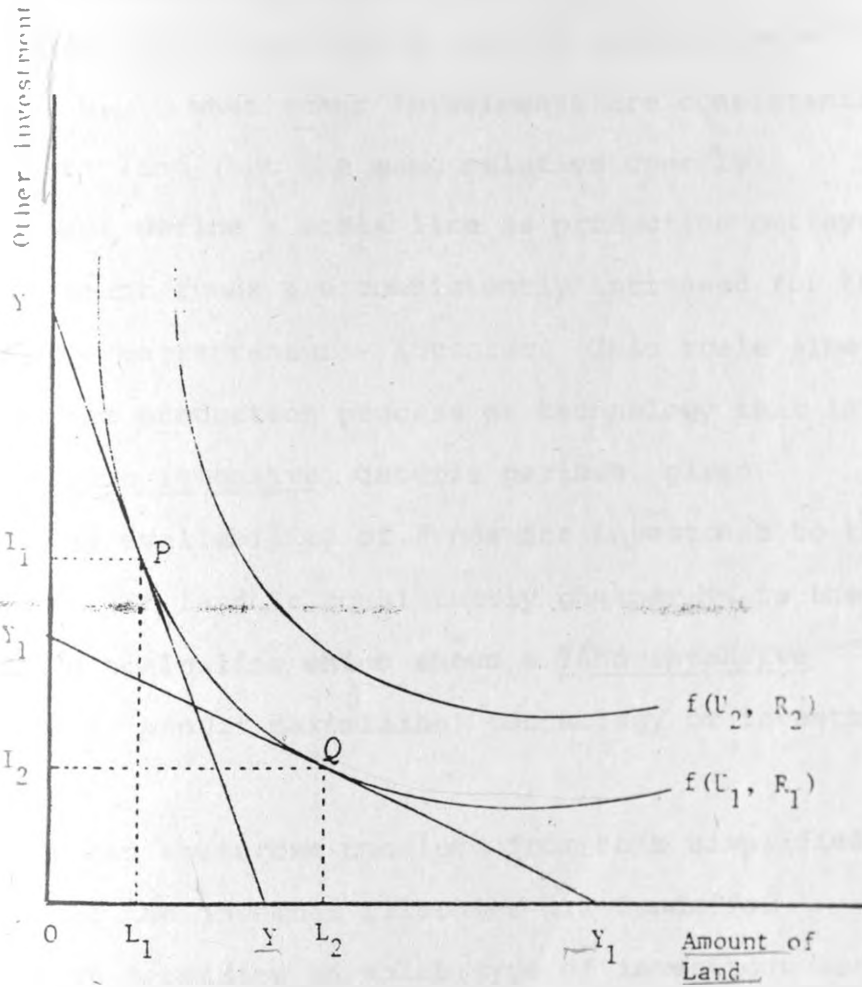


FIGURE 6-1: A profit maximizing model for an investor with two alternative kinds of investment.

budget line becomes  $Y_1 - Y_2$ . In this case Q becomes his equilibrium point.  $I_2$  of other investment is purchased and  $L_2$  of land is purchased to attain this  $f(U_1, R_1)$  level of satisfaction and profit.

A series of equilibria up the isoquant surface (Fig.6-2)

K, B, C, D, when other investments are consistently cheaper to land (but the same relative cost is maintained), define a scale line as 'production outlays or investment funds are consistently increased for this producer - entrepreneur - investor. This scale line defines the production process or technology that is other factor intensive, ceteris paribus, given increasing availability of funds for investment to this investor. If land is consistently cheaper M-L is the resulting scale line which shows a land-intensive production (profit maximizing) technology or investment process.

We can therefore conclude from this simplified model that the investor allocates his funds for investment depending on which type of investment is cheaper. By this is meant that attractiveness of investment reflects cheapness, since little financial outlay is going to be needed for the investment to yield good rates of return and investment good prospects. In a situation where relatively better return and investment prospects prevail in other alternative investments than land little of land will be combined by other factors for production purposes. In other

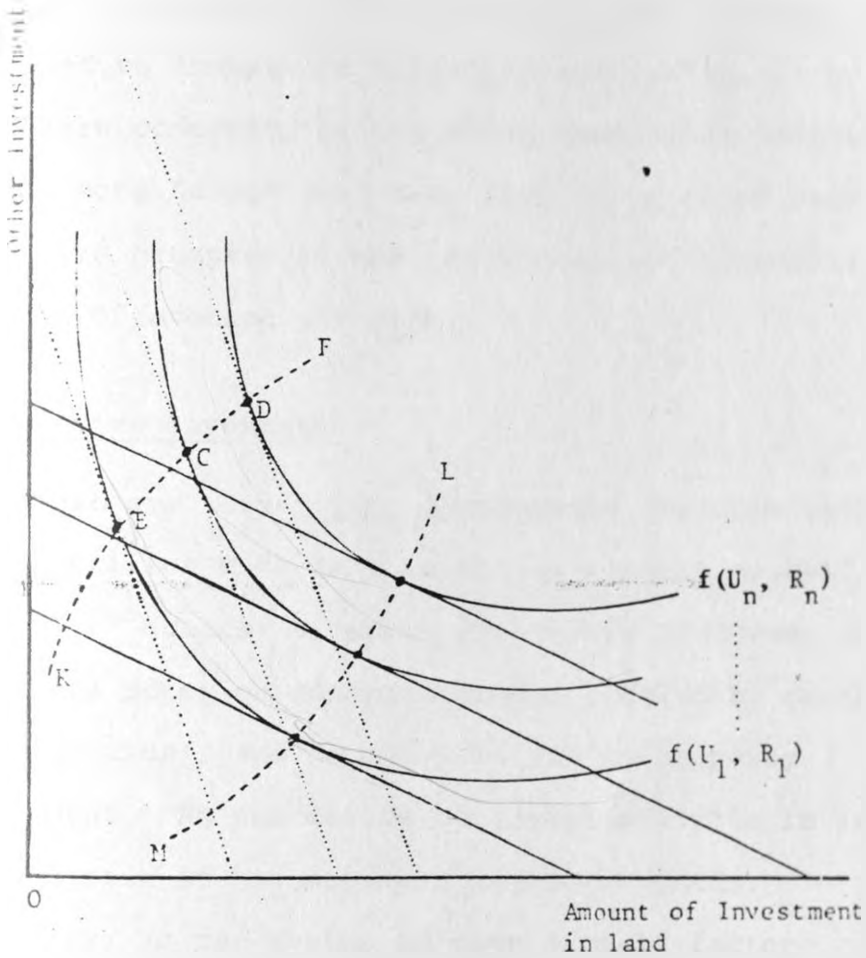


FIGURE 6-2: A profit maximizing model for an investor with two alternative kinds of investment. This version shows two "technologies" - a land intensive and other investment intensive technology available to this profit maximizer.

words, other types of investment will take place at the "detriment" of investment in land. On the other hand, if investment in land is more prospective, and therefore "cheaper" in terms of good returns and attractiveness the process of production (and therefore investment) will be land intensive. Demand for land will increase. This is a graphical illustration of what actually happened to investment into land and real property by the Asian community in the 1970s when other investment became more "expensive" than land in terms of risk (negative prospects), the emotional and financial strains of avoding the risk.

#### Alternative Investment

What are these other investments that are so much in competition with land in the investment market? In a "market" economy a person can choose to invest or spend his money on consumer goods, (including rental accommodation), and no money at all on property investment. He can decide to invest a little in land and the rest of his outlay on consumer goods. Similarly, he can decide to open a small factory, start a small business, purchase shares in a public company - etc., and invest very little in land and real property. Any alternative that he chooses procures a definite rate of return (or utility in the case of consumer goods); and he can opt for one of the many countless combinations between land and any or all of these alternatives - hence his budget

constraints in figures 6-1 and 6-2.

Generally, in the "market" economies, one of the greatest "rivals" against land for investment funds is financial claims. This is because they are always available through the stock market,<sup>14</sup> and could be easily purchased by any prospective investor who also may be in a position to purchase real property. Purchasers of financial claims offered by public companies in effect become part owners of these companies, and actually benefit from profits made by these firms from the sale of goods and services manufactured by them. Stock-owners are entitled to dividends of some kind, depending on the type of financial claim they own against any of the firms.<sup>15</sup>

#### Types of Financial claims.

##### 1. Ordinary Shares.

These are bought from incorporated public companies from the stock market. They carry no guaranteed rate of interest or income. Their return depends on whether or not the company they belong to make a profit or not. In this case a profit will be taken to be any money remaining from the payment of all production costs, including the management and directors, and after the company had undertaken some reinvestment. If any moneys are remaining a dividend may be declared, and the shareholders may split the dividend in a ratio that depends on how much shares each one has. Otherwise there may be no dividend

at all, especially when the company is experiencing difficulties in marketing its product. It also follows that the amount of dividend may not represent the trend of amounts payable in future, either in percentage or in absolute terms. Dividends are therefore not sure indicators of the rate of return for investment in that firm.

Then why should one own shares at all? This is often because of their speculative value. The price of the shares in the stock market seems to be fluxuating with the perceived expectations of business prospects in the firm by all investors in the economy. Because of the shares' almost perfect liquidity, any economic indicators that seems to affect the investment prospects is welcomed with either purchase or sale of shares. In a well organised stock market like in London or the Wall Street, New York; some people specialize in speculating in shares at the stock market. They purchase any type of shares when they anticipate that the prices of these shares may rise, depending on perceived expectations of investment prospects. Later, or even in the same day, they sell the shares when their prices have risen enough to earn them some sizeable profit.

The stock market is one of the ways of raising production capital from ordinary people who may not have multi-million amounts of funds to invest in their own companies. Thus the companies benefit from extra



sources of funds that are not from the main holders of equity in the investment. This could be thousands of shillings. On the other hand ordinary low and medium income people are supposed to benefit from participation in the enterprise of big corporations without having to raise big sums of money to start their own investment.

## 2. Preference Shares.

These have a fixed rate of return, because their owners are supposed to have contributed more liquid capital to the process of investment. The owners of this type of shares are paid their dividend in full before the holders of ordinary shares. They have the benefit of a higher rate of interest or return than the holders of ordinary shares. This is a deliberate device of including greater commitment from the holders of preference shares.

## 3. Debentures.

These are issued to large financiers, public corporations, super rich people and institutions who give financial credit to the "public" companies for production expansion. The holders of debentures are, in effect, creditors to these corporations and manufacturing concerns. Whether or not the company makes a profit the holders of debentures are entitled to the interest or the rate of return they have been promised in accordance with the debenture contracts between them and the borrowers of their funds.

#### 4. Stocks.

Stocks are issued by governments and public corporations, (like local authorities, etc) as devices for borrowing money from the public generally for development of public services, or for repayment of old loans. They are very secure financial claims, and are often used in real estate and financial circles as norms for assessing the relative degree of risks among investment. Their almost risk-free status originates from the fact that local authorities, governments and similar corporations hardly go bankrupt because of their ability to levy taxes from the public. Governments, whether local or central are supposed to honour their obligations without any failure - hence the security and the guaranteed risk rate of their financial promises.

#### 5. Government Securities or Treasury Bonds.

These are stocks that are issued by the ✓ government through the central bank mainly for controlling the level of economic activity and effective demand in the economy. They may also be issued to help the government to raise funds for large public investment and development profits. They are also very secure investments (or financial assets) because the government will always honour its obligations.

To conclude this section it is worth reiterating that the level of effective demand for land would

depend on the relative attractiveness of land as an investment in comparison with all the available avenues for investment in an economy. Real estate investment demand is greatest when these alternative investments are not as attractive as real property in both the security of capital investment aspect, and the security of cash-flow. The security of cash flow, both actual or psychologically perceived, is what is alternatively called prospects for investment. When these prospects are viewed in aggregate for the whole economy, encompassing the sum total of investors, they are equivalent to the Keynesian term: Expectations.

#### Availability of Land for Investment.

It has been mentioned in chapter two that the **physical amount of land is the same and cannot be altered**. No new land is capable of being physically created. Some land has been reclaimed from natural swamps and shallow sea beds, but this is a negligible amount in comparison with the rising demand for land.

In the countryside there may be some fallow land that can be utilized for growing of more crops. However, the general situation in most fertile areas is that land tends to be under some use or another. In order that this land can be utilized for some new more profitable projects, people or landowners usually abandon the systems of production or the land use to which the land is devoted at the material time, and switch onto a new land use pattern that gives greater

return in view of the changed economic circumstances. Land in old and sub-optimal use is adapted to fit a new use, depending on the economic conditions prevailing. Under such circumstances it can be concluded that man keeps on shifting land use, so that over time it can be put to the highest and best use. In a money economy situation, the landowners keep on changing land use in agricultural areas and in urban areas (but more so in the latter) so that it can earn them the highest rent.

There are, however, various factors that stop land from being adapted to the highest and best use immediately an opportunity for earning a better return is available. Throughout history, man has evolved a series of laws and regulations regarding property rights and ownership, where one can separate various legal interests prevailing over one piece of land. For example, land can be owned as a freehold. In turn, the owner can rent the land to other individuals for a period of time through a legal covenant or an agreement. This is what is called to 'lease' the land. In most cases, land leases give the leaseholders exclusive use of the land on which the lease applies to the exclusion of even the initial landholder, or the freeholder, who has absolute possession in perpetuity.<sup>16</sup> This means that as a result of this type of covenant, and while the covenant exists, the freeholder cannot rent his land at a higher rent, no

matter what the conditions of the market are; because both parties to the leasehold contract are bound by its provision. A lease has to expire, so that the freeholder can be able to put his land to what would then be the highest and best use in the interest of profit maximization. This may have to be an entirely different situation from when such opportunity profit maximization in the highest and best use presented itself, at the time when the lease had not expired.

Similarly one can borrow a loan and tie his land as a collateral (i.e. mortgage his land). This gives the money-lender a financial interest in the land owned by the loanee; and in most contracts of this kind the existing land use and ownership cannot be interfered with by the loanee, until the loan has been paid in full - i.e. until the mortgage or the charge on the land has been discharged.<sup>17</sup> This has similar effect to a lease - namely that land cannot be transferred to its highest and best use as long as it is the subject of a charge that has not been fully discharged - i.e. until the loan is paid in full. By the time such a loan is paid the economic conditions may be such that the subject land can be put to a higher user; or such that due to external diseconomies in the surrounding plots that have arisen over time the land can no longer even be put to its original use. In other words its rental value may have fallen.

Various statutes limit the mobility of land use. The rent Restriction Act,<sup>18</sup> for example, as we shall see in the next chapter may limit the ceiling of rental values for a particular piece of land such that no matter what economic conditions may prevail in the country, no matter what the level of effective demand, the rent level is kept at the statutory level - never to rise; it may, however fall, but it does not rise to exceed the statutory level. Planning statutes, zoning laws, etc., may limit the type of use that land may put to, so that any other use, however lucrative in economic terms, is prohibited on the piece of land.<sup>19</sup>

Legal restrictions of whatever nature, therefore, have to expire, be waived or be obeyed in order that land can be available for optimal use under the prevailing economic conditions. Otherwise, these restrictions tend to limit the mobility of land as a factor of production, in the sense that land can never be combined optimally with other factors of production as and when the profit maximizing opportunity arises. In most cases, land is available for a certain optimal use or function, but subject to certain legal restrictions. These legal sanctions, when their effect is translated into monetary value, influence the cash-flow, and generally have a considerable effect on the rental; hence the capital value of land.

Due to certain tastes and preferences of society, certain land uses are not complementary. Plenty of land may be available, for example, near existing noxious industries but such land cannot be used for office purposes because the office workers may not like the smells coming from the noxious industries. Such noxious land use is said to generate a negative environmental externality on the neighbouring land. An externality can be defined as any comfort or discomfort (whether valued in monetary terms or not) felt on the piece of land which is not the result of the use to which that piece of land is put, but results from the land use of the neighbouring piece of land. In neo-classical economic terms externalities can be defined in terms of external economies or diseconomies of scale. However, the word externality is wider in meaning, because it includes such things as noise, visual perceptions, odours and other things that cannot be easily quantifiable in monetary terms. Positive externalities experienced by any piece of land complement the use to which that land is put in economic, aesthetic and environmental terms; while negative externalities are unpleasant experiences on the land, showing that the land use of that plot and the neighbouring land are not complementary.<sup>20</sup>

In this context, therefore, land may be available for various uses which in terms of returns

may - other things being equal - promise profit maximization. However, such potentially profitable uses may not be able to occupy the land because of the fact that the land may be subject to some negative externality. In some cases, the occupant may have to overcome these externalities by taking special precautions such as reinstalling special equipment, growing a hedge, or constructing a fence, drains, fans etc.; to allow some economic land use to take place. In this case we say that he is internalizing the externalities - i.e. making the combating of nuisance a part of his production costs. This, when it is done, and translated in monetary terms it has a substantial effect on the rental, and therefore the capital value of the land in question. With respect to the discussion in chapter five, externalities may affect rates of return and individual MEI functions of investment in land.

Thus land may be prevented from acquiring the highest and best use by these externalities; and may be partially or wholly immobilized. In some cases, where serious failure of the market causes the danger of such externalities on some community it becomes necessary for local authorities or central governments, through taxation, to force the noxious neighbouring land uses to internalize these externalities. Taxes are then used to provide some environmental protection to those citizens who are



being affected by adverse external effects of this noxious neighbouring land use. In fact, the rationale of zoning is to - as much as possible - bring together complementary land uses, to minimize adverse externalities, and to maximize complementarity among land uses.

Even without externalities social preferences may restrict land from changing use to the highest and best use. The society may be deriving certain utility out of the use of land for in-optimal purposes; and no matter how much such land can potentially fetch in the open market, its use may be restricted to the preferences of society. Examples of this are playing fields, golf courses, common lands of all kinds, parks, etc. *Kaya forests in Kilifi* In this case social utility exceeds private profit maximum goals, and the society feels that such land must remain under this social benefit maximizing use. So, land that may appear fallow or under-utilized cannot be employed to increase the supply of economically productive land; (or monetarily productive land) despite the increase in demand for that land for commercial use. Social preferences restrict, therefore, land mobility. In some African cultures, such as those of the Meru of Eastern Mount Kenya, certain lands are reserved by the community as common land. In ages past, there used to be taboo-land where agriculture was not permitted by tribal

elders, neither were any other kind of pleasure or economic activity. It was believed that ancestors and other deities would be displeased by such human activities. These are taboo lands.<sup>21</sup> So, even in the pre-money economy times, mobility of some types of land to the most utility maximizing (or product maximizing) use was under considerable social restriction.

As mentioned in chapter 2 the market for land is imperfect because of the secretiveness inherent in market or capitalist economic systems of the land transactions. Owners of the land under suboptimal use are less prone to respond to economic situations and to put their land to optimal use when they have no perfect knowledge of the most optimal use. In addition, land is not a homogenous commodity, and so not all land is suitable for any specific use that one may consider. Its lack of physical mobility complicates the situation, because a plentiful supply of land in one location cannot be moved to another location where land is in short supply to "balance supply and demand" in the location of shortage. In this case locational factors assume a paramount role in influencing land use, the "market" for such land, and the price that could be paid for such land. People in the best locations tend to derive the full economic benefit of the land in that location; and to assume some kind of locational or

spatial monopoly - while people farther away may have to pay transportation costs in addition to their other production inputs in order to counterbalance the effect of their inferior location. As seen in chapter four these transportation costs have a profound effect on land values, so that land value gradients result, values being highest at the positions of the best locations and lowest in positions that are farthest from these best locations. This is one of the cardinal observations of Von Thunen.

In view of these imperfections, some kind of information system is required for informing potential investors in land which land offers the best investment alternative that could maximize their returns once they choose to invest their financial outlays on land and landed property, real estate agents, auctioneers, valuers and other people in this field are expected, (and in fact do to a certain extent) to "grease" the process of market perfection by providing advise on these factors that determine the best investment on land. They do this through advertising in local newspapers and other media, and cause land purchase transactions to be consumated.<sup>22</sup> Whether or not the resulting price is the equilibrium is debatable; and will be examined shortly.

Physical factors render adaptability of land to certain uses difficult. In fact, the suitability

of land for any particular purpose very much depends upon its topography and geology. In some cases, like on steep hillsides, or in black cotton soil conditions, on rocky ground; etc., land is completely unsuitable for all (or most) land uses. In these cases money has to be spent to adapt land to the required uses. Sometimes that money is so much as compared to the proposed return, that it is not worthwhile undertaking the improvements. In this case, no matter how close land is to the best location, it may still be unsuitable for those uses that the neighbouring land has been put. An example of this is the Nairobi river swamp that occupies the space between Kirinyaga road and Ngara road near Nairobi's city centre. Despite the closeness of this land to the city centre no urban development can take place there - the river flows through, and the land is marshy along the Nairobi river flood plain.

In the hilly residential areas of Nairobi it takes a lot of money to blast the rocks, excavate a site and to construct access roads before a house is constructed. In this case the proposed residential use must be such that the expected present value of the cash-flow of rent will be sufficient to offset the costs of blasting the hillside, and at the same time to give the proposed house-owner a good profit. This means that if the present value of the expected cash flow is enough to offset the land improvement

*This information is now obsolete since the area is being internally developed by Africans!*

works it pays to use the land, despite its difficult terrain. Houses in Muthaiga, Kileleshwa, Parklands, etc., facing river valleys are evidences of this fact.

In a situation like this, when money has to be invested to remove a physical barrier to land development, we talk of removing physical thresholds.<sup>23</sup> A physical threshold will remain in place until such a time as it is worthwhile to remove it - then, after assessing the benefits and costs of removing it, and making sure that the former are greater than the latter, the threshold is removed. Physical thresholds need not be confined to individual plots only. Entire towns or communities could be subject to them. For example, if a community is enclosed by a medium sized river it will remain without bridges until the demand for goods and services in it from the surrounding countryside, and the volume of trade is such that the community will derive more social and economic benefits from the construction of bridges to connect this river island with the outside than the costs of constructing this infrastructure.

Looking at this issue from the availability of land viewpoint, we observe that the supply of land, in addition to its being restricted by physical mobility is also constrained by non-homogeneity of its surface - irregularity. It was observed in Chapter four that Von Thunen assumed equivalence of the quality of land when he was casting his model.

physical factors are therefore a complication of the model. They obtain when the uniformity and unitropic assumptions are relaxed. In terms of transportation costs they increase distance friction between the handicapped piece of land and its service centres. So, any land that is handicapped by the physical factors would not be in such great demand as that which is not handicapped, because people tend to avoid extra expense in development; if it is assumed that they are rational and profit maximizers. This way, development tends to take place first on the easiest land, before the handicapped land is touched. This, it will be observed, is quite in keeping with the Ricardian model as explained in chapter three.

#### Urban Redevelopment.

Existing development, especially in urban areas, can also constrain land from being changed quickly to take advantage of the economic situation that comes and promises higher returns than the ones receivable from the existing land use. Thus, when such a new use comes about, the existing buildings are first converted to this use by internal alterations. This takes place when the expected return from the new use requires a building of equivalent value to the one occupying the site. In the cases where larger and a more complex buildings are required, it pays to demolish the existing building and put up new ones.

This is what is called urban re-development. Essentially, it is a change of use in which old buildings long past their economic life are demolished and replaced with new buildings.

This comes about because buildings are subject to depreciation and obsolescence during their "life-time". If we assume the value of the site remains the same, a building's economic life (or the economic life of the structure) ends when obsolescence over time causes the value of the structure to drop below the site value.<sup>24</sup> Figure 6-3 is an attempt to demonstrate this phenomenon.

In accordance with our assumption the site value is kept constant at  $S-S$ .  $D-D_1$  is the obsolescence trend the effect of obsolescence on the value of the building - or a depreciation curve. The curve is made concave to the origin because at no time does the cost of improvement (which equals the building's value) reach zero. A building structure, no matter how obsolete, is capable of performing some economic function. Its space is likely to remain useful; but as compared to the surrounding newer buildings, the space will be obsolete. In the diagram the economic life of a building terminates at time  $L_1$  when the depreciated value of the structure is less than the site value.

On the other hand, if optimum use to which the

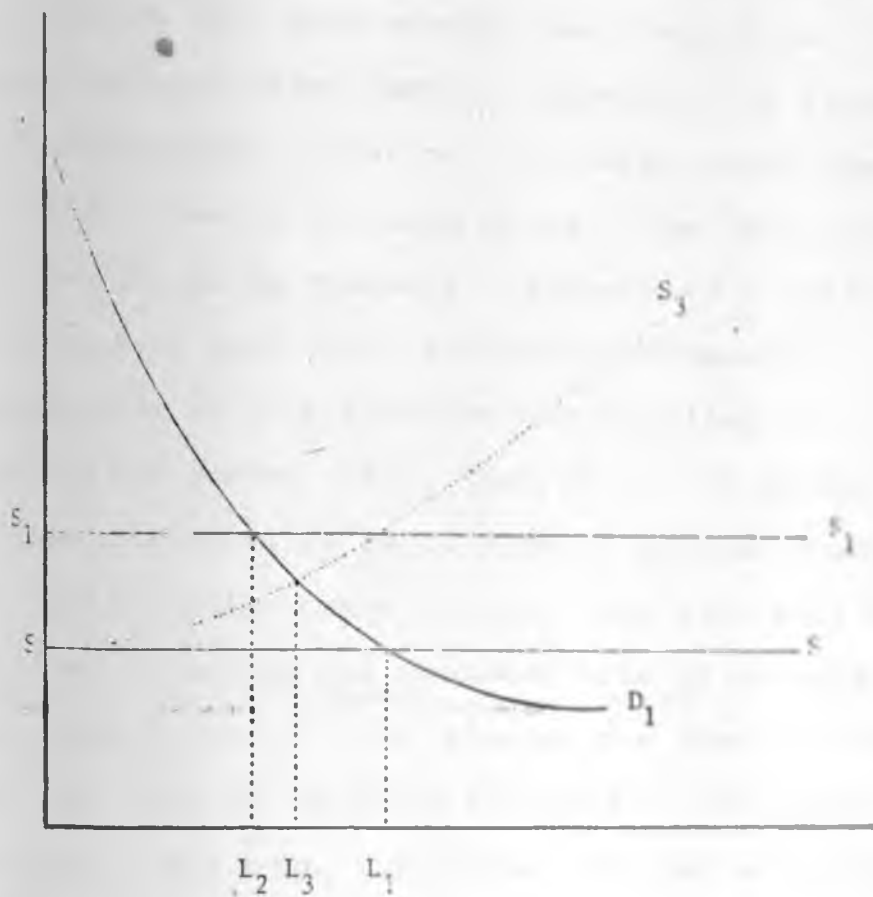


FIGURE 6-3: A model of economic life of buildings and capital infrastructure.



site can be put changes over time, and the potential value of the re-developed site changes - usually increases in fast growing towns; then, given the depreciation trend of improvements, the economic life of a building will come sooner than when it is assumed the site value remains constant. In figure 6-3 a hypothetical situation is assumed where there is a sudden rise in the site value. The land prices in a town may go up suddenly - perhaps as a result of a gold-rush or some other economic phenomenon. Economic life of this hypothetical building will therefore end sooner, at  $L_2$  than at  $L_1$ . A gradual increase in site value as is natural in most towns will take a similar trend to  $S-S_3$ ; and also will have the effect of ending the economic life of a building sooner than  $L_1$  at  $L_3$ . The steeper the trend of site value with time and the better the economic opportunities available in the town, the sooner the end of economic lives of buildings. Therefore, theoretically  $L_3$  could be on any side of  $L_2$  in the diagram.  $S-S_3$  ranges in steepness from perfect flatness assumed above, to sudden rise,  $S-S_3$  could be vertical. Theoretically, the rise in site value could be so sudden that buildings become obsolete immediately they are constructed, and their economic life ends at time zero; if the  $S-S_3$  is perfectly vertical. In any case - after the economic life of a building has ended, it pays

to renovate the building, or to construct an entirely new structure in order to put the land to the highest and best use.

Theoretically, opposite processes can take place, especially in a situation where land zoning yields negative externalities to neighbouring use. The effect of these is so depressing on the site value that there could be some sudden depression from  $S_1-S_1$  downwards to  $S-S$ . (Zoning laws, inducing positive externalities, can cause sudden increases in site values).

This phenomenon is not restricted to buildings alone. It occurs in all items of infrastructure. The developer in this case could be a public authority in charge of a road network, an electricity service, a school, etc., or all of them put together. The relationship between these and site values is more complex - involving the theory of public goods and welfare economics, but is analogous to the above process. In fact, entire areas in cities can be obsolete or blighted, like slum areas, etc. Therefore, they could require attempts to appraise their economic worth, so that accessibility and urbanization economies can be reaped more readily in the classical fashion of urban re-development.<sup>25</sup>

In the latter case, the term "building" is being generalized to include infrastructure, and any mode of production over land - i.e., the capital

and technological aspect of land development. In rural areas an increase in land values can be brought about by perhaps greater accessibility of such land from market areas. This will then mean that the production technology over land - especially the capital investment - will require to be changed to allow land to be put to the highest and best use. Farm buildings, irrigation systems, roads, implements, etc., can reach the end of their economic life in a similar way - besides their actual physical aging.

#### Urban Sprawl.

Agricultural land in the neighbourhood of urban areas may experience urban encroachment due to the expansion of urban areas; and the effect that this has on accessibility and the site values is called "urban sprawl." Economic factors in the periphery, coupled with speculation, may cause land values in the peripheral areas to increase; because many buyers would be offering high prices for such land. This tends to decrease the economic life of agricultural "investment" and "technology", or the agricultural process of production. Land then changes use to residential or other urban and suburban activities. The resulting discontinuous pattern of development is caused by the fact that legal interests "lock up" some land parcels under agricultural use for some time while the neighbouring unencumbered land changes

use to suburban or urban activities. Urban sprawl is taking place around many cities in capitalist economies.<sup>26</sup>

Equilibrium in Property Market;

Fact or Fiction?

Equilibrium has been defined as "..... a state in which forces making for change in opposing directions are perfectly in balance." It is a concept borrowed from physical sciences to act as a model for describing stationary economic situations. In economics, a market will be in equilibrium if the quantities of the product which the buyers want to buy at the prevailing price is exactly matched by the quantity which the sellers wish to sell.<sup>27</sup>

In the context of the real property market a question arises as to whether there is equilibrium in real property. This is because, as has been explained in earlier chapters, this commodity is heterogeneous with respect to location, legal differences, physical and even in economic characteristics. This is true because the factors that determine the supply and demand of land are numerous. Generally speaking, a situation can be conceptualized in theoretical terms where the effective demand for land is matched by the amount of land available. But because of the imperfection of the market and the heterogeneity of real property this is not so simple and straight-

forward. In fact, it becomes easier to think in terms of different kinds of land in different locations, and with different physical characteristics as really different commodities. Each type of land has its kind of demand schedules, supply schedules and individual equilibrium position. Different kinds of development like bungalows, maisonettes, flats, office blocks, etc. have their own kinds of market, which are in turn complexly differentiated in terms of accessibility, obsolescence, facilities and amenities surrounding them, etc.

In other words, all real property cannot possibly be in equilibrium at the same time. Some kinds of land could have a specific market which could be in equilibrium; when the demand and supply conditions are changing in some other kinds of land; and therefore while the markets in some other kinds of land are in a state of disequilibrium.

In general economics, the concept of equilibrium is anchored on a static condition on the time dimension - one particular moment in time. In real life, and especially in land and landed property economic variables are changing every day; and the situation is dynamic, always changing. This is different even from the general equilibrium analysis in economics where some variables may be held constant while other variables are changing.

variable is changing at the same time, and so at a different rate from any other variable. There is even interaction between different variables so that the economic situation is extremely complex. A state of equilibrium in the market of any commodity is therefore very difficult to define.

For real property analysis most estate agents use crude surrogates, like auction market prices, to indicate the so called equilibrium price. The highest bid in an auction is often characterized as the equilibrium price. At times, advertized rental values by estate agents are usually called as "market values". Any land or building that occurs at some price is referred to as having a "market value." Using these crude surrogates the real estate man "analyses" the market, and comes out with mean prices, which he in turn applies to neighbouring or identical properties for appraisal (valuation) purposes. When challenged in the courts to show how he arrived at his valuation he wins by producing as many examples of rent and sales as possible; he convinces the court that his valuation is an "equilibrium market price." In the absence of any better method this process of analysis has been accepted by the legal system. This is what C.M. Kiamba calls a "deterministic"

method of valuation.<sup>28</sup> He advocates a more rigorous method using operation research techniques which are designed to reduce the amount of human error and prejudice in the assessment of property values. In the deterministic method therefore there is no reason to believe that the values reached are necessarily "equilibrium prices". After extensive rigour in operations research methods human error could be minimized, and near "equilibrium" prices may be calculated. However in view of the complex nature of the property market and that of the variables influencing the market, equilibrium still becomes difficult to identify - so do equilibrium price, the equilibrium quantity of land supplied, and that quantity in demand at this price.

To insist that values determined this way are equilibrium prices pre-supposes the accurate knowledge of all the variables interacting with one another and affecting the real property market at all locations. This assumes that the nature of the demand and supply functions of the subject kind of property, their slopes, and their exact positions of intersection are known; i.e., the exact quantity demanded in the economy is known, and can be seen to be equal to the exact quantity supplied; (which is also known) at a particular point in time; and that these indicate the exact price. But this is rarely

the case, In fact the difficulties involved in the measurement of these functions are such that there is hardly an instance where any has been identified properly. Economists have set out to measure them, and they find out that some of the variables are hard to identify. Others, although identifiable, change their very nature during the process of observations.<sup>29</sup>

The accurate phrase to describe the values arrived by market analysis should be something like "the going price", rather than the "market" or the "equilibrium" price; because these empirical market investigations reveal only recent selling prices; or selling values of identical or similar properties in similar neighbourhoods. So, when Lean or Goodall imply that estate agents help in the bringing about perfect knowledge in real property through advertising, they kind of overstate the case.<sup>30</sup> Rather, the going prices are revealed by advertising.

The nature of real estate business is such that there could be an oligopolistic situation created by the finite numbers of estate agencies in each city or neighbourhoods. They could, through their professional organizations, collude to affect the market in the interest of earning higher commissions that are based on land values - thus maximizing their profits this way. Real estate men, although they may claim to the contrary, could be in a position to manipulate the



real property market in their interest oligopolistically. One firm, if it is a sole manager of property in a large neighbourhood like say westlands, (Nairobi) could rent one property at a certain high price. When the next customer comes they then tell him that property so and so has just gone at such and such price; and could manage to convince him that the price at which this property has been sold is the "market price." The chain is endless, until the whole area is influenced over time and the mean rental value rises to the freak high price which the agency began with in the first place.

To conclude we could say that equilibrium is a theoretical Marshallian concept of static demand and static supply functions, that exists as a simplifying model of what happens in the market; and a convenient explanatory tool of the economist. Whereas the concept is easy to conceive theoretically, it is difficult to identify in practice; and all that can be obtained as far as real property is concerned is the "going price". The exact quantities demanded the quantities supplied, elasticities of demand and supply, and the multi-variate influence of parameters outside the property market remain an elusive mystery; to all of us.

FOOTNOTES

- 1 John M. Keynes; The General Theory, Chapter 5.
- 2 David M. Lawrence (et al.) Modern Methods of Valuation. (London: Estates Gazette Ltd., 1962), chapter 2.
- 3 As at April 1984 the Bank rate is 12%, the banks and financial institutions are lending money at 13%, 14%, and 16%.
- 4 The great collapse of the western economic system during the last dipression is well documented in many works on the history of Economic thought and general Economics. See especially the work by Milton Friedman and Rose Friedolman, called Free To Choose; (New York, Harcourt Brace Javanovich, 1979).
- 5 Michael Stewart; Keynes and After (London: Penguin, 1967). This work documents what happened before and after the publication of J.M. Keynes' General Theory in 1935. Government Control of the economy is accepted without question in the Second half of the Twentieth Century.
- 6 Hon. Mwai Kibaki's Budget Speech of June 1975 in Kenya's Parliament, when he was Kenya's Minister of Finance.
- 7 Ndegwa Commission Nairobi, Government Printer, 1971.
- 8 For a detailed analysis of the operation of the Multiplier see any general textbook on Macro-Economics like Fred R. Glahe, Macro-Economics: Theory and Policy (New York, Harcourt Brace Javanovich Publishers, 1977.)
- 9 John K. Galbraith; The Affluent Society. (New York, Mentor, New American Library, 1978:) pp.162-172.
- 10 The phrase "Seemingly powerful" has been used deliberately because the author holds the Galbraithian view expressed in the above work that monetary policies may not function the way they are intended to function: because of economic and institutional forces in market economies.
- 11 Bills of Exchange Act; chapter 27 of the Laws of Kenya.

12 William J. Baumol; Economic Theory and Operations Analysis, chapter 15 illustrates that a firm could have other objectives than profit maximization. This is why  $U_1$  has been included as a utility function which a firm may want to consider as one of its investment goals.

13 The Isocost and Isoquant model is well treated in many economics textbooks. See William J. Baumol; Economic Theory and Operations Analysis: Chapter 11.

14 The stock markets are most effective in the developed countries of western world. Those of the under-developed world are merely poor cousins of the ones in the western countries. For example, Stephen Kituuka has found out that the Kenyan Stock exchange is largely ineffective because it is a strange concept among the small investors of Kenya, with little amounts of capital. See Stephen E. Kituuka "Industrial Real Estate Lending in Kenya". (Unpublished M.A. Thesis, Department of Land Development, University of Nairobi, 1981), pp.126-131.

15 Individual meaning of financial claims are described in Graham Bannock, R.E. Baxter, and Ray Rees, A Dictionary of Economics.

16 See any general book on Law of Property regarding typical relationship between landlords and tenants. In particular see Philip S. James: Introduction to English Law. (London: Butterworths, 1966); pp.382-412.

17 Tudor Jackson, The Law of Kenya: An Introduction. Nairobi, (East African Literature Bureau, 1970), chapter 6-9.

18 The Rent Restriction Act, chapter 296 of the Laws of Kenya.

19 Brian Goodall; The Economics of Urban Areas (Oxford, Pergamon Press, 1972), chapter 12.

20 David W. Rasmussen; Urban Economics (London, Harper and Row, Publishers; 1973), pp.19-20, 64-65, and 76-78.

21 Krishan M. Maini Land Law in East Africa (Nairobi, East African Literature Bureau, 1967), pp.1-17; Control of land use through tradition, is common among Kenyan tribes.

22 W. Lean and Brian Goodall; Aspects of Land Economics (London, The Estates Gazette, 1966), pp.46-50.

23 The author prefers a simpler term Physical Obstacles to development. This term avoids any confusion between "Threshold Area" in market analysis and Thresholds in infrastructural descriptions.

24 Brian Goodall; Economics of Urban Areas pp. 207-210.

25 Arthur F. Schriber, Paul K. Gattons, and Richard B. Clemer; Economics of Urban Problems. (Boston, Houghton Mifflin Company, 1976), pp. 177-181.

26 Marion Clawson; "Urban Sprawl and Speculation in Suburban Land", Land Economics, Vol. 38. 1962; pp.99-111.

27 Graham Bannock (et al.) A Dictionary of Economics

28 Charles M. Kiamba; "Real Estate Investment: The Selection of Capitalization Rates". (Unpublished M.Sc. Thesis, University of Reading, England; 1979.)

29 William J. Baumol Economic Theory and Operations Analysis pp.179-190.

30 W. Lean and B. Goodall Aspects of Land Economics, p.46.

## CHAPTER SEVEN

### THE HOUSING MARKET

#### Introduction

The housing industry is one of the most important sectors in the construction industry generally; and the real estate market in particular. The main reason for treating it separately in this chapter is not because it forms a different branch of land economics - on the contrary; it is because the parameters that affect demand and supply of real property generally are the same, or nearly the same as those affecting the market for housing. Moreover, the same economic analysis that has been done in earlier chapters also applies to the housing market.

The main reason why the housing market merits separate treatment is its prominent position in urban economic policy making by both central and local governments. Housing consumes a large proportion of central and local government budgets as they attempt to improve the living standards of urban dwellers. Housing forms a part of general social welfare policy. In addition, housing is one of the greatest urban land users. Over  $\frac{1}{2}$  of the area of all built up land in Nairobi is used for residential purposes, and residential amenities. In most cities over 35% of all urban land area is residential land.

The use of large government funds in housing can be illustrated by the fact that in the 1979-1983 Development Plan period the Kenya Government intended to spend an average of Kenya Pounds fifteen million (K£15,000,000) per year on housing, and a total of approximately K£75 million during the plan period. This is approximately 4 to 5% of the total government expenditure over the entire period - a substantial amount of money, given that other items like education, defence, public health, etc. have to be catered for as well.<sup>1</sup> Housing is also a large expenditure item in individual consumer budgets. In western countries it has been estimated that housing expenditure takes about 34% of the annual income of an individual household.<sup>2</sup>

~~In Kenya, the Housing Research and Development Unit of~~  
the University of Nairobi estimates that an individual household's housing expenditure amounts to roughly 25-30% of that individual household's income per year.<sup>3</sup> Housing expenditure decision is of strategic significance for the urban household; in both the high and medium income brackets of the community. A decision to purchase a house or not to purchase one is often made once in a life-time. If any family decides to purchase a house they find that they are committing large fractions of their income for long periods of time to a single consumer good - the house. The family may tie itself onto a bank mortgage for periods ranging from ten to twenty years.

In cases where families do not have such substantial incomes that could be committed every month to a housing mortgage, they resort to renting accommodation. The affordable rent has been found to be 25-30% of the monthly income.<sup>4</sup> For very low income people this competes considerably with the expenditure for other necessities. Matters are made worse in situations like the one prevailing in Nairobi where a high rate of rural-urban migration, coupled with the natural rate of population increase and a high inflation rate, have complicated the housing demand and supply situation to make the rent of low-cost housing so high that the low income families cannot afford the so called "decent houses".<sup>5</sup> In this case, the low income households have had no choice but to live in sub-standard shanty-slum areas like Kawangware, Mathare, Kibera, etc.<sup>6</sup> Even then, the average rent for the shanty is also rising due to inflation and high demand, despite the sub-standard neighbourhoods and environments wherein such average shanties are located. The shortage of housing in Nairobi has been so acute that the public bodies like local authorities have come to realize the implications of the failure of free market to supply housing cheaply and efficiently - hence the high government and local authority expenditure on housing construction; and housing subsidies of various forms.

### Economic Considerations in Housing Production

A house is more than a mere shelter; it provides a part of a larger social environment; it is a part of the general neighbourhood, although the internal life - style of the occupants of every housing unit may differ considerably. The neighbourhood has certain external impacts on the household's economic behaviour, especially in the allocation of individual consumer budgets ..... "to keep up with the Kamaus." The environment of the neighbourhood has some influence on the physical and mental health of individual members of each household in the neighbourhood. Neighbourhood externalities therefore, constitute a large part of the housing good that is consumed, and ~~complement the shelter attribute of housing significantly.~~<sup>7</sup>

To provide good amenities in the neighbourhood, and to locate each housing unit, land is required. To a certain extent, the amenities available in the neighbourhood are a function of the land availability since each amenity has to be located on land. Therefore, housing consists of the structure, land, and the amenities available in the adjoining land, or on the subject land whereon housing is located.

A simple economic model in which land and structure are both allowed to enter into housing production can be envisaged. In this model, structure consists of bricks, masonry, blocks, mortar, concrete, plumbing, wiring and fixtures. It also incorporates professional



...tive<sup>8</sup>, but the latter is viewed in ordinary  
...ics as the entrepreneur element of the factors  
...ed in the production of the building space. Land  
... physical space, the "terra firma" on which  
... is constructed in an urban area. This includes  
... land on which peripheral amenities of housing  
... children play space. car parking, resting  
... etc.

Figure 7-1 illustrates an Isoquant - Isocost  
... where equal outputs of housing are produced  
... land and structure are combined in varying  
... ties. The shape of isocosts depends on the  
... costs of land and structure.

... example where structure is relatively cheaper  
... and more will be spent on it than on land as  
... an isocost A - A; (and vice - versa, on isocost  
...). In the former case  $S_2$  of structure is used,  
... of land to achieve a level of housing  $Q_1$ ; whereas  
... latter case  $S_1$  of structure and  $L_2$  of land is  
... used to arrive at the same quantity in the case where  
... is cheaper. In the usual neo-classical fashion,  
... of a scale line in the case where the cost of the  
... is cheaper would be nearer the structure axis;  
... where the cost of land is cheaper it is nearer  
... and axis. This would demonstrate structure or land  
... relative housing production technology respectively;  
... quantity of the housing produced is increased

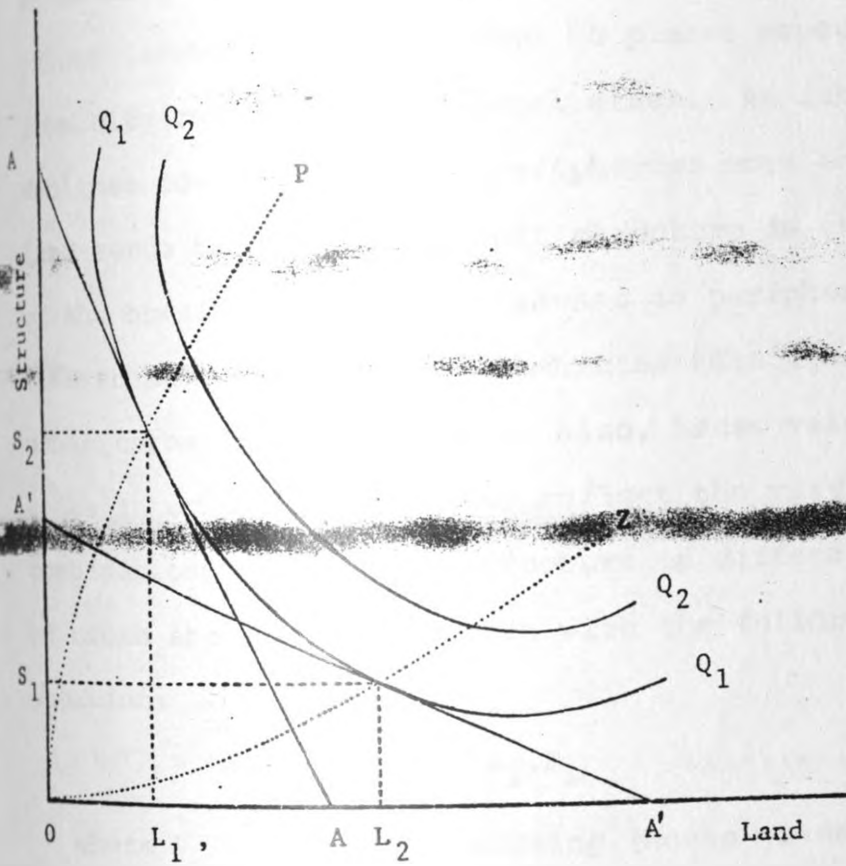


FIGURE:7-1. A simplified Isoquant-Isocost surface for the housing commodity, with two factor combination; Land and structure.

in the economy. These "technologies" are shown on dotted scale lines O-P and O-Z, respectively.

In most urban areas the building costs are constant in every location (disregarding the transportation costs for simplicity's sake)<sup>9</sup>. However, as we have seen in the foregoing chapters, the land prices (rents) vary from place to place; especially from city centres to peripheral areas. As land rent declines towards the urban peripheries more and more land tends to be used per unit structure in the provision of the housing good. Thus, houses in peripheral areas tend to have more land for amenities than those in urban cores, and vice-versa. Also, house values or costs in urban areas tend to reflect the varying combinations of land and structure in different parts of urban areas, in accordance with the following equation:

$$V = A_s \cdot P_s + A_l \cdot P_l \quad \dots\dots\dots(1)$$

Where V = Amount of housing (house value)

A<sub>s</sub> = Amount of structure

P<sub>s</sub> = Price of structure

A<sub>l</sub> = Amount of land

P<sub>l</sub> = Price of land.

Since V is the "going price" or what could theoretically be called "equilibrium price", A<sub>s</sub> and A<sub>l</sub> are the market quantities of structure and land, respectively; and their

prices are  $P_s$  and  $P_l$ . Figure 7-2 shows the price consumption curve for land when the structure price remains constant, and the land becomes cheaper towards the periphery. Assuming equal scale for both axes, and equal spacing of isoquants, more land each time is applied to produce any quantity along scale-line OP. Increments in land use I-J, J-K, K-L, are bigger than their structure increase counterparts N-Q, Q-R, R-S, respectively. As we shall see later, this should drive the low income people to living in the periphery. However, because land is not sold in small units, but in large quantities, and because of increasing transportation costs, the rich who can afford these large plots of land and the costs of transport tend to occupy land in the periphery, while the poor concentrate themselves in urban cores.

It must be mentioned that this is only a simplified model. Like all other property, the housing market is extraordinarily complex and widely differentiated. It adjusts more slowly to changes in equilibrium than markets for ordinary consumer goods. The forces governing the housing market in any city are intertwined with those governing the respective components involved in housing production. Earlier, we mentioned the fact that the structure includes the expertise employed in housing construction. Its cost will therefore be influenced by labour market, materials market, transportation market, professional and trades market, and the land market. The market for all these

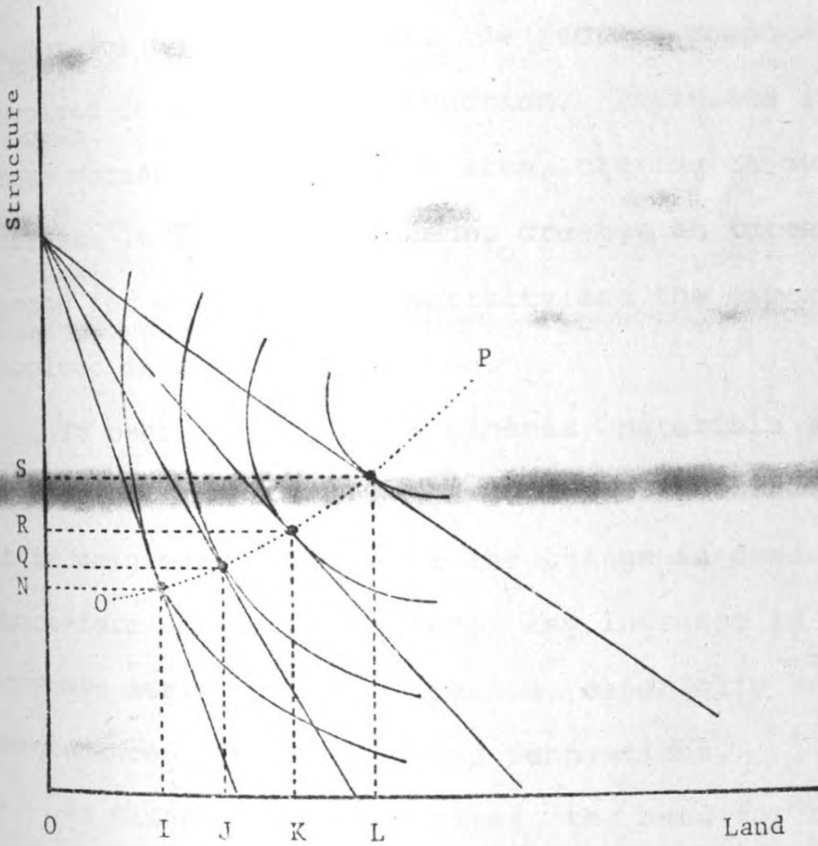


FIGURE:7-2. A simplified Isoquant-Isocost surface for the housing commodity showing the scale line resulting from increasingly cheaper land.

components is organized in what is termed as the "Building Industry".

### Organization of the Building Industry.

The demand for space rises out of the usual demographic and economic factors in a country. Changes in population, production technology, real incomes (and effective demand), transportation technologies and volumes of interregional migrations affect the market for housing and all the factors components involved in housing construction. Increases in all these variables in any one area, causing an overall increase in demand for space, creates an increased demand for construction activity and the experts involved in the construction.

To begin with, these experts, materials etc., are employed in renovations of existing structure and their maintenance, to meet the change in demand in a short-term basis. Therefore, any increase in the economic activity of any region, especially building maintenance, alterations and renovations.

As demand for space rises, the need for new building is felt - hence the need for technicians, professionals, labour, materials, and ultimately, land for constructing buildings. The scarcity of each of these "commodities" influences their prices; and therefore the costs of new buildings. If labour

experts, technicians, professionals, etc. are scarce, the few that there are are very highly paid. Theoretically, this should induce new trainees into the various cadres of the building professions; and their individual markets adjust accordingly.

Each time the economy responds to the demand for space, demand for materials for construction of building structures increases. This shoots up their prices, and induces suppliers to bring more of them into the market. The individual markets for materials have also to be taken into account; and their equilibria analyzed in order to find out as much as possible the nature of the factors influencing house prices. The market for land also changes, and the land values change with the changing economic circumstances. Materials have to be transported to the construction sites. So the knowledge of the transportation market in the subject locality is required in order to have a fuller explanation of what is influencing the cost of housing.

In effect the original economic model becomes extremely complicated and can only be stated explicitly by a series of equations as follows:-

$$V = A_s \cdot P_s + A_z \cdot P_z \dots\dots\dots (1)$$

$$A_s = M + E \dots\dots\dots (2)$$

$$V_s = M \cdot P_m + E \cdot P_e \dots\dots\dots (3)$$

This makes

$$V = M \cdot P_m + E \cdot P_e + A_z \cdot P_z \dots\dots\dots (4)$$

where

$A_s$  = Amount of structure

$M$  = Materials

$E$  = Professional experience

$P_m$  = Price of materials

$P_e$  = Price of expertise

$A_l$  = Amount of land

$P_l$  = Price of land.

The resulting demand curve is complex and can only be stated implicitly:

$$Q_D = f P(M, E, L) \dots\dots\dots (5)$$

and the same applies to the supply curve

$$Q_S = f^* P(M, E, L) \dots\dots\dots (6)$$

**The market price of a house in any locality is**

determined by the equivalence of demand and supply

$$\text{where } Q_D = Q_S$$

and the equilibrium price takes the simplified form of equation (4) above. Figure 7-3 illustrates this equilibrium diagrammatically.

In summary, we can therefore say that any housing unit is a multi-dimensional good representing a number of attributes like space, quality of space, and external environment. In colloquial terms these include the number of rooms in a house, interior size, architectural and aesthetic qualities, condition of structure, and external environmental attributes - what can be called neighbourhood externalities. These



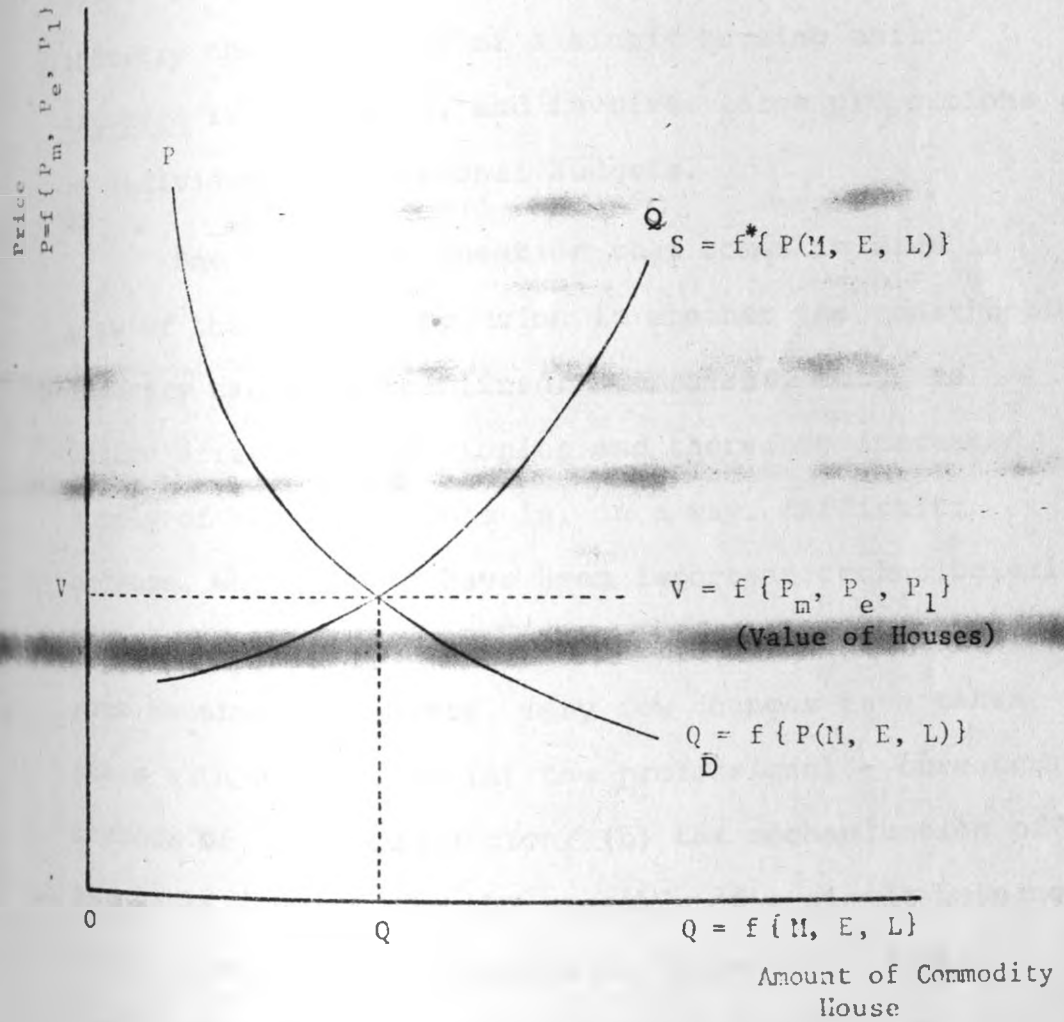


FIGURE:7-3. An implicit demand and supply model for the housing commodity. The complexity of equilibrium relationships makes it senseless to assume that explicit demand and supply schedules are possible. The implicit form of the model approaches the multi-dimensional nature of the housing market.

reflect the amount of labour professional expertise, materials, and land expended in the provision of housing; the neighbourhood of such housing; and distance from the central business district of a city. Because of this complex nature of the building industry the provision of a single housing unit anywhere is expensive, and involves large proportions of individual and national budgets.

One important question that comes in mind in view of the above conclusion is whether the construction industry can be streamlined, mechanized, etc., to ensure efficient functioning and therefore increased supply of housing. This is, in a way, difficult; because, while there have been important technological ~~changes in other industries, and in the manufacture of~~ some housing components, very few changes have taken place with respect to (a) the professional - bureaucratic methods of land acquisition; (b) the mechanization of all the tasks involved in the assembly of a single housing unit. The supply of housing is therefore a slow mechanism, and takes a long time to respond <sup>to</sup> the constantly increasing demand for housing in the economy.

Housing is also a durable good. Some houses in Europe have stood for up to 600-700 years and are still being used. In Kenya, the life of a building is presumed to be 99 years - hence the 99 year long building lease granted by the government to potential

developers on building land. Some houses in Nairobi have stood up for more than fifty years and are still functional. Therefore, the economic activity related to housing production is marginal in the sense that only relatively few units seem to be required every year, in view of the fact that there is an already existing building stock. Therefore, before the private industry can decide to invest any money in housing the existing stock has to be taken into account, and its effect on the financial returns of new housing be appraised by potential investors. In this case the supply of housing really takes off when great demand for housing has forced the prices of houses to such high levels that potential investors in housing are guaranteed of attractive returns. This explains why the private market fails in keeping the supply of new housing at parity with the increased demand for housing as the sector supplies housing only when good returns are eminent; and attractive to potential investors.

#### Temporal trends in Building Activity

It then follows that the supply of housing follows the trend of the demand for housing in the economy. The demand for housing in turn is influenced by general economic and demographic variables such as increases in population, increases in national income, employment, production etc. It can be concluded that building activity is largely a function of general fluctuation of trend of the economy.

The cyclic nature of economic activity has been given great attraction by economists, and it is generally agreed that economies experience periods of lightened economic activity (or boom), followed by recessions. Great ~~dis~~<sup>depressions</sup>pressions similar to the one of 1929 - 1939 are presumed rare nowadays; and economies tend to have a general upward growth trend<sup>10</sup>. Within this trend, however, there are times when the rate of growth is not as fast as in boom times, and these are the so called recession times; when the level of most economic indicators is relatively lower than the preceding times. These indicate that the rate of economic growth, and therefore investment is lower than previously.;

Fluxuations in housing investment are mainly caused by the fact that most investment is durable. Investment is produced or created when there is pressing demand for such investment. An increase in general economic activity creates "bottlenecks" in the existing investment - generally - and housing investment in particular. Then there is some increased investment to meet the great demand that results; which continues unhampered until all demand for investment has been satisfied; and until a new equilibrium in housing investment has been attained.

Because of the imperfect nature of the market when this equilibrium has been reached the investors will be unaware of the occasion. Consequently, there is

a lag between the time when economic boom is noticed and when the building activity goes on at full blast. Even when the decline in demand is noticed, there is a lag that occurs between this time and the time building activity comes to a halt, because the existing building contracts have to be finalized, and because not every sector in the industry responds spontaneously with the changed demand. The result is accumulated space inventories or "voids" in the then recently completed buildings, which cause investors to stop investing in building structures altogether.

Because the demand for housing space is derived from the demand for economic activities generally, it follows the general economic trend<sup>11</sup>, rising after the growth trend has risen for a while, and falling after it has fallen. The housing prices and the construction prices therefore follow the trend; and immitate the cyclic activity of the economy. After all, housing is a stock good, just like capital; and the housing industry is some form of capital formation. We can conclude, therefore, that the peak in construction activity is reached sometimes after the peak in economic activity has been reached; and the recession in construction activity follows the economic recession<sup>12</sup>.

## Subsidized Housing

### The Adaptive Model of Housing Market

The foregoing economic model and description attempts to capture a complex market mechanism where the demand for housing takes the nature similar to that of a good differentiated on a qualitative basis and on other complex criteria like location. The supply is assumed to take place not only through new construction, but through a series of intricate changes in the markets for the components making housing on which the quality of the existing units and new ones depends. Therefore, the rent level in this model is adapted to the complex pattern of demand expressed in this theoretical market for housing services. The economic model and the foregoing description assumes non interference by the government with the housing market; and normal interaction of all parameters in the economy; so that even if the housing market is not perfectly competitive it is assumed unregulated by public authorities.

If we assume these circumstances and elaborate further on the model, new housing would be seen to enter the market at the upper level of the socio-economic classes of society, because this income group happens to be the socio-economic class who can afford new housing. Once this class has moved to their new and fashionable units they abandon the ones that they have been occupying for the use of the economic bracket that immediately follows them on the income ladder. This lower income bracket in

turn abandons the units they were occupying to be used by the following economic class, and so on, until the lowest income bracket is reached. This lowest socio-economic class would tend to occupy the poorest class of housing that no one in the upper income bracket may want. Thus, housing is said to be filtering down to the lower income brackets from the rich, in the same way that automobiles and other consumer durables filter. In some instances the rich emigrate from some localities altogether, leaving the middle class in their former impressive residences. The middle class may also abandon an area for the low income.

This process has been termed the adaptive model of housing market by Heilbrun<sup>13</sup>. It assumes an entirely rental market, because a large part of urban housing is rented. Rental housing market is assumed to be dominated by a large number of housing suppliers; such that there is monopolistic competition among sellers. Competition, in this case can never be described as pure, owing to the great differentiation of housing units in size, quality and location. In other works this model assumes the process has been called the filtering down mechanism<sup>14</sup>.

The mechanism takes place when the character of a dwelling unit changes, so that its rental value changes.<sup>15</sup> Character is one of these attributes that are difficult to quantify. We can talk of "good" "bad" "standard" "sub-standard" "crowded", or "uncrowded" housing. In order

to determine the actual character, one is faced with the problem of measuring those attributes that invoke each of the above adjectives as classification qualities. Most of these attributes are not easily quantifiable as indicated above. The physical condition of the structure is often described as "sound" or "unsound" well maintained or dilapidated. Adequacy or inadequacies of amenities, equipment and utilities also requires subjective judgement. Adequacy of space, how many rooms, area of floor area, how much of the unit area is available to the occupant may be measured, but this is not enough to counteract other subjective qualities. Internal and external design is also subjective, but things like adequacy of windows, light, dampness, etc can be easily detected, though not easily measured. Nevertheless, these subjective attributes do change and lead the rich to look for, or build themselves new housing. Any unit left behind by an economic class to the use of the lower character is said to have been filtered.

A government or a local authority can decide not to interfere with the market mechanism in the process of housing supply by regulation, but to act only in such a way as to accelerate the filtering down process. This downward filtering strategy would tend to increase housing available to low income groups only if the rate of new construction exceeds the rate at which the rate at which new family units are formed in the area.



This approach to solving the problem of housing shortage with minimum government intervention tends to have political appeal, especially among the high income, because most types of construction are too expensive for low income families; and because it favours giving loans and other incentives to the high income for them to improve their housing and to acquire new housing, so that they can leave their old units to be occupied by the lower income brackets. The system has been popular in the U.S.A., since the end of Second World War; where new construction has been encouraged by government programmes that make credit more readily available at lower cost<sup>16</sup> to the high income.

Left to work without this government intervention the model works very slowly in practice because of the complex market operating in the construction industry. ~~Some sections of the community, especially the poor are~~ likely to be underhoused; especially when the rate of new construction of the high income housing is minimal as compared to the rate of new family unit creation at all income levels. The shortages result in increases of the prices of housing; and the poor are often priced out of living space because the rent of the filtered down units may be more than they can afford. This may lead to the available houses on the lower echelon meant for the poor going to, or remaining at medium income levels, without filtering down as expected by policy makers. The old house owners then take advantage and partition these filtered down units into

very many small sub-standard housing units with very poor amenities, which are then occupied by the poor at exorbitant rents. This way, the neighbourhood degenerates into a slum without solving the problem of housing adequacy or without reducing house rentals to affordable levels.

When the government intervenes to subsidize the output of new units by giving loans to the high income so that new housing can begin "filtering down", the strategy becomes regressive because it subsidizes the relatively wealthy in order to improve the well-being of low income families. While there is nothing very wrong with governments improving the well-being of rich and middle income groups, this becomes unfair if it is done under the guise of helping the poor and with tax money from the poor, unless this policy helps the poor directly and more effectively than any other groups which it is unlikely to do.

#### Rationale for other methods of subsidy

The market process and the filtering down process, even when the latter is subsidized, are slow and inefficient methods of increasing the housing stock in a community; and slow in providing shelter for all the income groups in a country. This is because no matter how good the economy is, the process will not be efficient enough to offer a decent house for each member of the community. So Governments have designed

other methods of interfering with the market, and accelerating its functioning in various ways such as through direct subsidies to the poor, rent controls, various types of zoning, urban renewal, slum clearance etc.

In addition to the market imperfection, housing tends to take a low priority in consumer budget allocation. If ordinary town-dwelling people in the street are interviewed, and requested to list the order of priority of their economic wants, housing tends to take a place after job, food, clothing, and other consumer goods. People imagine that once they have a job they can earn enough money to rent accommodation while they save the money to purchase housing later in their lifetimes. Very few think of building a house first or as a second priority after getting a job. This is due to the large financial outlays involved in housing construction. Consequently, less housing is constructed than should be in an economy, thus creating shortages and other adverse socio economic conditions resulting from these shortages.

Therefore, housing falls into the category of a "merit good" which people should be consuming more of, but very little of which is in fact consumed. This is because consumption of more housing increases the welfare of the society, but the society tends to defer this kind of consumption in favour of other goods. (Compare the concept of a "merit good" with that of "de-merit good"

like cigarettes, excessive alcohol etc, which are harmful for health, but which people consume in large quantities).

Consequently, most governments encourage housing consumption so that citizens can benefit from more of the commodity that they consume less of in absence of government interference. This is the rationale for most housing subsidies; where in order to induce people to spend on housing the government subsidizes individual efforts with material and financial help, to make it less straneous for individuals to construct, finance or acquire housing for their personal use than it is in absence of government subsidy. In the case of the de-merit goods, taxation is employed to discourage people from their consumption. Sometimes it is a criminal offence to consume some de-merit goods like addictive drugs, etc. It must be recalled that taxation and penal measures are direct opposites of subsidies.

#### Some Economic Models for Housing Subsidy

Given a set of preferences between any two natural commodities that are substitutes, a reduction in the price of one will result to the approximate substitute whose price remains unchanged. In the following housing subsidy model we are assuming the presence of two normal goods, which are rented accommodation and purchased or newly constructed

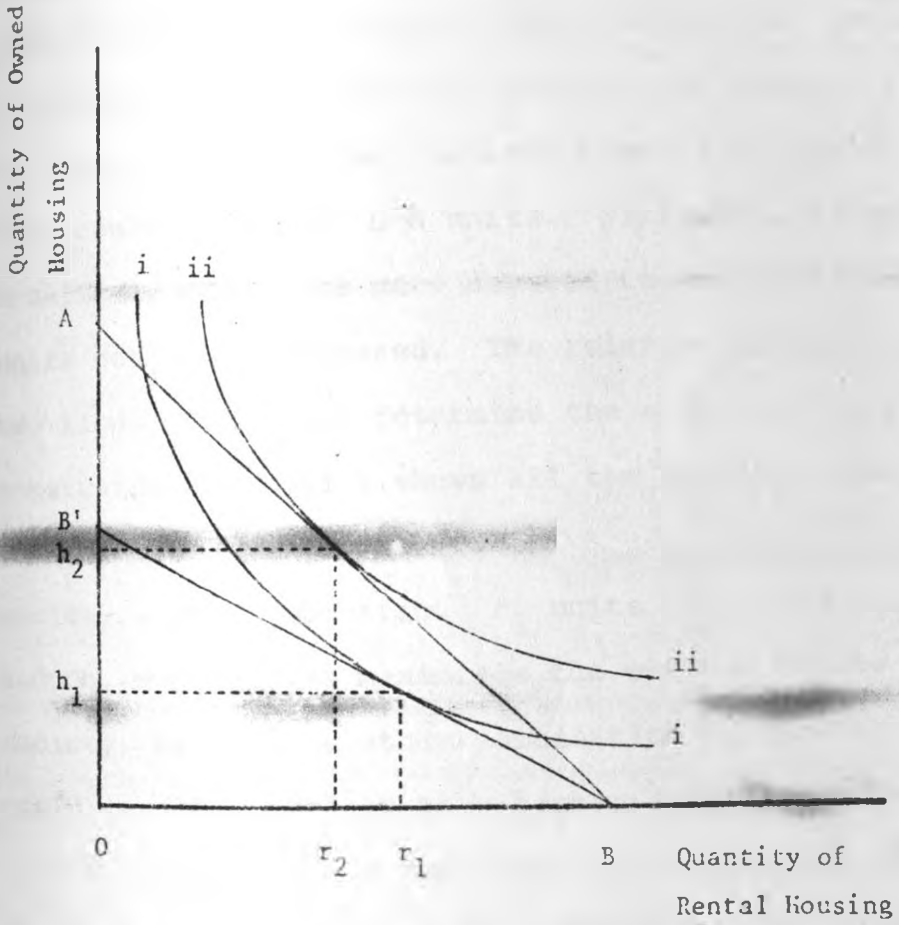


FIGURE:7-4. An Isoquant-Isocost model showing the amounts of housing produced as owned housing becomes cheaper or more easily available than rental housing.

accommodation. When the price of home ownership is lowered relative to that of a rental unit, the consumption of the former increases, and that of the latter is reduced. Figure 7-4 assumes that the society is indifferent between various combinations of quantities of rented and owned housing as shown by curve (i). If all persons spent their housing budgets on rental units, they could purchase  $O-B$  units. Similarly, if all housing expenditures were devoted to owned units  $O-B'$  units could be purchased. The relative prices of the two kinds of housing determine the slope of the budget constraint  $BB'$ , which shows all the possible combinations of rental and owned housing that can be purchased by the society. The combination  $r_1$  units of rental housing and  $Oh_1$  owned units maximises the welfare of the society, because no other combination of housing could move the society to a higher indifference curve. If the price of owned dwellings is subsidized, the slope of the budget constraint will change to, for example,  $AB$ . Under the new system of relative prices society will consume more owned units ( $h_2-h_1$ ) and fewer rental units ( $r_1-r_2$ ). The population is better off with respect to housing because the subsidy permits society to move to a higher indifference curve (ii). It must, however be noted that this is a generalized conclusion. Society may not be made better off by this particular improvement in housing, because the welfare of a society must be judged in a broader context<sup>17</sup>.

One can view subsidies as operating on the supply side of the housing market, eliminating bottlenecks in the supply of land, building materials, infrastructure, and eventually the housing space. By providing more and better housing through subsidies, people are made to consume more of the housing commodity than they should have under ordinary market conditions as illustrated by change in slope of the budget constraint in figure 7.4. The supply of housing is increased by inducing the production of housing through the provision of cheaper materials, technology and land. Sometimes, the process of supplying housing to meet the often pressing demands as prevail in urban areas is made faster. Under ordinary circumstances, an investor may not invest in housing if he feels that the returns would not be attractive enough as compared to other investments. As we said earlier, investors in rental housing tend to wait until the excessive demand forces the rents to high enough levels to guarantee good returns.

In subsidized housing the governments and local authorities do not care about the profits that they will get from the housing schemes very much - as long as they can be able to amortize external loans, if they have borrowed any to finance the scheme. If no such loans exist then whatever profits are earned are usually used for the maintenance of the housing units and the administration of the housing estates.

The supply curve for subsidized housing lies to the right of the actual market supply curve as shown in figure 7-5. This reflects the fact that more housing is being produced by the community at lower prices than could have been produced under normal market conditions.

In this diagram the market supply curve is  $S_m$  and that of subsidized housing is  $S_s$ . Assuming the demand remains the unchanged, and the elasticity of demand remains the same, any subsidy that makes housing supply more efficient shifts the supply curve to the right, whereupon the increased quantity causes a movement along the demand curve in the short run causing the new prices to fall to  $P^*$  and the amount of housing to rise from  $Q_0$  to  $Q$ . More of the housing is consumed, and at a lower price, causing the community to have extra disposable income to be spent on other consumer commodities.

The shifted supply curve in the short run illustrates less prices for each housing unit by  $P_0 - P_1$  as in  $Q_0$ . Alternatively it illustrates that more can be produced at the same price - like  $Q - Q_1$  at price  $P^*$ .

In the medium and long run, the favourable terms of subsidized house ownership may attract more people to owning subsidized houses. Demand curve may shift  $D_1 - D_1$ . Prices of houses may rise in response to increased



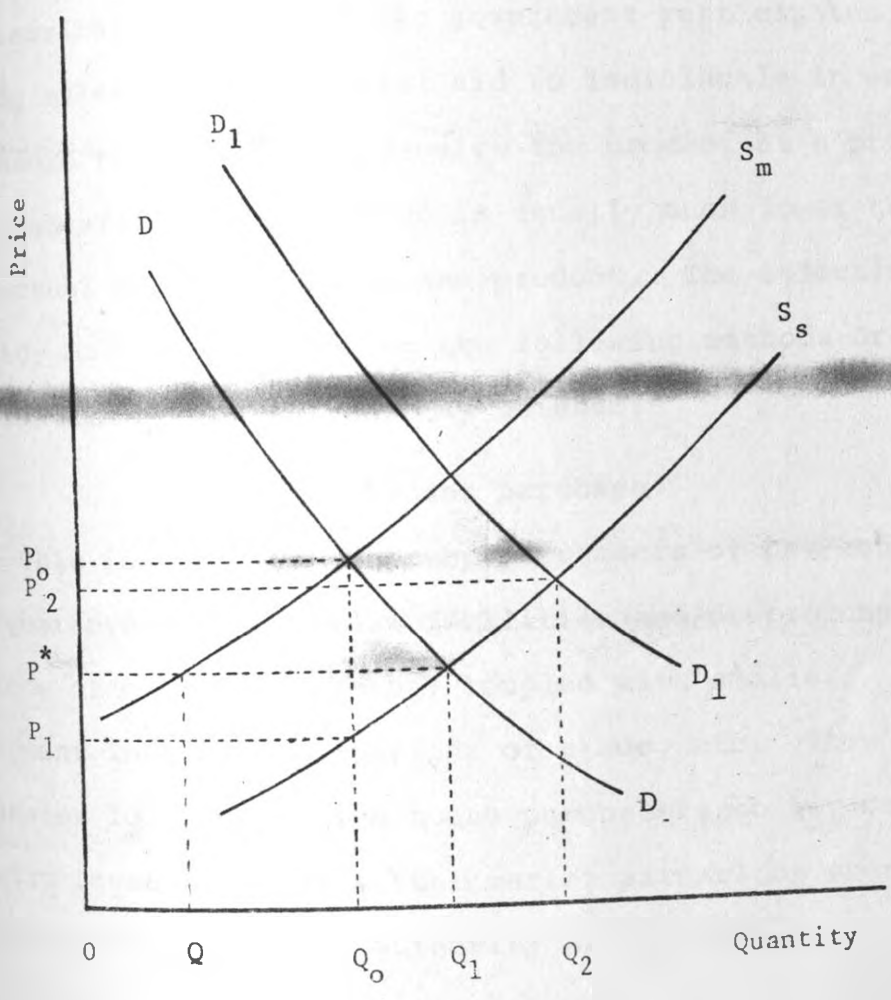


FIGURE:7-5. A supply and demand model showing the expected market conditions, and those conditions that prevail under subsidized housing.

demand, but may take time before they reach the original prices  $P_0$ . Even if they do, a large amount of houses would be available in the economy and society would be better off with more quantities available at less prices.

### Methods of Subsidizing Housing

A subsidy can be defined as any method of production or distribution in which the government participates giving material or financial aid to individuals in order to ensure that consumers receive the product at a price they can afford. This price is usually much lower than the actual market price of the product. The effecting a subsidy on the good housing the following methods or a combination of the methods may be used:-

#### (a) Tenant purchase:

This is a process whereby purchasers of new housing are guaranteed easy credit facilities and/or prolonged periods of credit repayment; coupled with smaller repayment instalments, periods of grace, etc. This makes it easier for prospective house purchasers to buy or, acquire houses than in actual market situations where no government or public authority aid is present.

#### (b) Subsidized rental housing:

Governments and local authorities build houses and charge less rent than the prevailing rent

("market rent") in the neighbourhood where a subsidy is supposed to take effect. The objective of the local central government is not to maximize profits but to recoup the cost of housing construction; and to provide a small running profit which helps to meet the management expenses, the costs of repair, and the costs of maintenance of individual housing units.

(c) Site and Service Schemes:

By this method the value of the land may be subsidized. In countries where land banking is practiced by the government like in Kenya there are considerable fractions of urban areas owned by the government for future use of the community. In this case the central or local authority may arrange to set aside some of this land for subsidized housing schemes at lower rentals than the market rent; or at minimal sale values - whatever may be the case. In addition, the tenants may obtain their plots with infrastructural services already installed free of charge, or at very low costs to them. Toilet facilities, drains, water, common washing places, playgrounds etc., are then provided before any dwelling is constructed. Once these are ready, the tenant is then requested to build his own house within a specific period, and he is allowed to use any building materials that his financial resources can allow him to purchase. The main advantage of this is to create conditions where large population densities can live together in modest (poor) housing

without risking any outbreaks of disease, or and without denying them the basic infrastructural facilities available to the more well-to-do classes in society.

Such schemes have been found to be practical in Kenya for the very low income; especially in Nairobi; because of the rapid annual increase in the population of the city caused by both natural growth and rural-urban migration. It has been estimated that whereas the average rate of overall population increase in Kenya is about 4% per annum (one of the highest in the world) the urban population increase in Nairobi is about 7% per annum. This means that the market process of providing new housing is likely to be seriously strained; because the rate of new family creation in this city is going to be way beyond the rate of the construction of new housing units ..... especially when the filtering process is considered. This has partly contributed to the sharp increases in house rents within the city since 1963; causing the poor to be priced out of any decent accommodation. It has led to the formation of slums that are eyesores aesthetically and a danger to community health<sup>18</sup>. This is translated as negative externality on the well-to-do classes of the city. It has created a political response, and a strong will to solve the situation. Kariobangi, built in 1964, Huruma Estate, 1975-1976 and Umoja have these elements of site and service scheme. The idea has been spread to other up-country towns where housing shortage is acute; such

as Thika, Kisumu, Karatina, Nyeri, etc.

(d) Subsidized Technical Services:

In response to similar socio-economic forces as those causing the design of site and service schemes, the central and local governments may subsidize the construction process by offering to the prospective poor tenants specialized technical services available among their civil servant cadres. These technical government servants may help in the design of housing units, the laying of drains, brick-making, actual building construction, etc.; free of charge, while they are doing their official work under government payroll. The result is to cheapen the overall costs of housing - if the prospective house owners are not going to be liable to pay for these professional services.

(e) Concealed Subsidies:

These take the less obvious forms like less taxation on housing, easy loans to certain sections of the community for housing construction, owner occupier house allowance for government and local authority workers who own their own houses, etc.

Each of the methods (a) to (e) can be applied either individually or may be used simultaneously with a number of other methods; depending on the financial resources and the choice of the subsidizing authority. In Kenya, especially within Nairobi, all these methods are used in varying doses for subsidizing houses at various

income levels - from the low income, through the medium income and upper income levels<sup>19</sup>. In a case like Umoja Estate in Eastern Nairobi more than one of these methods has been applied. Land was alienated at cheap rates by the government to the tenants. Infrastructure was provided by the City Council using a cheap loan financed by the United States Agency for International Development. Then houses were partially constructed, and tenants were required to occupy the finished parts while completing the unfinished parts. In most cases the basic accommodation requirements like one or two bed-rooms, a living room, kitchen and a toilet were completed, and then the tenant was required to provide additional bed-rooms, outside fencing, etc. in accordance with plans provided by the City Council. In this estate are evidences of a land subsidy, infrastructural subsidy, building structure subsidy, some form of a site and service schemes, and a cheap loan-all used simultaneously.

Advantages of Subsidized Housing:

(a) Social welfare improvement:

Since housing is a merit good, the government or a local authority would like the communities under them to consume more of the good than they usually do. By subsidizing housing they influence the supply side of housing, causing shifts in the supply curve. Given the same unchanged demand this supply curve shift may bring down the cost of the buildings than at ordinary market prices. The reduced costs of housing acquisition

may cause the housing units to be more easily affordable, and may ultimately result in a shift in the subsidized housing demand curve. This means that in effect more housing is consumed after a subsidy than may actually be consumed before a subsidy. More of the housing good is consumed by the citizens, and the standard of living may be affected - made better. Occupation of good housing may prevent overcrowding that is likely to occur in urban areas if high population increases in absence of subsidies - as under normal market conditions when housing is allowed to filter down.

(b) Activation of the economy:

As a result of available cheap housing, money that would be used in the purchase, construction, or renting of expensive housing in absence of a subsidy is available as additional disposable income that could be spent on other consumer goods than housing. This tends to stimulate effective demand for other goods, and may result in increased investment within the sectors of the economy that are involved in the production of consumer goods. Such investment may have a multiplier effect that can operate throughout the economy - causing some more employment through investment, and a general growth in the national income.

(c) Wealth Distribution:

If specifically so designed, and efficiently carried out, housing subsidy can be used by governments

as one of the fiscal policy weapons for re-distributing wealth from the high income and the medium income brackets to the poor. This is especially so, if the country's taxation system is progressive, and the money obtained from the rich through taxation is used to provide cheap and good housing to the low income families. The money saved by the poor from renting or constructing expensive structures may be used to purchase other essential necessities. This has the effect of making the poor afford easily the basic necessities of life that may be difficult if they were faced with high rents for their accommodation.

**(d) Checking the "sky-rocketing" of rents:**

If subsidized housing projects are extensive and well managed the increased housing supply may cure excessive demand that arises in large urban areas under normal market conditions. This excessive demand, if unmatched by supply, is responsible for the sky-rocketing of rents - in absence of government intervention. Availability of cheap shelter may cause a fall in rental levels, even in the private sector of the housing market.

Disadvantages of Housing Subsidy:

For subsidized housing to work, the subsidizing authority has to have easy access of cheap funds, like easily raised taxation or loans, available locally and internationally at favourable terms; with low interest rates and longer repayment periods, etc. This makes it



easy for the authority to purchase land, materials, etc., and to subsidize individual borrowing. If the government is not rich - like most in underdeveloped countries - such subsidies can then become heavy financial burdens that may commit the country in question to heavy external and internal debts. If the houses are financed from taxation the tax burden can be excessive on the already heavily taxed low-outpart economics. If this is overdone, it may even affect output, by reducing the disposable income; and therefore the level of employment; and ultimately reducing national income through the operation of investment and taxation multipliers. This is, of course, not a big problem for rich countries like some members of the Organisation of Petroleum Exporting Countries (O.P.E.C.), large mineral and cash-crop exporters, and industrialized countries.

Subsidized housing involves a considerable amount of administration. Any government commitment in any or a combination of the scheme means that staff, office space, stationery, energy and money is going to be used every year for the administration of the scheme. This is especially so in rental housing schemes, where permanent housing managers and their secretariats are employed on a full time basis for the life of the housing estate which could be more than fifty years. The cost of these services could be great in present value terms.

Tenants may be lacking incentives to treat cheap, subsidized housing like valuable assets. Misuse of premises and carelessness may result in prolonged periodic maintenance costs that can add to the costs in present value terms of housing subsidies.

Some schemes are difficult to manage. This is particularly so when the demand for housing is still high and unsatisfied. Black market conditions may result, where "key moneys" and other inducements are paid to various individuals either owning or managing the estates, so that they can secure housing units to some needy individuals who can afford this kind of inducement.

**This is, in effect, a corrupt practice that is largely** caused by inadequate subsidies. This means that for the subsidies to work, all factors that lessen this excessive demand have to be employed - houses have to be readily available to make any bribes unattractive. A large efficient and incorruptible housing management system has to be designed to police and facilitate housing allocation ... which means greater tax burden to the public served by the subsidizing authorities.

Despite these and many other small defects, most central and local governments resort to subsidized housing of some kind or another; both as income distribution or as social welfare improvement weapons. For subsidized housing schemes to succeed they have to be carefully planned along with other sectors of the economy. This makes sure that other

economic parameters do not defeat the goals that the subsidized housing projects are supposed to achieve. For example, subsidized housing in urban areas may be launched hand in hand with social and economic measures of discouraging rural-urban migration, and checking the urban population growth. This means that the annual rate of new family unit creation in urban areas is reduced and could be made to approximate the annual rate of the availability of new housing units. This means that the demand for housing units, and the rate of growth of demand is matched by the supply of new housing, and the rate of growth of the housing stock generally. Other economic measures can have similar effects, but space does not allow their full discussion here. In other words: subsidized housing has to be bolstered by other economic measures for it to work efficiently. In addition, if funds are available, it needs to be carried out in a sufficiently large scale, and fast enough to avoid construction of the growth rate of housing supply; and the spiralling of house rents - both subsidized and unsubsidized - that would result in absence of a sufficient supply of housing units.

#### Rent Control

Rent Control is imposed with similar motives to subsidized housing. The difference between the two is that in subsidized housing the government is stimulating the supply of housing

by reducing the costs of housing construction and stimulating consumer demand by the availability of cheap housing units at affordable costs; while in rent control only a maximum price is imposed without the government doing anything to aid the increase in the supply of housing. Since the housing stock is not increased, the resulting increase in demand as a consequence of statutory reduction in costs remains unsatisfied, and may have adverse economic consequences like black marketeering, etc. Any imposition of maximum price blocks the normal adjustments in supply to changes in demand. The price of housing is "imprisoned" under the static condition and is not allowed to change despite increases in consumer demand. Since the market for housing is difficult to measure the statutory maximum rent is likely to be artificial; and to reflect little of the market situation at the time of control, or even overtime.

If demand is let to increase without a matching increase in supply, black market situations arise; where people who require a rent controlled house, or any form of housing cannot obtain one, because the ones existing are already occupied. Corruption, key money, etc. are the result, as people scramble physically and economically to obtain the few available units. This increases the price of obtaining housing, and also of supplying one; because it becomes costly to avoid legal

barriers while at the same time incurring the normal costs of supplying housing units. On the demand side, the key money etc., become an additional cost of acquiring houses. In practice therefore housing is available at higher costs than that can be seen virtually through legal disectives.

Besides, if there is any legal loophole in rent control regulations it is likely to be exploited, and the suppliers will switch to supplying the type of housing that is satisfying the provisions of the legal loophole in their attempts to maximize individual profits. For example, the Kenyan rent control legislation provides for a rent control for all housing units below Shs. 800/- p.m. since 1965 (when the Rent Control Act was passed) for unfurnished houses and Shs. 1100/- p.m. for furnished houses. Since the passage of this act prospective large scale, rich investors in housing have tended to develop de-controlled housing units; so that as the rate of inflation rises they can be able to increase the rents if and when they please. Consequently, there has been a vacuum in private sector investment on low cost housing - except in slum areas where the rate of return for investing in hovels and shanties could be phenomenally high.<sup>20</sup> This has been one of the factors acting counter government efforts in providing cheap housing for the low income; because there is no supplemental assistance by the private sector in the provision of low cost housing. The government has tended to shoulder sole responsibility for

income housing provision, and the private sector that of providing housing for medium and high incomes<sup>21</sup>.

In Figure 7-6, if the government takes the static housing market condition at time  $T_0$  and fixes the maximum price at  $P_0$  when the quantity or the stock of housing is  $Q_0$ , this may stop any housing from being supplied at rents above  $P_0$ . Assuming no fall in demand - which is mostly the case in urban areas, any housing supplied legally gets supplied at the prescribed market price along the dotted line A-B. The legal or rent controlled housing supply curve therefore becomes  $P_0$ -A-B.

However, a steeper supply curve - which we can call a black market supply curve - develops due to difficulties involved in evading the legal price. Any increase in the demand is satisfied by housing supplies at higher prices than under normal market conditions that could prevail under conditions of supply curve A- $S_0$ . This is reflected by a backward shift in the supply curve to the left as at A- $S_1$ . In addition, the efforts to exploit legal loopholes and to extort key money and other black market charges cause less of the units to be supplied in the market at these exorbitant prices. This supports the fact that the supply curve would shift to the left under rent control. Shifts of the demand curve in the positive direction therefore are met by smaller supplies; which result in

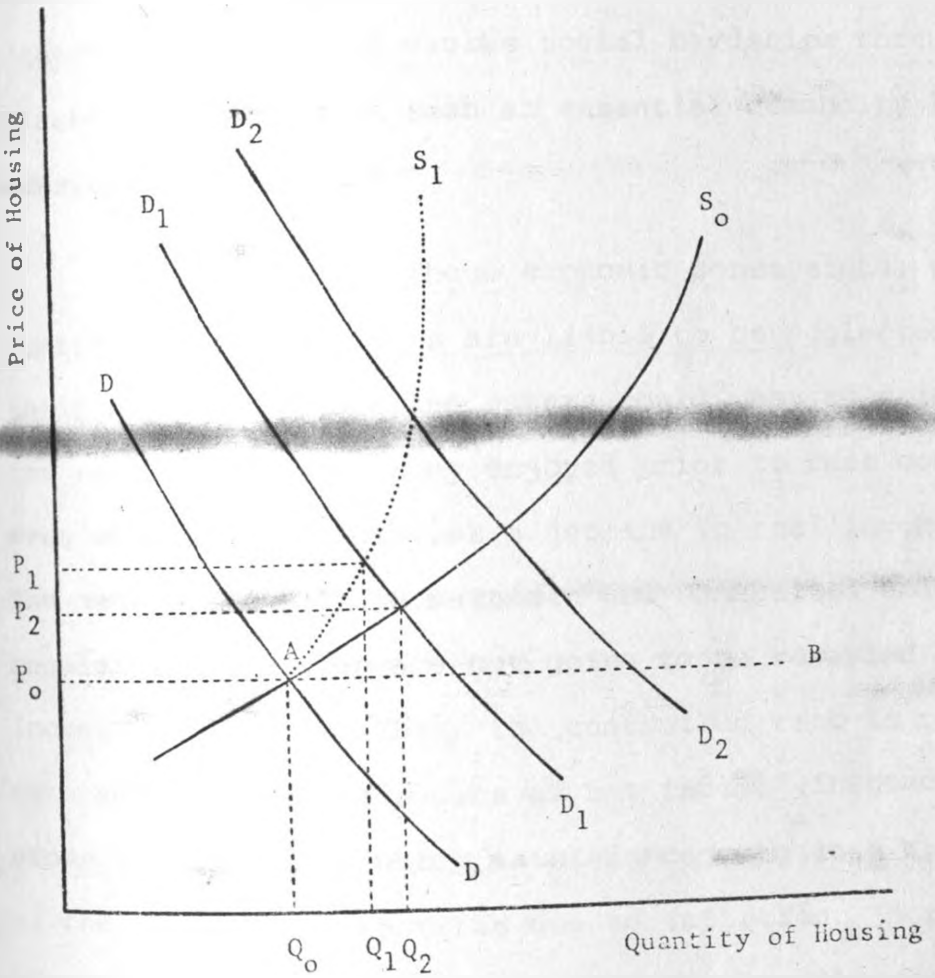


FIGURE: 7-6. A rent control model at any time T<sub>0</sub> showing different equilibria positions resulting from assumed shifts in the demand curve.

higher prices -  $P_1$  instead of  $P_2$  - that could result under normal market conditions. Smaller outputs,  $Q_1$  instead of  $Q_2$  are produced at these higher prices; reflecting the difficulties, constraints and bottlenecks in the housing distribution process. This makes the housing production process slower under rent control (ceteris paribus) and causes social hardships through black-marketeering in such an essential commodity like housing.

In addition to these economic constraints, rent controlled housing units are liable to be neglected by their owners; because the owners could want to maintain the real income that they enjoyed prior to rent control - even when inflation causes a decline in real income. The owners may fail to maintain the controlled houses regularly since they are not going to be rewarded by increases in rent. Thus, the controlled rent is regarded more and more by the owners as net income (instead of gross income out of which maintenance outgoings are derived) as the value of money falls due to inflation. Moreover, cheaper housing does not mean that more people would occupy these controlled housing. The state of the economy may be such that a high proportion of people cannot even afford the rent controlled premises. Thus controlled housing may be occupied only by those few who could afford their rent controlled prices. This is especially so in a low income economy like Kenya or Uganda where there are very low per capita incomes that even would



not allow the majority of urban dwellers to rent the cheapest of the "decent" houses, despite their being rent controlled. This means that many low income families for whom these rent controlled houses are primarily meant would resort to living in slums like Mathare Valley, Kibera or Kawangware in Nairobi. The state of the economy therefore may defeat even the best intentioned goals of rent control.

This means that for any rent control scheme to succeed, there must be no legal loopholes. Price controls must apply to all housing, so that any housing supplied would be subject to some controls. Any partial control means that the suppliers would supply more of the de-controlled houses, leaving the economy in the same problem of housing shortage and high housing prices. Partial control needs to be supplemented by other measures such as plentiful subsidized housing, social and economic measures to control interregional migration (rural-urban) and other economic measures. These, indeed form the crux of the matter in development economic theory and urban-regional economies.

FOOTNOTES

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5. David W. Rasmussen: Urban Economics; (New York, Harper and Raw, 1973), pp.86-89.
6. Andrew Haake: African Metropolis; (New York St. Martins Press, 1977). The complete work is an analysis of the difficulties experienced by the ~~low-income immigrants into Nairobi that leave them with~~ no alternative but to live in slums.
7. David Segal: Urban Economics, pp. 89, 126. James Heilbrun: Urban Economics and Public Policy; (New York, St. Martins Press, 1974), pp.122-123, 263, and 264-266.
8. James Heilbrun: Urban Economics and Public Policy; chapter Ten.
9. The value of a house is largely determined by its location. It is common knowledge that the costs of construction (excluding transportation) do not differ markedly within a country or a single urban area. In fact, it is the locational aspect that includes the transportation element - hence the differences of house values in different locations within an urban area.
10. Keynesian oriented economic planning principles are supposed to stop adverse cyclic economic activities that would lead to a great dipression like in the 1930s. See footnote 11 following.
11. Thomas F. Dernburg and Duncan M. McDougal: Macro Economics: The Measurement, Analysis, and Control of Aggregate Economic Activity; (Tokyo, McGraw-Hill Kogakusha, Ltd; 1972). pp.359-375  
Alfred W. Stonier and Douglas C. Hague; A Textbook of Economic Theory; (London, Longmans, 1972), pp.485-508.

- 12 William Lean and Brian Goodall: Aspects of Land Economics; (London, The Estates Gazette Limited, 1966), pp.365-375.
- 13 James Heilbrun: Urban Economics and Public Policy, chapter Ten.
- 14 David W. Rasmussen: Urban Economics; pp. 95-103. James Heilbrun: Urban Economic and Public Policy, chapter Ten.
- 15 Ibid.
- 16 Ibid., p.95.
- 17 David W. Rasmussen: Urban Economics; p.96. William J. Baumol: Economic Theory and Operations Analysis; (Englewood Cliffs, N.J.; Prentice Hall, Inc., 1977), pp.496-536.
- 18 Andrew A. Haake; African Metropolis.
- 19 B.S. Rihal; "National Housing Policy and the Role of the Private Sector." Build Kenya; (September, 1977) pp.20-22.
- 20 In Mathare valley, for example one shanty dwelling could cost as little as Kenya shs. 300/- and the rent per month is 80/- to 150/-. This means that the shanty "developer" gets his money back in two to four months time. The rate of return could then be as high as 300%!
- 21 B.S. Rihal, "National Housing Policy."

PART II

REGIONAL ECONOMICS

# CHAPTER EIGHT

## ORGANIZATION OF REGIONAL SPACE AND REGIONAL GROWTH

### Introduction

We have been dealing with land and real property as a commodity for sale in the market; and particularly as a factor of production, whose demand is derived from the demand for space whereon to locate human activities. All though Part I an attempt has been made to look at what affects the demand and supply of different types of land; to explore whether really there was the market for land and landed property. In most cases, the general economic factors as affecting this market has come into focus; and, except in the analysis of various rent theories, the distance factor and the effect of location have been de-emphasized. In addition to de-emphasizing the distance factor we have tended to localize our focus - to some definite areas - thus ignoring the interrelationship of various areas, or among various rural neighbourhoods. The approach of this analysis in earlier chapters has been largely from the view of the person who sets out to purchase a piece of land, asking the often intriguing questions: "what is the value of that land? Am I getting the best bargain for my money in purchasing this property?" In order to understand whether or not one has the bargain he needed to have some insight into the operation of the

market and what factors are going to influence the property market from time to time. The last Chapter on the housing market also examined the housing problem from the view point of the market analyst who would be interested in what affects the prices and the costs of the housing he either intends to purchase or (if he is a public official) the costs of his housing estates.

From now on, the emphasis is on another aspect affecting land values - an examination of these land values as they are distributed over space. Von Thunen's rent theory has looked briefly into this issue in chapter four, when we were trying to understand why the rents are different in different locations. Henceforth an assumption is made - that land values are affected even by the wider forces that determine the location of activities over space. With this in mind, social economic factors that determine the location of activities over space are given emphasis. Interrelationships of economic activities over space are emphasized with a view to drawing that land values could be affected profoundly by the spatial distribution of activities over the wider space than the immediate locality or neighbourhood where the subject plot or property is located.

The main aim of this approach is to project spatial distribution of activities from the narrow plot concept to its widest context. Thus, the distribution of activities within a region is

examined, and what causes such distribution. The causes of the specialized nature of activities over a regional space are highlighted - for example; an attempt is made to explain why we have cities and rural areas within a specific area of the country. The relative growth and decline of these cities and their activities are viewed as some of the cardinal macro-determinants of demand and supply of individual plots that are located in a micro-space. If a region is growing, for example, this means that the activities within a region are increasing. Any increase or decrease in activities cause an increase or a decrease in demand for space whereon economic activities are located. Therefore any change in demand of this kind has a direct effect on the market for landed property at a micro-space level. Due to the physical fixity of the supply of land (as we saw in chapter two ) any change in the activities within a locality responding to changes in demand for land, any physical manifestation of development in response for changes in demand for space, reflects the tendency for land within a region or an area to adjust to the highest and best use. The demand for a certain type of plot therefore may be under the influence of economic forces operating within a region.

The forthcoming consideration of the economics affecting land therefore (with due respect to neo-classical economists: what could be regarded as a

macro-factors operating within any region) may give a rough idea of the level of demand for space - and therefore land in that region. One can be certain, for example, that demand for agricultural land in a region is likely to be high, given certain things like the high immigration into a region, the existence of a large urban area nearby, a large industry with a large population concentration, etc. Once this understanding has been "generated" then the micro-view of the Part I of this text can be employed to analyze the respective markets for land in certain corners of the region. Then, using either statistical or deterministic methods, the present value of incomes accruing from an individual plot in each individual corner of the region can be estimated, appraised, valued; etc. Thus, the process of valuation or finding the going price (or rent) has wider implications than just looking at a plot and its neighbourhood. It demands, in addition, the understanding of the region, and the regional economy.

The forthcoming discussion and chapters will open by examining briefly the various methods that have been employed over time to delimit both areal homogeneous regions and the urban nodal regions. Once these concepts are defined they will be used extensively in the theoretical and empirical analysis and the discussion that follows.



Regions and Regional Delimitation.<sup>1</sup>

The Concept of a region.

Many authorities have pointed out that "..... the problem of defining a region is a notty one plagued by many ambiguities .... and it is sometimes possible for a regional (scientist) to avoid facing it all".<sup>2</sup> Consequently, there is a great volume of literature from various social scientists of divers disciplines: all attempting to explain what the concept of a region means. Equally - and sometimes more - difficult is the problem of regional delimitation. This is obvious, since the exercise involves the already difficult concept of region which is often not satisfactorily defined. In the recent quantitative age of regional analysis the process of regional delimitation and regional definition has been taken to high mathematical levels. This has made the largely intuitive process of regional definition a little more rigorous conceptually, but has not gone very far in the solution of practical problems that arise in real life. Regional definition and delimitation therefore still remains largely vague and intuitive, because of the many complex variables that have to be handled in the process.

It seems in regional analysis circles that a region is as large as the context of the study requires. It can vary from a small village to a massive block within a continent, depending on the range and type of questions under study.<sup>3</sup> This clearly implies that a region is a subjective construct of the analyst, which

he coins depending on the context and the scope of his study. However, it is widely accepted that basic to the idea of a region is a high degree of correlation of behaviour among its various parts. This is described through the concepts of homogeneity, contiguity, and functional integration.<sup>4</sup> These concepts are utilized in the form or another to describe, identify, and to help in the delimitation of a region. They are criteria which are employed to test whether a certain area in space can be classified as a region in regional scientific terms.

Homogeneity implies internal uniformity in terms of the phenomena that the regional analyst may be interested in. For example Richardson uses the phenomenon of a regional economy which, to display homogeneity, should function in a definite fashion, so that some variable change within or exogenous to a region may be expected to affect the economy throughout the region in a definite and similar way. This implies that after this exogenous or endogenous change in some parameter, the direction or the nature of change is internally uniform throughout all the constituent parts of a region.<sup>5</sup> Hoover narrates how, in recent times, the countryside of the USA has been partitioned into regions called State Economic Areas using computer models so that "..... (with respect to a large number of characteristics such as income level, racial mix, principal economic activity) the ... (areas) .... within one State Economic Area are highly similar, but the different State Economic Areas are highly dissimilar."<sup>6</sup> Other regional analysts have

come with highly sophisticated models to emphasize the need for homogeneity in regional definition and delimitation.<sup>7</sup> Regions could be homogeneous with respect to geographical characteristics, socio-economic characteristics, ethnic characteristics, etc. In each case, one part of a region needs to resemble very closely all other parts of the same region, and to differ highly from other parts of other regions. Authorities tend to agree that the conceptual and operational objective of regionalizing is to minimize deviation of variables being examined within each region; and maximize this deviation among regions.<sup>8</sup>

The contiguity criterion of regional definition and delimitation demands that a region must exist in one spatial unit within which homogeneity is visible. All parts of the region must be joined to one other with respect to at least one of the phenomena distributed over space; actual space being one of the most frequently used phenomena. In this context, regions are considered as individual units which, preferably, are not separated by space of any kind. Where such abstract variables are used different parts of a region should be parts of the variable being examined with no lack in connectivity of the abstraction. This is because any consideration of a sub-region which is far removed from the main region as a part of the main region means that the distance between them may have caused lack of maximum interaction between different parts of the region; and therefore may have

affected their internal uniformity - hence homogeneity<sup>9</sup>.

Functional Integration implies that each part of a region has some link with every other part of the same region through some definite phenomenon like transportation network, water supply channels, interregional migration flows, flows of raw materials and manufactured commodities, etc. The idea is most clearly manifest in nodal regions where Central Business Districts (CBD) are linked to the neighbouring peripheral areas by infrastructure and such like means. Hoover asserts that functional integration is the basis of the correlation or community of interest within a region.

These criteria are, as mentioned above, vague, intuitive, and indefinite. Due to the ambiguities involved, it is doubtful whether regions as defined and delimited using them can be useful in themselves as determinants of the spatial distribution of phenomena. The prevailing practice is to use phenomena in determining the boundaries of a region rather than the regions helping to delimit phenomena. Matters are made worse when the phenomena used in regional delimitation are used in the studies concerned with their spatial distribution within a region. It can be argued that using phenomena under investigation to define the subject under investigation lacks the objectivity that should be characteristic of any theoretical concept. For example, homogeneity within a region is assessed in terms of

similarity of the variables that are spatially distributed in the region of interest; and a regional boundary may be drawn where such homogeneity ends. Similarly, a boundary may be drawn where functional integration ends - where dynamic phenomena, such as infrastructural network, become discontinuous. All these would enclose a continuous space to satisfy the criterion of contiguity; because this criterion seems to be merely a physical, conceptual, and an operational spatial constraint that must be satisfied in the interest of functional integration and homogeneity. In view of all this, regional analysts have observed that there is no such a thing as a "true region". The region is deemed to exist only as an intellectual concept, useful for some specific purpose of interest. It is judged to be suitable or unsuitable on the basis of the light it throws on the problem being investigated<sup>10</sup>.

Regional analysts are, however, in agreement that the value of regions is to act as cues for further investigation; and areas wherein the spatial distribution of the phenomena under investigation can be observed. Regions serve to cut down complex space to smaller areas within which physical, socio-economic and environmental variables can be observed with relative ease; as compared to the complexity of these phenomena that is usually present over the unpartitioned space. Regional delimitation is therefore necessary for efficient manipulation of these spatial variables,

especially in these days of regional, physical, social and economic analyses; and planning. The concepts of "region" and "regional delimitation" are therefore in wide use (as they are currently defined) despite the prevailing ambiguity in their respective definitions.

#### Some Methods of Regional Delimitation.

There are two kinds of Regions; nodal or "polarized" regions and uniform, or homogeneous regions<sup>11</sup>. The structure of the first type has been likened to that of an atom; in which there is a nucleus and a complementary peripheral area. In such a region, functional integration rather than homogeneity - is the dominant basis of correlation, or the unifying variable; which is usually called "community interest." The second type has been termed as a compage by Whitelesey, and is characterized by the homogeneity of single features or association of several features - both natural or man made - that are related to human occupance and/or ecological functioning of the area.

#### Nodal Regions

These fall mainly in the category of urban areas and surrounding peripheral areas. The definition of urban areas and their delimitation is also not easy. Heilbrun indicates that there is no universal definition of an urban region which is generally accepted by social scientiststs. However, he argues that various disciplines

have their yardsticks of defining and delimiting urban regions. An economist, for example, will have no difficulty in accepting a definition of "urban" in terms of population size and density. He quotes the United States Bureau of Census definitions of urban areas in fortifying his definitions of urban places using population concentrations<sup>12</sup>.

An urban place has been defined operationally in the United States as any concentration of population (closely settled), usually an incorporated village, town or city of at least 2,500 inhabitants. An urbanized area has been defined as a central city or cities, and the surrounding closely settled territory. A city, a large town or a municipality in every-day language would fit into this definition (Refer to Table 8-1). In most countries, such urban areas are usually defined legally, with some kind of outer boundary. They include the central nodal areas with the greatest intensity of urban physical development, and peripheral areas with high population concentrations. Such regions have to be defined using similar delimitation criteria as are explained above. They are used for public administration, service provision, and other socio-economic purposes by the population.

Difficulties have been experienced in applying these definitions as urban areas of increasing size have been encountered - especially along the eastern seaboard of the United States.

NAME OF PLACE	POPULATION
Village	Under 5,000
Town	5,000 - 15,000
Municipality	15,000 - 75,000
City	75,000 - 1,000,000
Metropolis	1,000,000 - 10,000,000

TABLE 8-1. Grades of urban places and their corresponding populations.



It has become necessary to define and delimit higher nodal areas called Standard Metropolitan Statistical Areas (S.M.S.A.). As the name implies, the definition and delimitation of these areas is necessary for the purpose of detailed study and bureaucratic analysis; and, hopefully, for better and more integrated social, physical and economic planning. The definition has taken advantage of the fact that such SMSA's consist of central and nodal areas where there are intensive population concentrations; but where these nodal areas are economically interdependent with their surrounding peripheral areas. The latter are also closely settled. SMSA's have therefore been defined as:-

..... a county or a group of contiguous countries which contain at least one city of 50,000 inhabitants, or more 'twin cities' with a combined population of 50,000. In addition to the country or countries containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city.....<sup>13</sup>

This implies that boundaries of these nodal regions should include all areas of the node and the periphery with closely settled populations. Areas that are more geographically inclusive than merely the central core are enclosed because of their generally high intensities of development and human occupation. It must be mentioned

that the exact positions of boundaries become unclear because the distribution of population and development over space is indefinitely demarcated.

To aid in the delineation, the authorities have invoked the use of the concept of functional integration. The conceptual surrogate through which such integration can be seen is the social and economic integration which is measured as follows:-

The criteria of integration relate primarily to the extent of social and economic communication between outlying countries and the central county....

A county is regarded as integrated with the county or counties containing the central city if either....

15 per cent, of the workers are living in the outlying county or counties containing the central city of cities of the area, or ..... if 25 per cent of those working in the outlying county live in the county or counties containing the central city or cities.<sup>14</sup>

The integration criteria so outlined include the percentage of labour force that is non-agricultural, but commutes daily into the central city to work, and those residing in core areas that commute to work in the outlying areas every day. Social and Economic communication include peripheral intensive agricultural and other activities that specialize in supplying the urban core with daily necessities, in return for goods and services produced in the core areas of the SMSA.

Regional analysts have been looking for these criteria in their efforts to delineate SMSAs. Despite the clarity in definition, these areas have not been easily defined. Experts agree that the boundaries of these nodal areas are roughly where the concentration of phenomena used in categorizing urbanization become roughly equal to those of a similar kind contained in the surrounding unurbanized countryside. Obviously, such boundaries of natural and socio-economic phenomena are indefinite and often difficult to identify. Consequently, regional delimitation of nodal regions has received active research attention over the last 50 years or so in attempts to standardize the concept.

Most work of delimiting these regions has had the approach adopted by a pioneer in this field, A.K. Philbrick. In his paper he shows inter alia the spatial organization of land use within an urbanized node, using the town of Boswell, Indiana (Fig. 8-1). He then goes on to demonstrate the spatial extent of the functional integration of this node with the complimentary peripheral area. According to him, this integration is evidenced by the focality of functions concentrated in the town and symbolized by the pattern of community, including the town and the surrounding farms. This focus upon the town makes it a real centre of the periphery. The agricultural, commercial, and residential establishments centred in the urban node, and those serving the nodal area, but based on the periphery. With respect to the

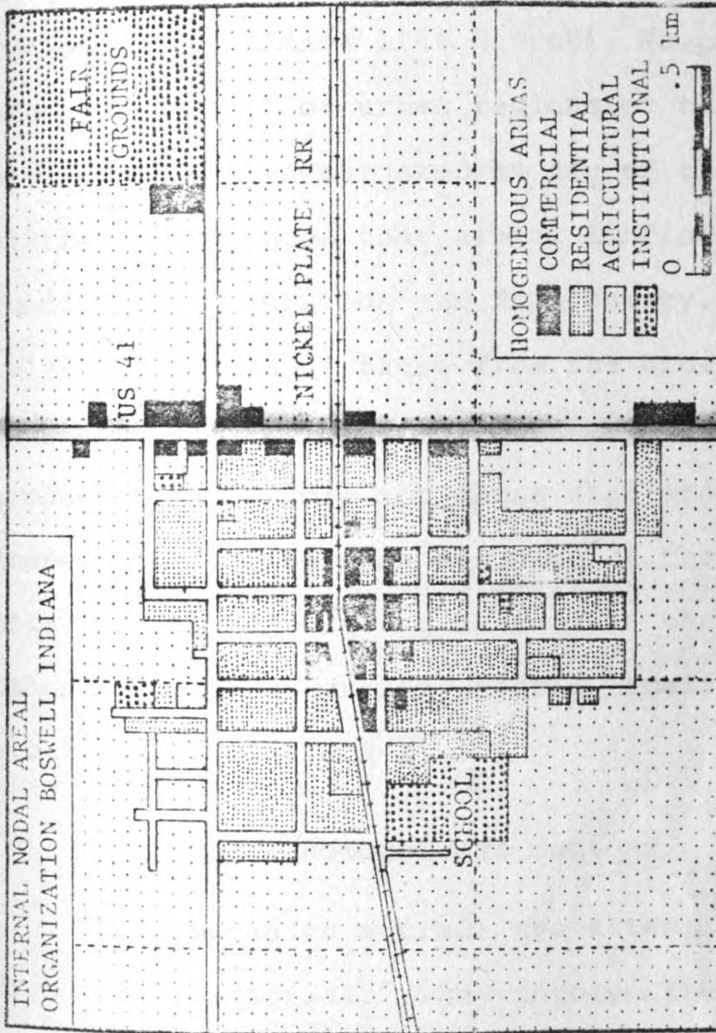


FIGURE 8-1: Spatial Organization of Land Uses Within an Urbanized Area: Boswell, Indiana. SOURCE: A.K. Philbrick: "Principles of Areal Functional Organization in Regional Human Geography," Economic Geography Vol.33 (1957) pp. 306-336.

peripheral area, he is interested in the farthest distance from which the farmers, for example, are induced to sell their commodities in the nodal market centre of Boswell. Compare this fact to the Von Thunen analysis in chapter four.

After such an empirical study on any such node, including big cities like Nairobi, Kampala, Dar es Salaam, etc., the extent of urban regions or their threshold area is usually demarcated by any of the empirical and statistical methods that aim at finding the extent of functional integration and homogeneity. Some of these rely on the mean distance from the urban core of all **boundaries of market areas of the goods and services** produced in the core and those that are marketed therein - i.e. the mean boundary of the trade areas of activities reciprocating trade with the nodal area. Other methods use gravity models, traffic flow models etc.<sup>16</sup> (see figure 8-2).

#### Homogeneous regions

These began to attract the attention of scholars from time immemorial. They involve the use of the physical configuration of the earth, and the physical homogeneity or heterogeneity of phenomena over space in carving out the regions for the purposes of administrative, conceptual and social-economic manipulation. Early attempts of regional delimitation of homogeneous area are not well documented, and

# TRADE AREAS OF BOSWELL, INDIANA

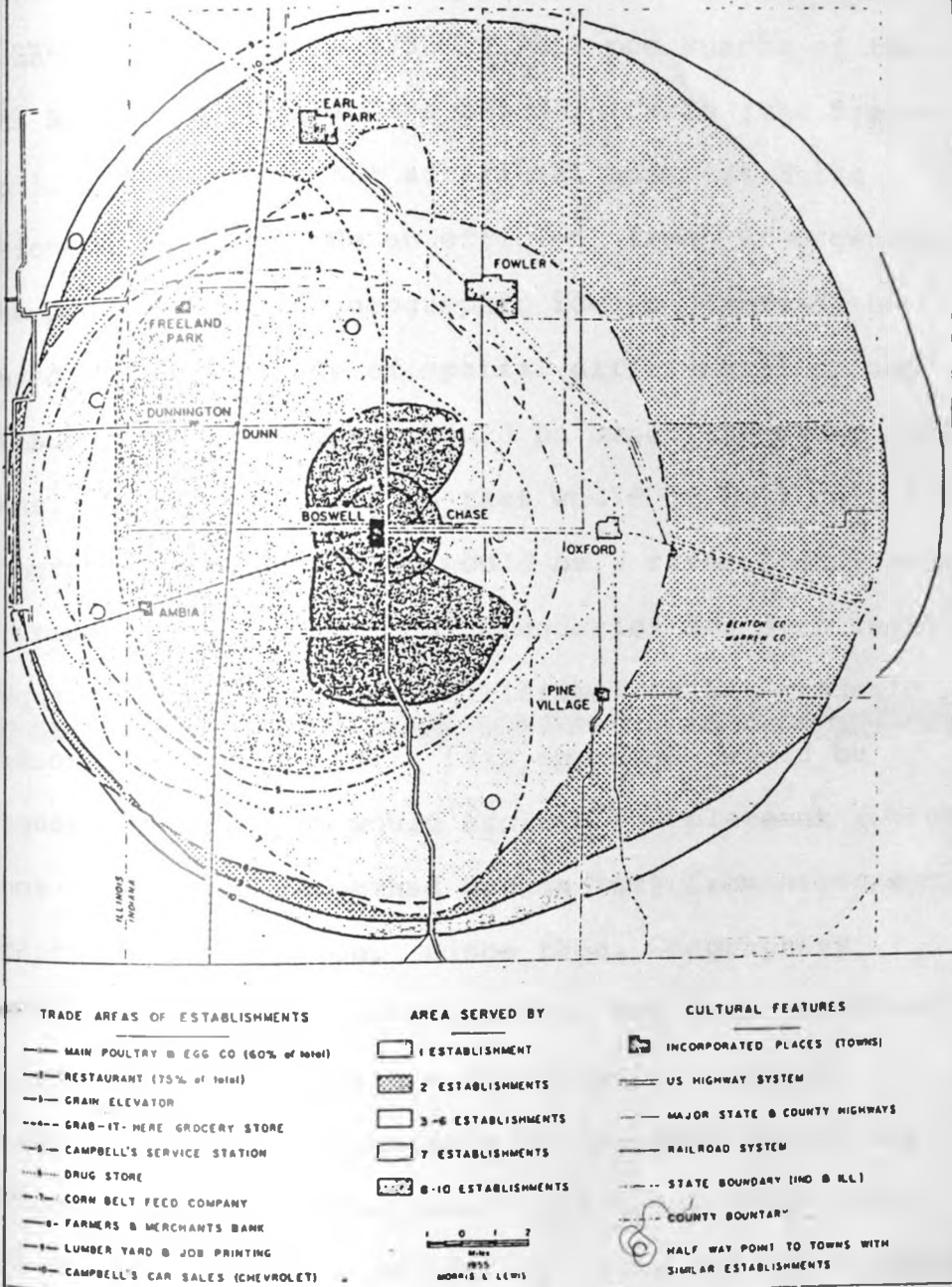


FIGURE 8-2: Boundaries of Market areas of the Goods and Services Produced in a Small Rural Centre: Boswell, Indiana.  
 SOURCE: A.K. Philbrick, "Principles of Areal Functional Organization" Economic Geography Vol. 33 (1957) pp.306-336.

therefore the sources and the concepts cannot be easily outlined. The earliest thoroughly documented attempt of this nature was done in 1752 by Philippe Buache of the famous School of Geographers based in Paris (the French School). He thought that artificial administrative divisions do not provide an efficient frame of organization in the presentation of geographic ideas. Instead, he proposed that the study of spatial differentiation and distribution of phenomena should be organized using natural regions. The natural region that would be best suited for this purpose in his opinion would be a river basin; because high ground forms the natural boundaries for such regions.<sup>17</sup> Consequently, he received criticism from his academic successors who felt that this approach would be inadequate, because it would exclude the plateaux (which did not form clear watershed boundaries) from serious geographic consideration. Since then, Geographers (geography being the discipline that has been concerned with regional definition and delimitation longest) have explored different methods of "regionalizing" the countryside. Use of geological formations, heartlands and coastlands, centres and peripheries, surface features, vegetation, human factors, etc., are some of the approaches that have been tried for regional delimitation over time. In each case the criteria of homogeneity, contiguity and functional integration forms the basis for judgement before a specific region is delineated. Despite this, regional delimitation remains

an imperfect method; and much remains to be done in the way of refining the existing techniques.<sup>18</sup>

Location of Regional Economic Activities.

Single Firm Location and Spatial Pattern of Economic Activity.

In chapter four we considered only one single major activity in a region - Agriculture. We saw how the Von Thunen model dealt with dispersed farmers who sold their output in a settlement market. In the simplest Von Thunen case the city was assumed to be punctiform. The city served as the market place for agricultural goods derived from a homogeneous, unitropic agricultural periphery. Consequently, the resulting pattern of land use was determined by the farmers' economic expression of the desire to be as close as possible to the market place. They would thus be striving to minimize transportation costs and to maximize profits.

Therefore, each of the farmers spread net over the iso-tropic space carries out some economic function. He sells his goods to the punctiform market to those people who need them in return for some money. Implicit in this is some degree of specialization where after the farmer obtains money he can purchase other goods and services that he needs from some place. It is impossible for farmers to be self-sufficient in everything. So the population in the uni-tropic space ceases to be homogeneous, and the most successful people in some function that is needed in the day-to-day life of the



tend to specialize in the production and provision of that service or function.

These specialized services cannot locate themselves anywhere they please on the plain, even if we assume unitropism. They tend to locate in the most accessible places on the iso-tropic space. This, ceteris paribus happens to be the most centralized location in this plain, and co-incides with the market place in the isolated space; because each consumer of these goods tends to minimize his transportation costs if he is rational, as we saw earlier. If the producer of these goods and services is supplying them to some market, then he must also think in terms of <sup>locating</sup> beating in the place where he will minimize his transportation costs to the market. So the market place in the Von Thunen analysis happens to be the most logical location of these producers. In this case, the city or the central place will be assumed to be wider than the punctiform market, so that it can contain other kinds of producers in the production of other goods and services that are required by everybody in the region - farmers, and themselves. Therefore, the central place becomes the market centre for commodities, and a distribution point for the retail goods produced by the other specialized group of the population who are not farmers. Farmers travel to this market, not only to sell their output, but also to purchase the needed goods and services from the other specialized sectors of the economy.

This is the kind of picture that we obtain from the attempts to partition the complex regional space into the homogeneous and nodal regions. So far we have considered only one of these nodes. In fact, Von Thunen has only one in his "Isolated State". In real life we come across many of these nodes, and of varying sizes, distributed all over the countryside.

### A simple location model

The discussion of central places' distribution over the uni-tropic space begins with a simple normative model<sup>19</sup> with simple assumptions identical to those of Von Thunen: an isotropic surface, uniform distribution of demand and population, small towns or settlements supported by trade with their hinterlands, and the existence of producers and consumers who are economically rational, seeking to maximize profits and utility. Initially, a linear market in which consumers are evenly distributed along a line could <sup>be</sup> assumed. Given all these assumptions we are interested in knowing the number of settlements required to serve the population, the size of the trade of these settlements, and their ideal spacing.

If we are interested in selling a good along this line (say a road) as in Figure 8-3, the success or failure of this attempt will be determined by how much of the good we must sell. Enough must be sold to meet the operating costs and the subsistence wage of the seller.

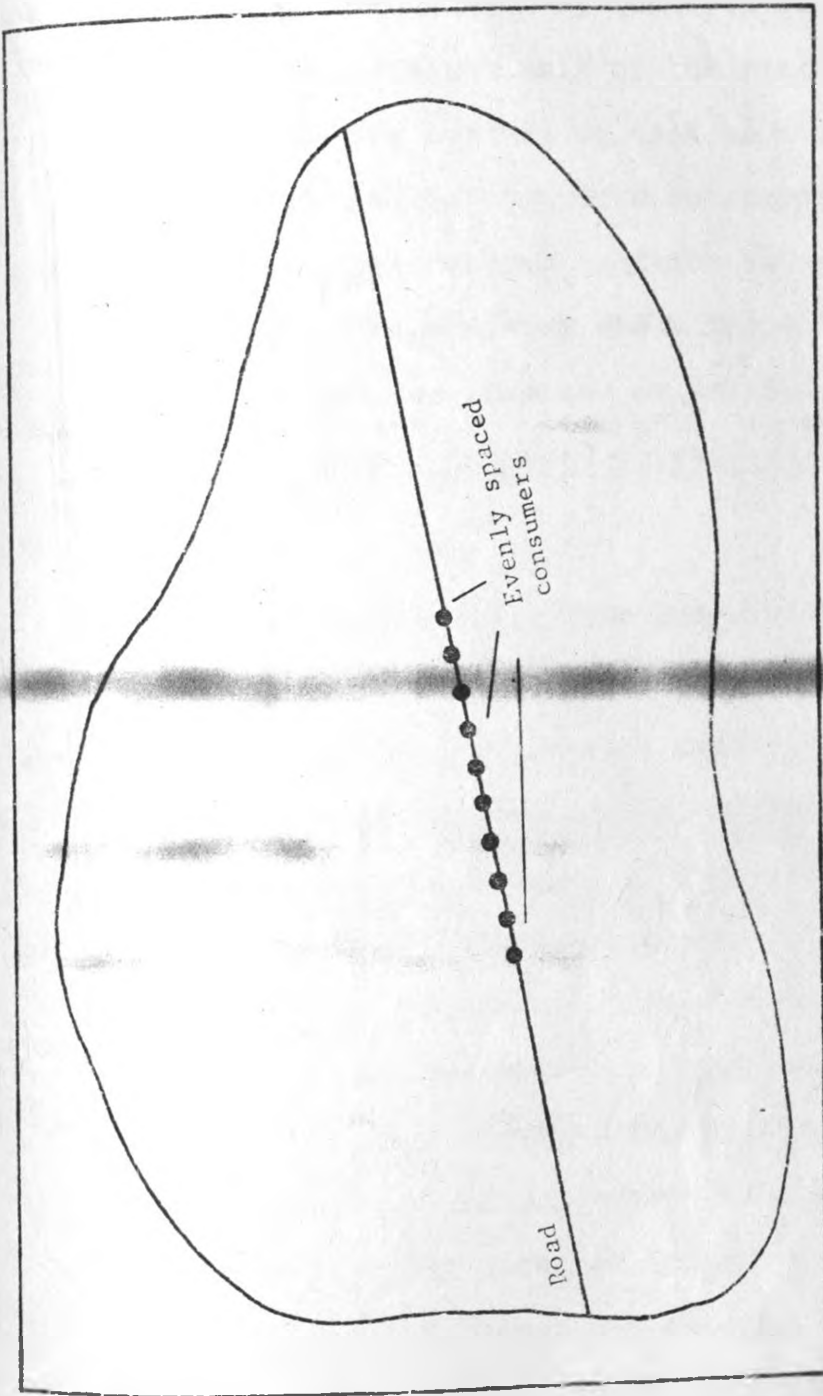


FIGURE 8-3: A Simple Linear Model of Evenly Spaced Consumers. (SOURCE: J.B. Foust and A.R. de Souza, Economic Landscape).

This minimum amount of the good is the so called threshold of a good, and is one of the key concepts of central place Theory. Usually economists talk of the minimum level of demand; and in this context we talk about the "minimum number of people" required to support a central function. The central function is one of these outlets along the straight road where the good is sold. Threshold of any service then can be defined as the minimum level of demand required to support a given central function.<sup>20</sup>

As we have seen earlier, the price of a good rises the farther one travels from the outlet where it is being produced. After the initial market price, what the consumer pays is a direct function of distance. Assuming the normal conditions of demand, if the price of a good increases with distance, then the demand for that good should decrease with distance. This observation is not dissimilar to the demand - Cone observed in Fig. 4-1 (chapter four) but is shown in figures 8-4 B. People stop purchasing the good when its price equals the transportation costs incurred to get it. If the good is seller supplied, the outer boundary of his sales will be the point on this line where he cannot earn any profit after paying for his subsistence, cost of production, and transportation costs. The range of a good supplied from a central place can therefore be defined as the distance from the central place to this outer limit of demand. The threshold of a good will

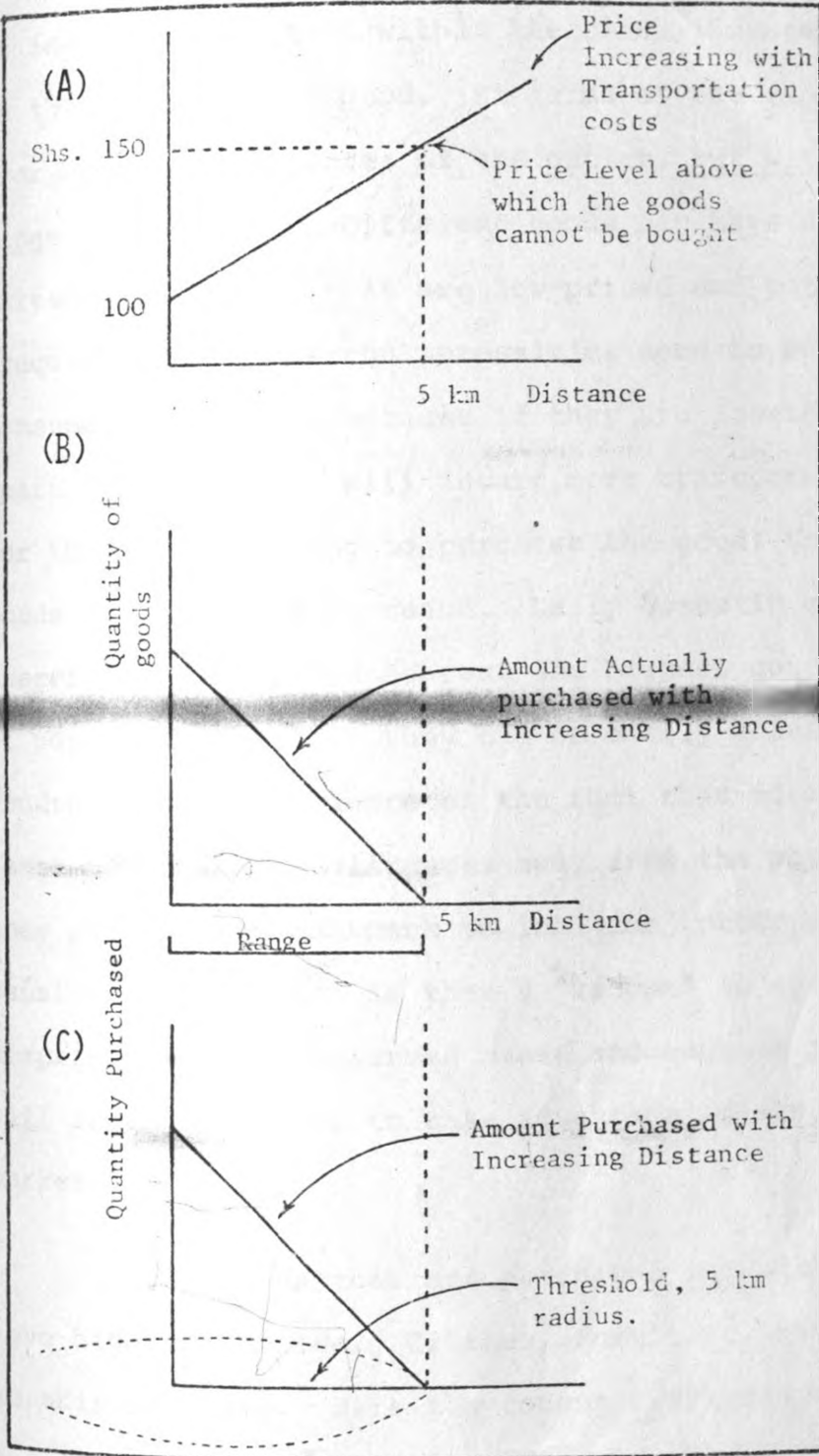


FIGURE 8-4: Range and Threshold of a Good. Amount Purchased of Any Good Decreases with Distance. (SOURCE: J.B. Faust and Anthony de Souza Economic Landscape. (London. Charles E. Merrill, 1978).

be all the consumers within this range in all directions. It includes everybody within the circle, whose radius is the range of the good. In terms of the linear market everybody on both sides of the outlet, but within this range is included. Different goods can have different thresholds. Goods that are low-priced and purchased frequently as short-run necessities need to be near consumers. This is because if they are located farther apart the consumers will incur more transportation costs (or the pain of going to purchase the good) than if the goods are within easy reach. Daily domestic goods therefore are located nearest the highest concentrations of population so that they can be easily accessible. Producers are well aware of the fact that if they placed these goods longer distances away from the population they will cause consumers to look for other alternatives. Usually what happens is that a "vacuum" is created comprising of the unserved area; and another producer will locate therein, to take advantage of the unserved market.

Costly goods that are purchased infrequently will have high thresholds. Clothes, furniture, etc., fall in this category. Here the consumer travels only once in a long time to purchase the good. Its durability will determine the frequency of purchases and sales among the population. So in most cases there is likely to be a lower density of population per square kilometre requiring that good at any one time. This is because

those who purchased the good have still <sup>have</sup> not unexhausted stocks of the good - until may be, an item of furniture breaks, or the clothes are worn out. To keep those producers going and in the daily process of production the area served by them needs to be large; so that they can be guaranteed at least a few customers every day. Like the low threshold area goods, the range of these goods is demarcated by the line where the price of the good equals the transportation costs of obtaining it. Goods with low thresholds are called low order goods, and those with high thresholds are high order goods.

In this simple model, a series of demand triangles for all outlets along a straight line will result. If they are too many, the demand triangles will intersect with one another as shown in Figure 8-5. The number of demand triangles along the straight line will be such that can just manage to stay in production for each order of goods. Any addition will be forced out of the market; or will force another inefficient outlet off the market if it can manage to stay. This will be the straight line spatial equilibrium shown in figure 8-5. In this diagram lower order goods are depicted spaced close together in this spatial equilibrium as at centres a, b, c, d, and e. They are also low priced to indicate their <sup>and everywhere</sup> ubiquity, and the fact that any high prices will cause the consumers to purchase them elsewhere. Their thresholds (market areas), as dictated by transport costs, are small. Higher order goods will occupy market

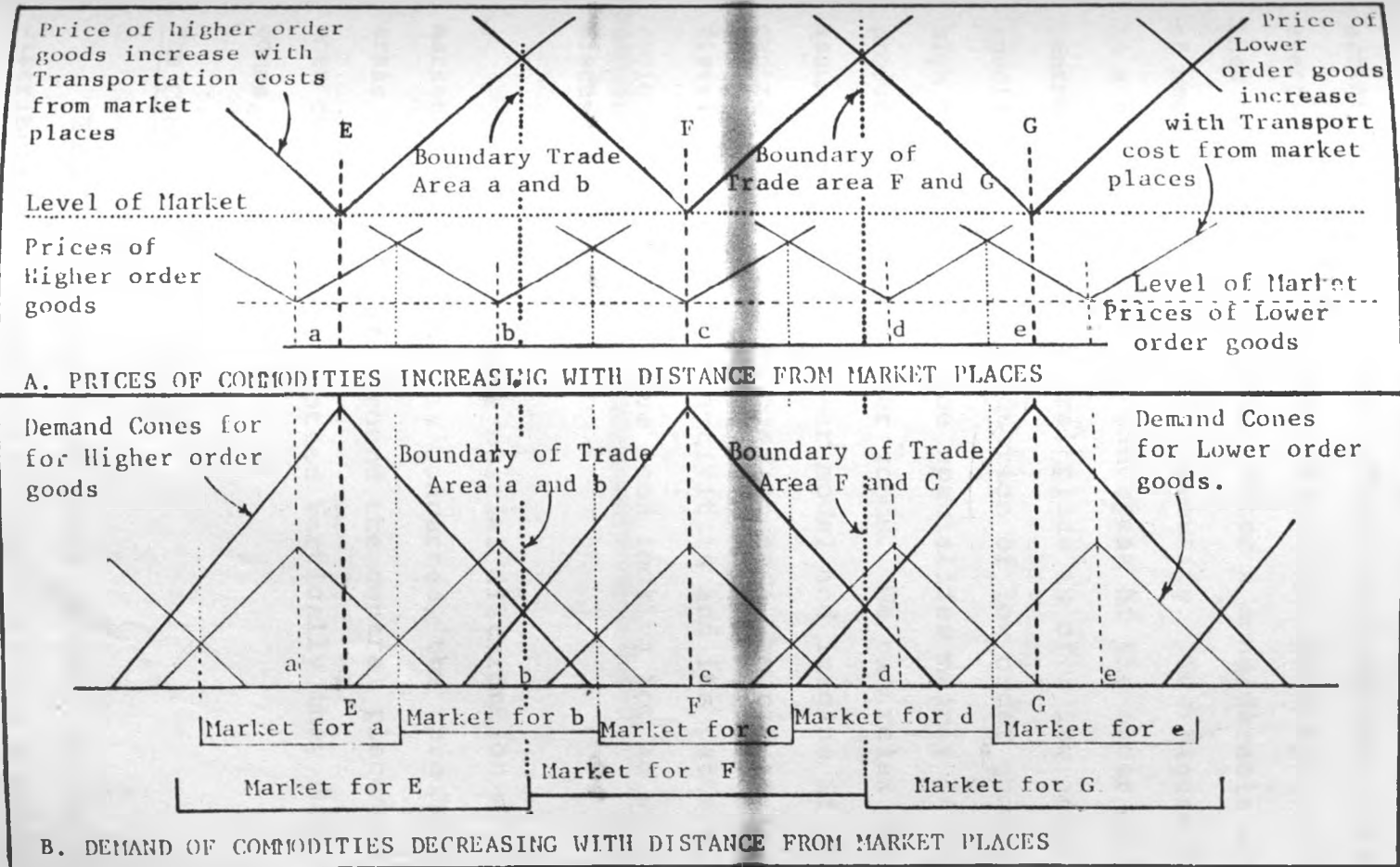


FIGURE 8-5: Demarcation of Trade Areas of All Orders of Goods.



places E, F, and G. They have larger thresholds (market areas) and longer ranges as shown by the extent of their markets. Their high market price everywhere reflects their relative scarcity; so that they can be obtained only after a considerable amount of specialization in the community. See figure 8-5 A. In a similar manner we can speak of the order of a central place. A central place is of a low order if it specializes in the production of low order goods. A high order central place specializes mainly in the production of high order goods. We can relax the assumptions of our linear model and imagine if these central places spread over space. The nature spatial distribution of these activities and its pattern is what regional scientists have been looking for as we shall discuss below.

In the case where spatial distribution of the market areas of goods is concerned, the threshold areas become circles around the central places; and when the values are plotted vertically they form demand cones.

### The Central Place Theory

This is a model that tries to explain the spatial distribution of human activities within a region. The model as it stands in contemporary location theory is the result of the efforts of two pioneer regional

(2/1)

scientists, Walter Christaller and August Lösch.<sup>21</sup>  
Their works were in turn inspired by those of earlier  
economists like Von Thunen, Launhardt, Weber, and others.<sup>22</sup>  
Both Christaller and Lösch started from different  
viewpoints - or "resolution levels" and both got to the  
same basic pattern of the distribution of central places.  
Christaller started from the highest order of central  
places and Lösch from the lowest order. The reader is  
referred to their works for detailed information.  
However, the model will be outlined as it appears in  
its simplified form from each of the two scientists.

#### Walter Christaller

Christaller began his analysis by considering the  
countryside around him, the arrangement of cities, and  
perhaps wondering whether the natural occurrence of  
settlements would be somewhat of a regular pattern - rather  
than a completely random pattern. In order to accomplish  
his investigation he considered the "nature of central  
places", and the factors that he thought were important  
in bringing about centralized and specialized service  
areas from the ordinary agricultural countryside. First  
of all he assumed that in the physical space, the  
crystallization of mass around a nucleus is an elementary  
form of order. We have this pattern of arrangements in  
molecules, atoms, and the solar system. According to him,  
the same principle could well be utilized to describe the  
tendency of human activities to be centralized - hence  
the existence of urban areas all over the countryside.

Centralistic principles apply to towns as centres of regional of ~~regional~~ human communities. Towns become receptacles of the most specialized and commercialized aspects of regional life. Towns function as central settlements for many activities meant for the benefit of their periphery. He thought that the best term to describe these centres is a "place". This word was considered neutral because it does not apply specifically to either towns, political communities, or economic units. The word includes the farthest area served by any activity based in a centralized nodal community. A place may be larger or smaller than a settlement.<sup>23</sup> According to Christaller the population size and the importance of central places are not necessarily synonymous; but they may be closely coordinated. The population of the nodal hinterland, however, indicates the relative importance of a central place. The centrality of a place is a term that denotes the relative importance of a place with respect to the region surrounding it - how much its services are required in this particular region or the level of demand in the region for its services. Thus central places may have higher, lower, or decreasing centrality. The concept also means that certain specialized goods and services are available for sale to the periphery from the nodal area. The importance of a central place consists not so much in the production of goods as such; but in the offering of these goods and services to the peripheral area. In some cases, least cost locations of some industries need

not be found in central places.<sup>24</sup>

The commercial functions of a central place indicate its economic centrality with respect to minimizing the distance from the region to it, and from it to the region. Christaller proposed the concept of a complementary region which connotes mutual interdependence between the central place and its peripheral area. The size of a complementary region is fairly constant, because its radius is a function of economic distance, or the mean range of the goods produced in the peripheral area. This is the mean distance that a dispersed population is willing to go in order to purchase a good offered at a central place.<sup>x</sup> The attraction of a central place to the peripheral or the complementary area does not depend completely on this distance, but also on the variety, quality and the price of the goods and services available in the central place. These in turn depend on what volume of business the businessmen providing them expect from the complementary region. If the effective demand for a particular good or service within the complementary area is too small to guarantee the supplier's a satisfactory income, then the good will not be offered for sale. This means that the density of population is critical in determining the variety of central place functions and goods. Effective demand for these will depend on the peripheral populations' income and tastes. Christaller therefore concluded that the "..... consumption of central goods is

decisive in the development of central places."<sup>25</sup>

Having outlined these assumed characteristics of central places he set off to analyze their distribution, and those factors affecting such distribution. In order to be able to simplify the reality of the complex regional structure he built a theoretical framework based on the following assumptions:

- (a) The subject region is a homogeneous plain without any relief that may disturb this uniformity;
- (b) resources, soil fertility, and environment are homogeneous throughout the region;
- (c) there is uniform distribution of rural population throughout the subject region; and
- (d) the region is homogeneous in terms of accessibility - unitropic; and the mode of transportation is homogeneous among the population.

Using these assumptions he examined the arrangement of central places in Southern Germany empirically; and arrived at a conclusion that each order of central places would have complementary regions of the same size all<sup>6</sup> across this uni-tropic space. These would take a hexagonal form. This form is the most likely conceptual form of a complementary region (or a

tributary area) because nearly all points on its outer fringe are almost equidistant from the centre. A circle would be the most ideal form, but then geometrically, it would leave unserved areas in between the complementary areas. To avoid this, the advantages of the smooth ring of the circle were abandoned in favour of the hexagon. This made all tributary areas equal, covered the whole subject region efficiently, and left all points on the outer rim of each hexagon almost equidistant to one another from the periphery. All other polygons do not fulfil the requirement of efficient service and equidistance of the outer limits from the central place. Figure 8-6.

Empirical examination by Christaller disclosed that the spacing of the lowest orders of central places would be formed by market hamlets or villages. These would form small diameter hexagons, and would lie about 6.96 kilometres apart. Superimposed over this network of low order central places would be the second order - also following the hexagonal shape in carving out their tributary areas - and so on, until there would be one major metropolis of the  $n^{\text{th}}$  order that serves the entire countryside. All the orders would be ~~nested~~ within one another in the sense that central places of a given order and their tributary areas are included within the next higher order. In turn, these higher order central places are included within the tributary areas of the places of the next highest order, and so on,

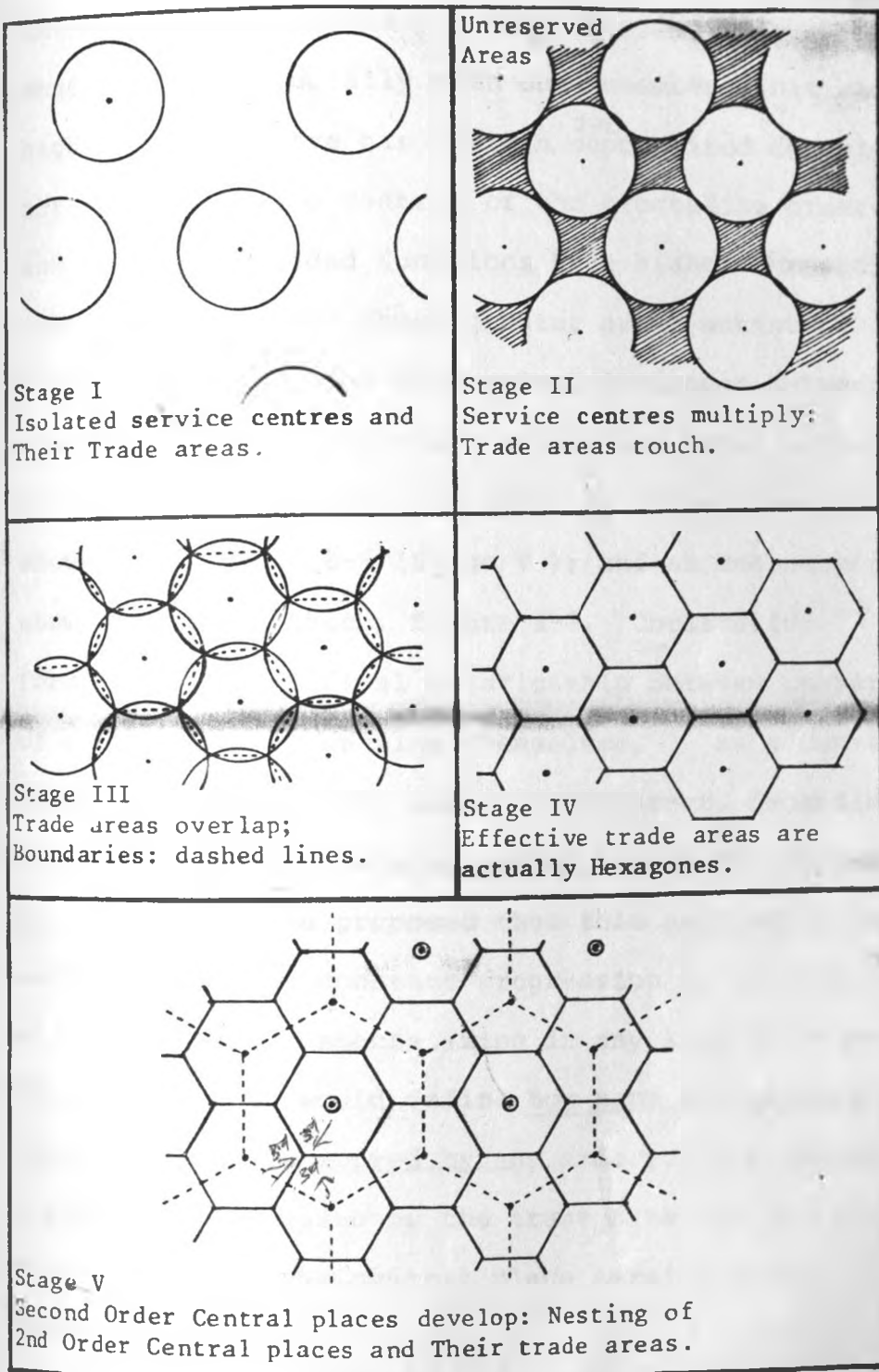


FIGURE 8-6: The Development of Hexagonal trade areas over a uni-tropic space. (SOURCE: Ray Northam, Urban Geography New York, John Wiley, p.131).

throughout the hierarchy. This is a logical observation, especially when one remembers that each higher order centre has certain <sup>spe</sup> specialized functions not present in the centres of the preceding orders, and that these added functions have higher thresholds, greater ranges, and thus, greater area~~x~~ extent of tributary areas. The theoretical distances between central places of different orders are shown in table 8-2; and their nesting, as shown by Christaller, is shown in figure 8-6 (Stage V); and as subsequently shown by August Lösch, figure 8-7. Christaller formulated an empirical relationship between numbers of central places serving themselves, as a constant numerical value, which would be different, depending on the purposes for which central places are supposed to accomplish. He proposed that this arithmetic constant would determine a constant progression up the hierarchy of central places specializing in any kind of function. This progression would define how many of the next lowest places are served by any order of the nested system. It is caused by the transportation and service requirements of the central place service under consideration.

For example, when one considers a central place system based on the marketing of goods and services (when the distribution of goods and services is of prime significance) this constant would have a value of 3. He called the constant "K" which means that the



TABLE 8-2

ORDERS OF CENTRAL PLACES AND INTERCENTER DISTANCES (AFTER W. CHRISTALLER)

Order Number	Order Name	Intercenter Distance (Miles)	Kilo- Metres
1 (lowest)	Market hamlet	4.35	7Km
2	Township Center	7.45	12Km
3	County seat	13.04	21Km
4	District seat	22.36	36Km
5	Small state capital	38.50	62Km
6	Provincial head city	67.07	108Km
7	Regional capital city	115.51	186Km

SOURCE: Based on W. Christaller, Die zentralen Orte in Suddeutschland (1933), as presented in Edward Ullman.. "A Theory on Location of Cities," American Journal of Sociology, XLVI (May, 1941).

K26

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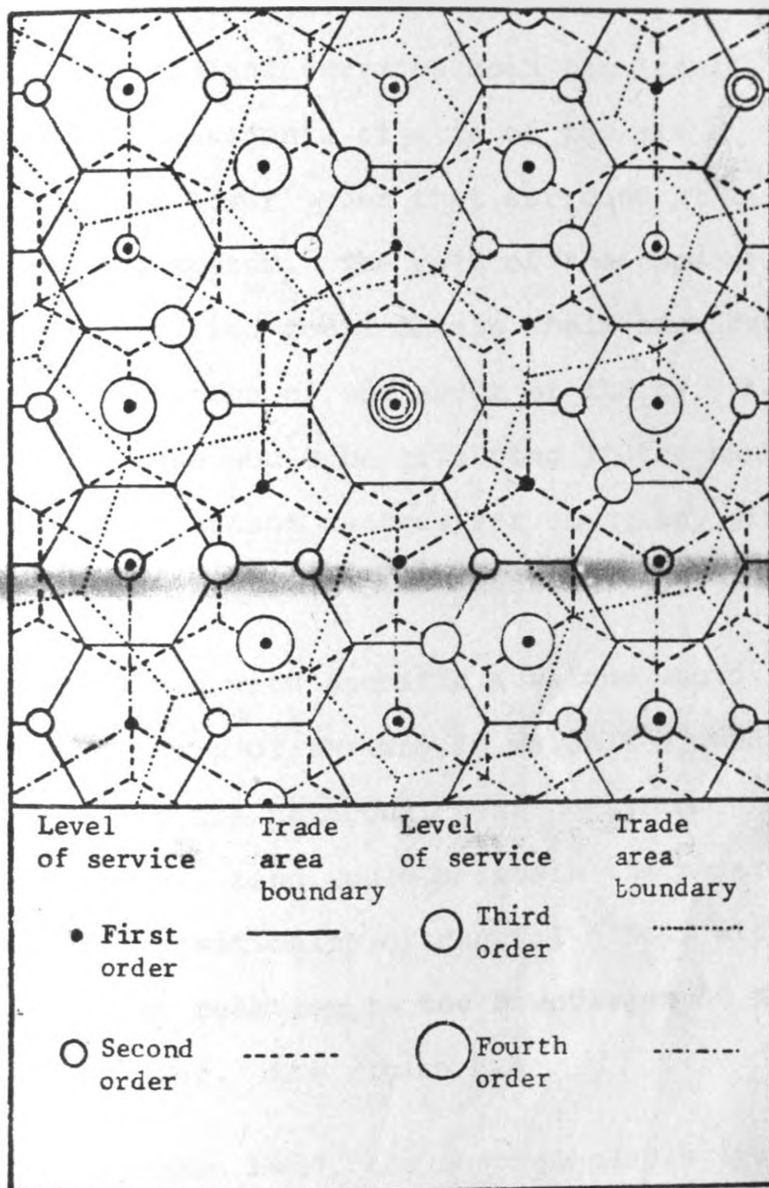
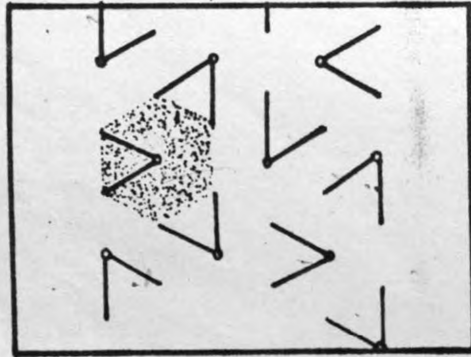


FIGURE 8-7: A Theoretical arrangement of orders of central places and their hinterlands. (SOURCE: Walter Isard; Location and Space Economy Cambridge Mass. MIT Press, 1956; p. 207).

K value of a marketing system of central places would be (or  $K = 3$ ). In this system each city of any order of choice could be served by 3 cities of the next largest size. It therefore follows that a given city of any order provides goods and services both for itself, and to a third of the residents of each of the six satellite cities of the next lower order that surround it in the hexagonal nesting system. The rest of the population of the satellite cities could obtain their services from the nearest cities of the order of choice. The K value in this case would be referring to the number of economically dependent centres served by any given centre of any order that we could pick.

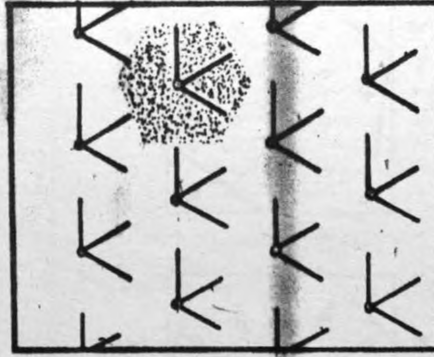
Central places with specific K values would have a unique pattern of the way in which they would be arranged within the hexagonal nesting system. Arrangements of this kind would maintain the hexagonal pattern, but the positioning of central places within the nesting and in relation to the boundaries of the hexagon would differ. See figure 8-8

If, on the other hand, the central places system is meant to maintain the political and administrative control, the transportation and service requirements would induce a spatial hexagonal arrangement with a K value:  $K = 7$ . This what Christaller called The Administrative Principle. In this system an administrative centre of any order serves itself and 6 adjacent lower order centres. Again there is a single node or focal point that serves



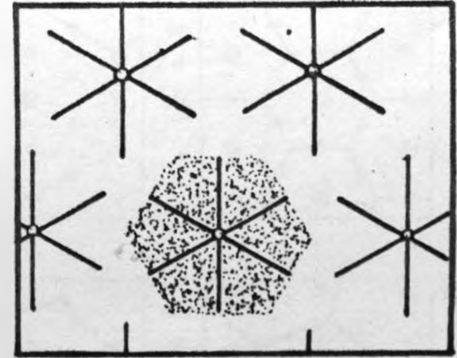
1. Marketing Principle

$k = 3$



2. Traffic Principle

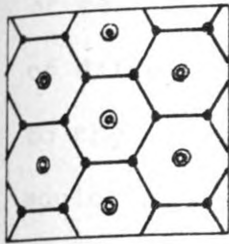
$k = 4$



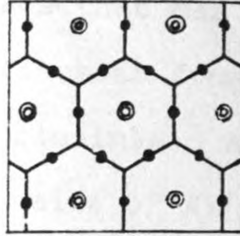
3. Administrative Principle

$k = 7$

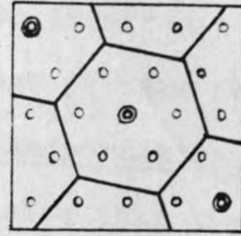
FIGURE 8-8: The nine smallest hexagonal territories in the Loschian K. System. (SOURCE: Peter Haggett, Locational Analysis in Human Geography: London: Edward Arnold Publishers, 1965; pp. 119.



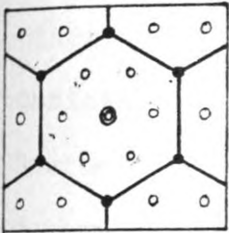
k = 3



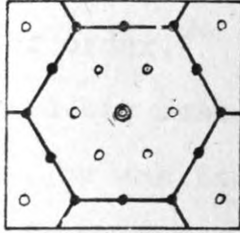
k = 4



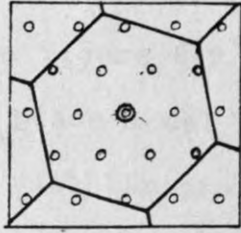
k = 7



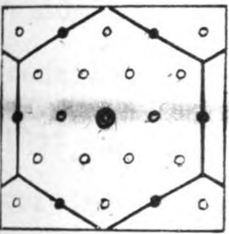
k = 9



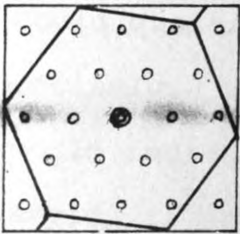
k = 12



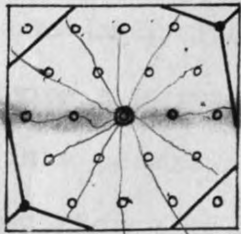
k = 13



k = 16



k = 19



k = 21

FIGURE 8-9: The three main nesting principles - according to Walter Christaller. (SOURCE: Haggett, Locational Analysis, p.122).

as a functional centre; but the region has a pattern of central places that has come about as a result of different processes from that pattern pertaining to the market principle. A transportation principle would have a K value of 4; meaning that any node of any order would serve itself and three other central places of a lower order.<sup>26</sup> See figure 8-9.

Christaller tested his central place model in Southern Germany, he was faced with the problem of determining the centrality of central places - he wondered how he could quantify the importance of central places precisely. He chose a surrogate that he thought would indicate this centrality - telephone service. For example, if the importance of a central place is assumed to equal the number of telephone connections (perhaps because of necessity and the business transacted through the lines), then a place with one hundred telephone connections would be more important than the one with fifty; the latter would in turn rank higher than the one with thirty; and so on, down the hierarchy of central places. The number of these connections was found to be closely correlated with population size of a central place; and therefore confirmed the central place's importance. Using this surrogate he was able to isolate central places of various orders as found in Southern Germany around 1933; shown in figure 8-10. This importance was calculated in accordance to a formula that he developed using the telephone connection

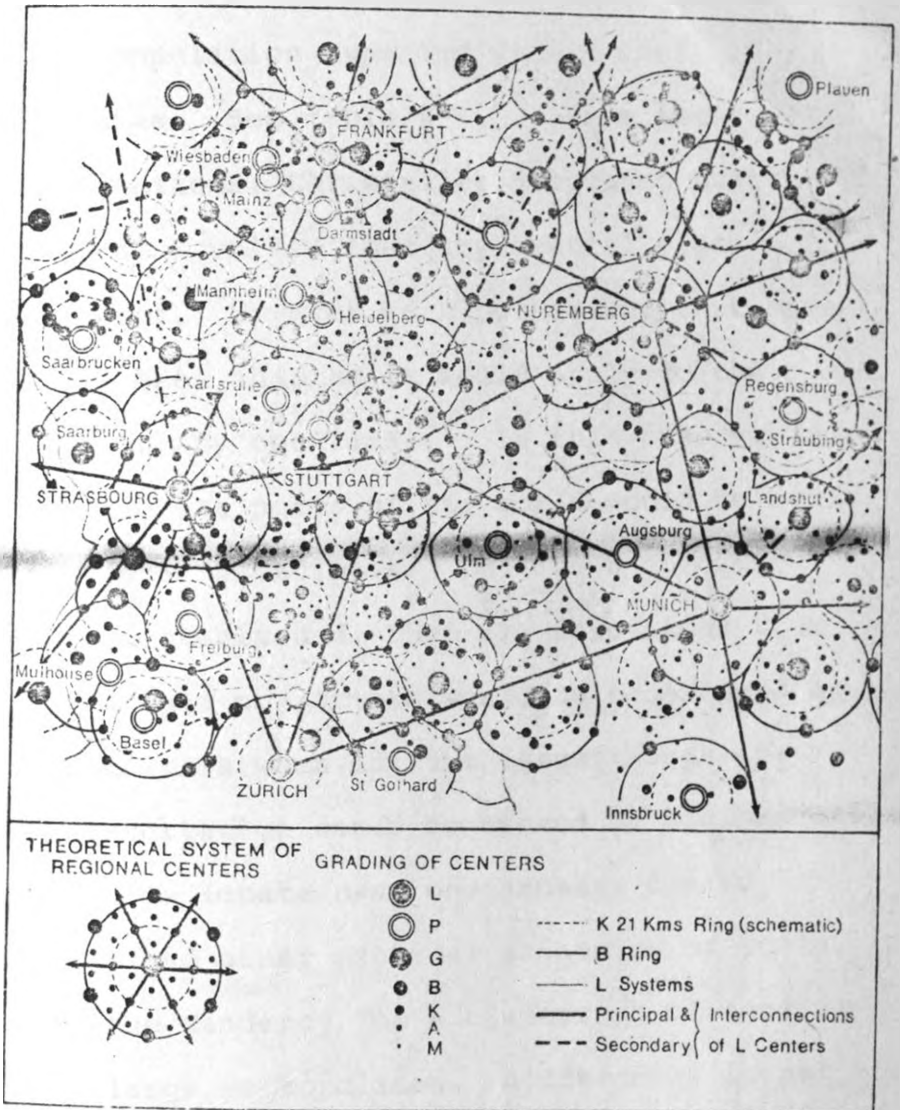


FIGURE 8-10: Actual Spacing of Central Places in Southern Germany during Christaller's time. (SOURCE: J.B. Foust and A.R. de Souza, Economic Landscape, p.75).

surrogate. Having developed these orders he was able to construct a table of urban hierarchy, with inter-central place distances among identical orders, the population expected of each central place of each order, the expected tributary (complementary) areas for each order, and the population expected within each complementary area. See table 8-3.<sup>27</sup> From these empirical examinations, Christaller concluded that there are several K values that any central place system might adapt. However he hypothesized that once one K value has been adapted it would apply to the entire network at any one time.<sup>28</sup> In this case various networks in different parts of the world would be built on any of his three principles. In case a specific arrangement was established, then the deviations from the normal principle or pattern would be occasioned by actual irregularities when all the assumptions are relaxed. A distortion could be caused by agglomeration when central place locate near one another due to infrastructural and other external economies of scale. This reflects the tendency for a clustering of central places around large metropolises. Differences in per capita income of population over space, the degree of localization of resources, the passage of time, etc., all would affect the regularity. Nevertheless, he thought that a rough pattern of this nesting would be found in Southern Germany, most of Germany, and Western Europe. The other characteristic approach of his is that he built his hierarchies from the largest



TABLE 8-3. The urban hierarchy in South Germany

Central Place (1)	Towns		Tributary Areas	
	Distance Apart (2)	Population (3)	Size (Sq. km) (4)	Population (5)
Market hamlet (Markort)	7	800	45	2,700
Township center (Amtsort)	12	1,500	135	8,100
County seat (kreistadt)	21	3,500	400	24,000
District city (Bezirksstadt)	36	9,000	1,200	75,000
Small state capital (Gaustadt)	62	27,000	3,600	225,000
Provincial head city (Provinzhauptstadt)	108	90,000	10,800	675,000
Regional capital city (Landeshauptstadt)	186	300,000	32,400	2,025,000

Source: E.L. Ullman (1941), American Journal of Sociology.

metropolises to the smallest. He hypothesized that market areas tended to descend in size from a large region dominated by a metropolitan centre capable of supporting the highest order of goods "national commodities", to the area so small that it can only support the goods with the least threshold (lowest order) or "local commodities".<sup>29</sup>

#### August Lösch

Following the original work of Christaller that was published in 1933 a fellow German, August Lösch, tried to rationalize the major postulates advanced by Christaller. He felt that the fixed K value proposed by Christaller was too imposing an assumption; and therefore he developed his model which allowed for differing K values to be superimposed on one another. Since there are many ways that this can be done, Lösch added the requirement that the overlays should occur in a way which maximized the number of coincident places. He did this by centering all of the hexagonal nets on one place, and making it the largest city in his landscape. He rotated each net slightly around the centre so as to affect a maximum number of common central places. This, in turn, gave a minimum number of total centres in the system.<sup>30</sup> Figure 8-11 shows a hexagon from each of the ten K fields, each with a common centre. Lösch labelled with numbers the ten hexagonal systems; and provided a representative hexagon from each system.

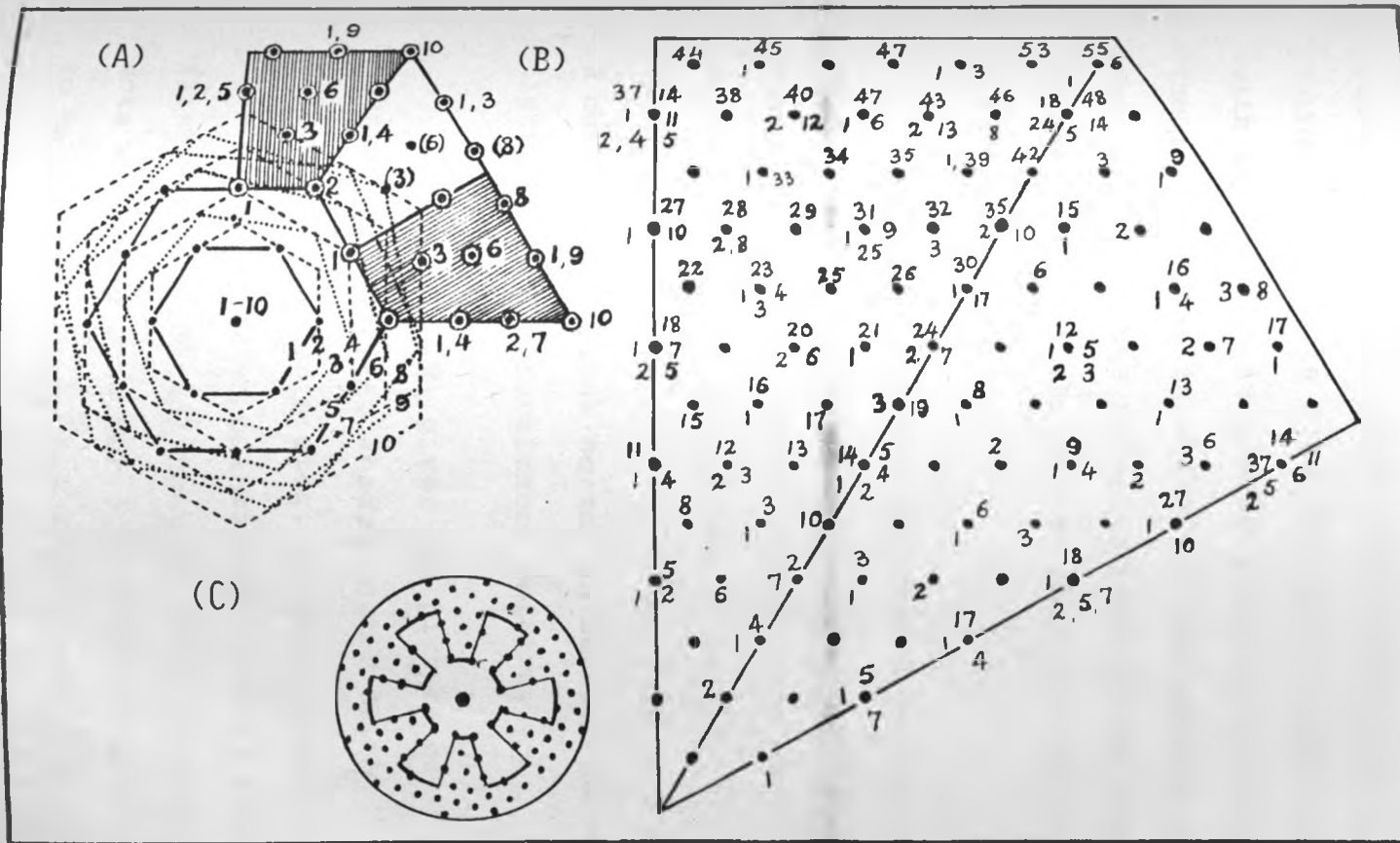


FIGURE 8-11: Distribution of Settlements in the Loschian landscape. (SOURCE: David Segal: Urban Economics Homewood, ILL, Richard D. Irwin, Inc. 1977; p.46).

Only this hexagon was shown after the nets had been rotated so as to maximize locational coincidence. This is seen in the portions of three sectors issuing from the central place, show in the upper right hand portion of figure 8-11(A). The simple dots indicate original settlements; with the numbers in brackets indicating the size of the market areas in which the settlements are centred. The encircled dots refer to co-incident market centres, with the size of the market shown alongside without brackets.

Two sector portions are shaded to illustrate the relatively high incidence in them of multiple-centre towns. These tend to be larger towns, with the size of the town being determined in part by the size of the largest market for which the town is simultaneously a centre. The blank sector in between shows a relatively light density-of-settlement pattern.

Figure 8-11(B) gives the picture of the outer section of the first shaded sector on the left and the following unshaded sector, moving clockwise. The relative density of coincidence is more visible on the first sector (shaded) than on the following sector. The dots which are unnumbered in both sectors do not seem to be centres of any importance, rather than 1st order centres. A simplified Lösschian landscape is shown in figure 8-11(C).

There are two interesting points to note from this analysis: firstly, that the alternating centres are in general agreement with the efficiency of transportation over space. Thus, for space economy, it may be necessary to have a range of cities of different sizes which they economize on infrastructural investments such as power lines, roads, etc. In this case the centres would be located astride the transportation axes emanating from the major metropolis of the region. A further economic advantage accrues in relation to link roads, or ring roads, and other parallel infrastructure; so that the busiest sectors (or the high density sectors) can be efficiently served by non-radial infrastructure. Economy is achieved through lesser outlays required to construct these non-radial networks, Lössch reported that when he was writing (1939) the environs within a 96 kilometre radius of Indianapolis (Indiana) and Toledo (Ohio) in the U.S.A. had similar settlement densities and density of settlement landscapes to that of figure 8-11(C).

The second point relates to Lössch's findings concerning the city production and size. In the Christaller system, cities belonging to the same order have identical production activities - specializing in goods of a similar threshold order. In the Lösschian landscaped this is not required. A city could be of the same size as the other one, but both could be producing goods of different thresholds.

Using his notation, two central places which produce goods having market sizes 2, 6, 20 and 1, 2, 3, 5, 12 may be similar in size. The economic output for each good with a different market size may be quite different, except those of the good with the market size 2; which is commonly produced in both centres.

Lösch's methodology of analysis and empirical examination (unlike Christaller's) began from below - the smallest economic unit. Using similar assumptions to those of Christaller he plotted the simplest landscape that is mainly agricultural; and hypothesized that this lowest order network, (and all the higher orders) would be having hexagonal trade areas. If there is a homogeneous plain with equal distribution of population - hence equal consumer density per unit area; if consumers are assumed to have equal incomes, tastes and preferences; their product homogeneous, and the production costs at the plants (central places) are equal; they achieve a spatial equilibrium when their trade areas are hexagonal in shape - for similar reasons to those advanced by Christaller. i.e. the entire space has to be served efficiently and effectively.<sup>32</sup>

Lösch hypothesized that as a result of specialization over time, and economies of scale, some of the smallest farmers find that they can produce some goods more efficiently than others. Eventually they opt to produce those goods that are not agricultural - so that

specialization develops over space - where farmers devote their time on farming while they depend on other members of the population for haircuts, beer, arts and crafts, etc. Each of these specialized services locates itself so that it acquires a spatial monopoly from other identical services. For similar reasons, hexagonal trade areas for these services tend to develop over time. Different activities but of the same order tend to cluster in one central place. Agglomeration economies operate in some of these centres including higher order services into them. This, and similar tendencies, build up a hierarchy of central places from the smallest to the highest.<sup>33</sup> As we saw earlier, identical orders of central places need not necessarily have the same order of services. This may, however, be the tendency.

**Lösch - Christaller Central Place System:  
A Comparison of Approaches.**

The Central Place Theory as it stands today owes its existence and rigour to both theorists. Researchers take the model built as a very good descriptive approximation of what may be expected to happen in reality. One major criticism is that it is static, essentially descriptive, and does not necessarily reflect the dynamic reality.<sup>34</sup> In addition it is not predictive. No economic variables or parameters such as technology, human and other resource variations are included in the model. Therefore, one cannot formulate an economic policy or a forecast on the basis of the

Central place model; because it does not explain what may happen over time. For example, when L<sup>ö</sup>sch tested the model in early 1940's around Iowa, U.S.A., it seemed that the model had some resemblance to the spatial distribution and hierarchical arrangements of central places. Improved communication technology of the second half of the Twentieth Century has brought out changes in individual central place arrangements; so that there is now efficient accessibility between central places of all orders. New York can offer the people of Iowa some of the lower order of goods that was not anticipated in the late 1930s. One can conclude that whereas there is some hierarchical arrangement and relationship between central places, the situation has changed. Therefore, this simply descriptive, static model cannot explain what the direction of change is or has been. This way, both models share the blame in the aspect concerned with what may be termed as overgeneralizations.

Christaller and L<sup>ö</sup>sch built their models from different resolution levels. Christaller began with the highest order, down to the lowest order; and L<sup>ö</sup>sch worked in the opposite direction. This is largely due to their methodology. Christaller's was basically empirical and depended on what was actually happening in Southern Germany. On the other hand, the L<sup>ö</sup>schian landscape was developed with greater economic rigour - perhaps because of his training as an economist. To L<sup>ö</sup>sch, the smallest firm was as effective as the largest



metropolis in serving as vital links to the nesting system of central places. When he got to the individual firm, the trade area was carved with neo-classical economic region. The economic rationalization of the smallest central place seemed to give a rationale for all the orders of the cities. Thus, Lösch's formulation is less rigid than Christaller's. It consists of a more continuous distribution of central places. It approaches reality in that central places of the same size used not necessarily perform the same functions. Larger cities, like in actual life, do not necessarily take on all those functions found in smaller cities. <sup>35</sup>

#### Isard's Modifications

Walter Isard<sup>36</sup> criticized equal area patterns of hexagons proposed by Christaller and Lösch. He asserted that regular hexagons are unlikely to occur in practice because of urbanization economies, agglomeration economies and economies of urban concentration. Those economies are manifested in savings in production costs obtained by activities when they cluster around certain points. They include access to larger markets, other urban commercial facilities, and infrastructure. Isard therefore said that nearest the areas of maximum economies of this kind the trade areas of central places of all kinds are likely to be smaller hexagons than farther away from these concentrations. Hexagons then would be

modified to accommodate the spatial layout where their size decreases as one approaches the larger metropolises. See figure 8-12. According to him the regular hexagon is a pure concept for geographers and regional scientists, just like the perfect market is a pure concept for economists.

#### Developments of the Central Place Model

Following Losch and Christaller many empirical studies have been done to try to see whether the model can be applicable to real life situations. One of these was done by Losch himself in Iowa; when he found close relationship between the hypothetical propositions of his model, and those found in the city arrangements within the State of Iowa and upper mid-western U.S.A.<sup>37</sup> Similar empirical relationship was found by various scholars - notably by John Bochert and his team from the University of Minnesota.<sup>38</sup> The purpose of Bochert's investigation was to provide some guidance to the planning of development activities involving cities and town in this area. No attempt was made to project growth, or recommend development policies for any specific urban place. But, as a basis for any subsequent efforts with similar local applications, the study developed some interesting and useful findings regarding characteristics and growth tendencies of central places; corresponding conceptually to the "orders" of the theoretical Loschian-Christalleran central place hierarchy.

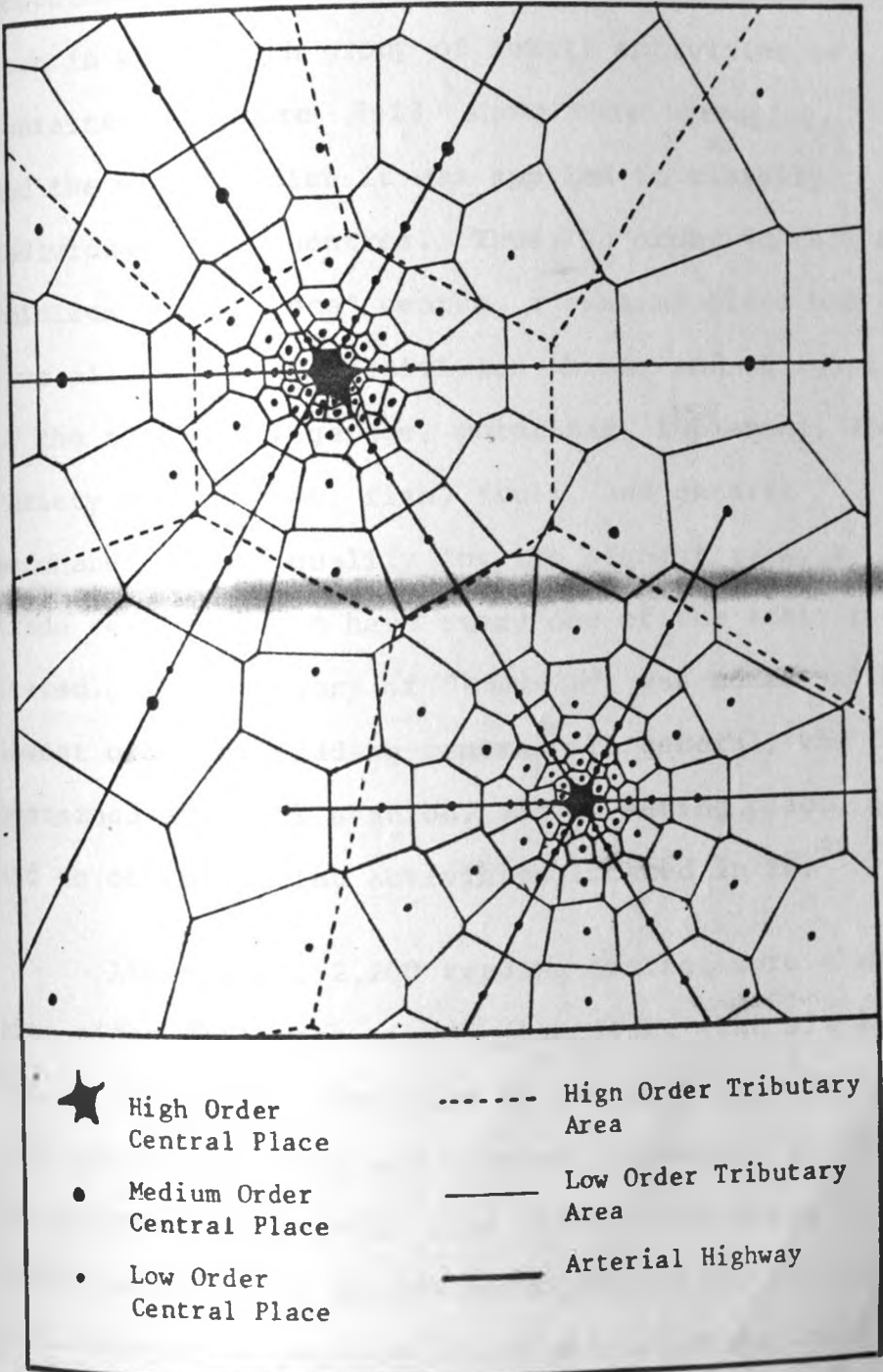


FIGURE 8-12: Spatial arrangement of urban tributary areas as affected by high order central places and transportation routes. (SOURCE: Ray M. Northham Urban Geography New York, John Wiley, p.137.)

Bochert and his team first listed the retail and wholesale activities; and arranged the urban places containing them according to the smallest size of the town in which each group of retail activities is contained. Figure 8-13 shows this grouping, and the way in which it was applied to classify individual trade centres. Thus, in order to rank as a "minimum convenience" centre, a central place had to have all of the six activities shown; and at least two of the next four: garage, motor-car, implement, dealer, variety store, meat, fish, fruit, and general merchandise. To qualify for the highest rank, a trade centre had to have every one of the activities listed. The category of "hamlets" was added as the lowest order of trading centre. In general, the "hamlets" contained a petrol station, and an eating place, but had no other trading activities located in it.<sup>38</sup>

Altogether, 2,200 trading centres were classified into eight different sized categories. The six largest centre sizes are identified in figure 8-13, along with the major production and service activities found to be associated with each size class. The Lösch-Christaller model assumes that cities belonging to any particular size category engage in all of the economic and trade activities of lesser sized cities, plus a few of their own rank and order. This assumption seems to be supported by the Bochert mid-western study, as shown in figure 8-14.

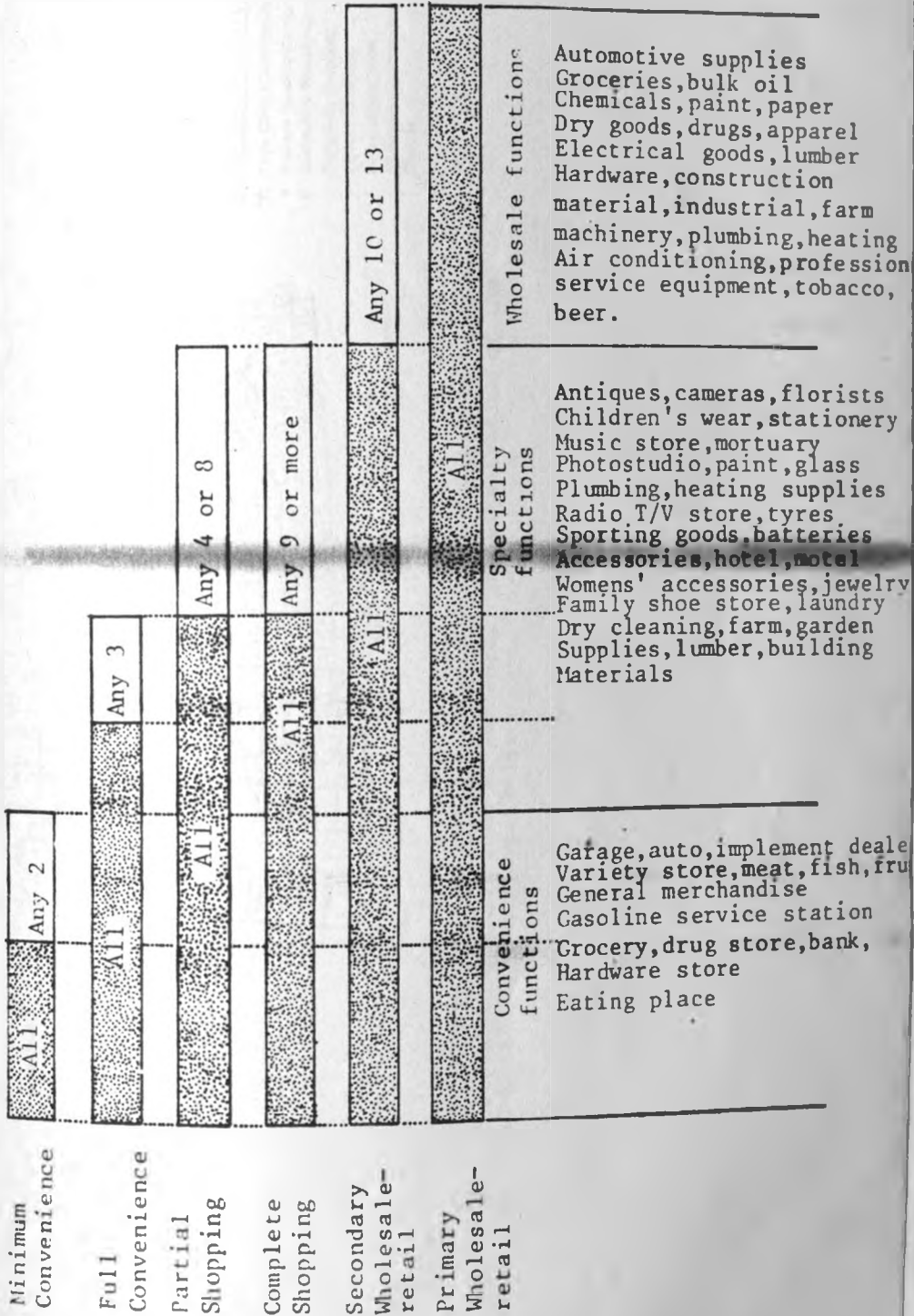


FIGURE 8-13: A classification of retail and wholesale activities in hierarchical order (SOURCE: John R. Bochart, "The Urbanization of the Upper Midwest," Upper Mid-West Economic Study, Urban Report No.2 Minneapolis, Minn. February, 1963; Figure 4, p.12).



FIGURE 8-14: Spatial Distribution of Trading Centres in the Upper mid-west U.S.A. (SOURCE: John R. Borchert, "The Urbanization of the Upper Mid-West" Figure 5, pp.13-14.

Empirical studies and applications of this model have been made throughout the western world. The model lays emphasis on retail trading and distribution of service activities. Accordingly it can be applied with the best results in flat lying agricultural regions, where such retail and service activities prevail over the dislocations that the uneven distribution of resources (mines, quarries, etc) and topographic features may cause. An example of such a study which appears in the literature is shown in figure 8-15; which shows trade centres in south western Wisconsin, U.S.A.<sup>39</sup> and available in each trade centre. Orders of trade centres are clearly visible in this diagram.

A number of recent studies have applied the model to the internal structure of business activities within a city. Any given city is viewed as having a large central business core - analogous to the central place of the greatest hierarchy in Lösch-Christaller theory. The core is then surrounded by satellite suburbia of a lower order; and each suburb may have a network of shopping centres, each with its own large cluster of activities. Finally, surrounding each of these may be a set of neighbourhoods, each with its own convenience facilities or neighbourhood shopping centres. These shopping centres tend to be the lowest level trading centres in the business structure of a city. One such study has been done in Nairobi by Kimani<sup>40</sup> and he found evidence of this hierarchical arrangement in

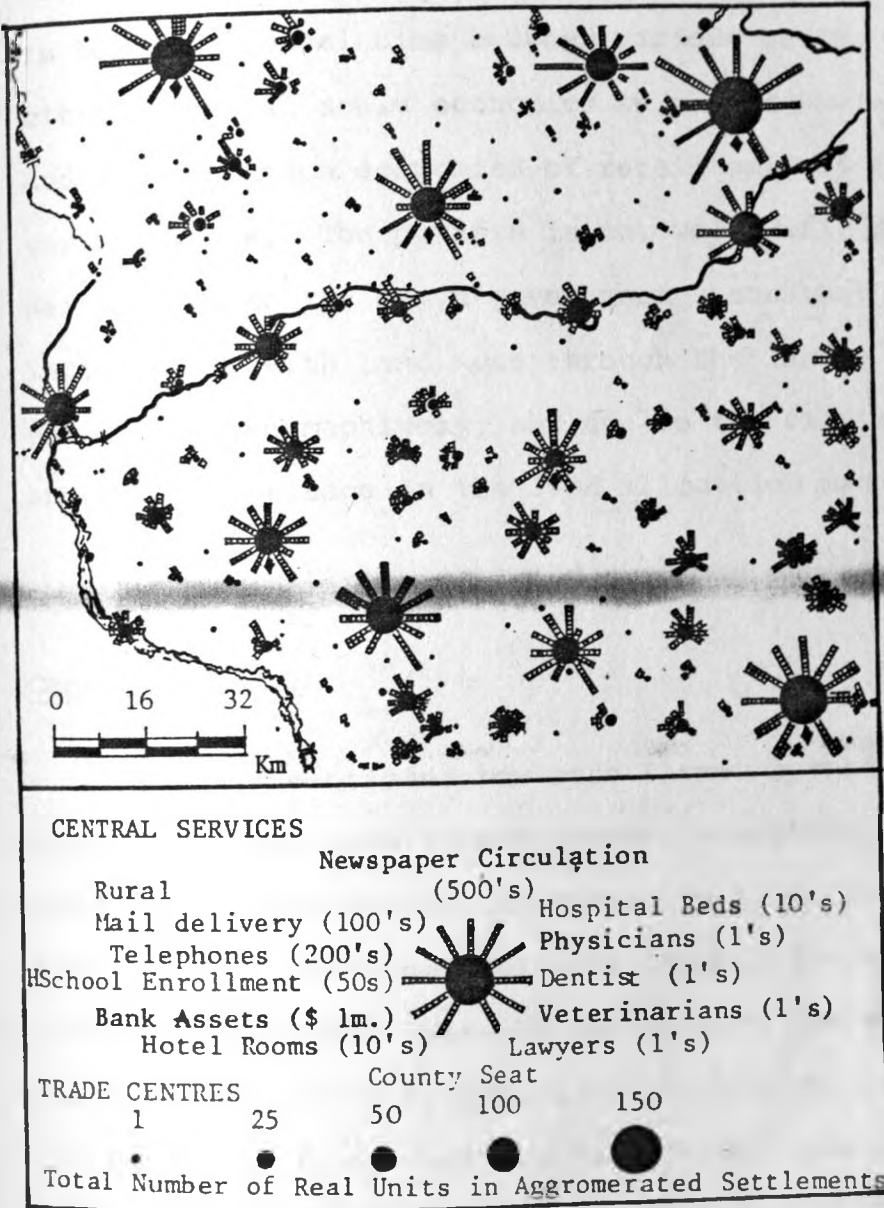


FIGURE 8-15: Trade Centres in South Western Wisconsin. (SOURCE: John E. Brush, "The Hierarchy of Central Places in South-Western Wisconsin," Geographical Review, Vol. 43, July, 1953, p.388).



redimentary form; the size spacing and order of these places being determined by the level of demand for goods and services, transportation costs (usually measured in terms of travel time between various points in the city), internal scale economies in retail operations, and agglomeration economies of retail outlets for various goods. The pattern is not well defined in Nairobi due to the Kenya government's constant interference with land use through the land administrative machinery, and due to the city's colonial and racial heritage in the land allocation mechanism.<sup>41</sup>

### Central Places' and Regional Growth.

#### Central Places.

We have mentioned how each farmer spread out over the iso-tropic space cannot produce everything he needs; and how the most successful farmer in providing a different good from agricultural commodities specializes, and locates himself where he can attract the greatest number of customers by minimizing transport costs over the plain. This specialized firm forms (along with the others located in the most accessible location) a mutually interdependent community that tends to thrive because of external economies of being near one another. The growth of these activities, and the initial first order centres is largely aided by these agglomeration economies.

Agglomeration economies are external economies of scale arising from the location of many producers in the same vicinity; and when these producers benefit from one another. For example : some of the producers may be providing raw materials or finished products that are used in the manufacturing processes of neighbouring firms. When a firm produces raw materials or intermediate products that are used in the manufacture of finished goods by another firm, economists say that these two firms have an industrial linkage and in this case forward linkage. Backward linkage occurs when finished goods of a firm are used in the manufacturing process of the other firm. <sup>42</sup>

In addition to being industrially linked together, firms located in the same place may join together to share common infrastructure, common training facilities, common social amenities, etc. Each time such sharing takes place, substantial amounts of money are saved, and the firms thus realize external economies of scale in their production process.

Once these first order places are spread all over space, some unique advantages available in a few of them may cause these few to grow faster than all the others of their size. These advantages can be visualized when the assumptions of the iso-tropic space and homogeneity in resources, density of population and effective demand are relaxed. Some of the first order places are therefore more accessible than others,

have higher densities of population around them, higher effective demand, and perhaps more natural resources about them than the other towns of the same size. The producers of the second order of goods tend to choose these more accessible places, so that they can serve wider regions.

In turn, some of these higher orders get their advantages from their unique surroundings, and they develop faster, attracting third orders of services, while all the rest of central places remain as second order and first order service centres - and so on up the hierarchical orders: until, eventually, one of them may grow to be a large metropolis like Nairobi, London, or New York. In each of these hierarchical arrangements the spacing and ordering of consumer goods is defined in a pattern closely relating to what has been found out by Christaller-Losch, Bochart and others. Table 8-4 shows the orders of central places, their respective goods of service, and the distances between central places of each order.<sup>43</sup>

It must be borne in mind that this is just a rough order of goods, services, and spacing. The items listed in Table 8-4 are itemised in various patterns in real life - despite the fact that the basic pattern is discernible. This fact has been aptly pointed out by Josephine Olu Abiodun.<sup>44</sup> She examined the relevant variables that could be taken into account when studying central places in Africa using multi-variate analysis techniques; and the actual spatial distribution of

TABLE 8 - 4

CENTRAL PLACE HIERARCHY SERVICES AND INTER-CENTRE DISTANCES

ORDER	ORDER NAME	SERVICES	APPROX. INTER-CENTRE DISTANCES	
1.	Market, hamlet, village Centre	Canteen, Grocery shop, church, bar petrol station, Garage Restaurant, barber, primary school.	7km	4.35m
2.	Township (Divisional centre)	All the services of order one + Hardware shops, Post Office, Building materials, lumber products, clothing shops Local Govt. facility, Furniture, Social hall, Shoe repair, Secondary School	12km 24km	7.45m 15m
3.	County Seat (District Centre)	All the lower orders, and also Beauty, Banks, Insurance, Drug store (Chemist) specialized auto - repair, Laundry, Lawyer, Doctor, New auto sales, used auto sales, movies, plumbers, Auto accessories, Veterinarian, Radio services, motel, photographers, Music and auto sales	36km 64km	22.36m 40m
	Teacher Training College -junior college -Higher school Cert.			
4.	Small state Capital (Provincial Centre) Municipality	TV services, Bakery, printing services, soft drink factories, Agricultural processing factories, sporting goods, refrigerator sales, Tourist hotels, Provincial capital Electrical repairs, Dairy products, Indoor amusements, oil fuel bulk station, Grain depot.	62km	38.50
5.	Large Municipality (Provincial head city U.S.)	All the lower order services and Heavy industry, Real Estate, Large banks, Regional Distributors of manufactured commodities - large wholesale shops, etc., Newspapers, physical planning consultants, Railway depot, Port.	108km 322km	67.07 200m

ORDER	ORDER NAME	SERVICES	APPROX. INTER-CENTRE DISTANCES	
6.	City	Regional Commercial Centres Survey equipment, Large electronic Equipment - modulators, transmitters, etc : and services for these equipment, University Consultants of all types, Insect eradicators, Banks and Insurance headquarters	185km 805km.	115m 500m

This is just a rough order of the goods and services. They are intermixed in various patterns in real life, but the basic pattern exists, where the goods and services requiring large regions for their economical production the found in higher order central places.

Josephine Olu Obiodun

"Urban Hierarchy in a Developing Country"

Economic Geography Vol. 43 No. 4, 1967 pp 347-367

central places around Abeokuta, Eastern Nigeria, She came to a conclusion that the services considered as "basic" first order services in the socio-economic milieu of the western countries have very high significance in the subsistence socio-economic environments of Africa. The order of services is so reversed that an African town having such a "basic" service as a post office may be a very high ranking central place. This is because in the African socio-economic circumstances a telephone or a post office is not so much of a necessity as it is in the western world - it is in fact a luxury, and has a very high threshold. Her basic message is that a regional analyst in Africa should not be duped by appearances of the variables as they are found in western models and textbooks, but should examine each central place on its own merit; taking everything into account, before placing the central place in its appropriate rank.

#### Regional Growth:

It will be remembered that in regional analysis circles a region is as large as the context of the study requires. It can vary from a small village to a large sub-continent - depending on the range and the types of questions under investigation. Thus, each of the central places, immediately it attains some spatial dimension, becomes a small region with its own little economy. In addition, its threshold area, or tributary area is a part of the central place's economic sphere.

Both the central places and their complementary regions function organically, complementing one another in economic activities. No region can grow without its population. It follows, therefore, that each activity within each region is carried out by its population. As a region grows, it attracts higher order of activities, and the population to carry out these activities. Such level of population and effective demand also attracts other population to support that other population carrying out productive activities, and so on. Thus, as long as the region under investigation can be clearly delineated, it can be regarded as an economy which can be studied using modern econometric techniques.

These econometric methods utilize the Keynesian and neo-Keynesian approaches to investigate the impact of new regional activities on the regional economies under investigation. In a similar fashion the impact of exit of regional activities can be analyzed.<sup>45</sup>

In these models, the basic equation for determining the level of regional income is as follows:

$$Y = C + I + G + X_m - I_m$$

where Y = Regional income

C = Local consumption in a region

I = endogenous investment within a region

G = Local and Central Government investment in a region

$X_m - I_m$  = Net exports of a region.<sup>46</sup>

Increase in regional disposable income affects personal consumption C by creating more effective demand within a region. Increased effective demand will cause people to purchase all goods and services being manufactured or produced in the region. Increased purchasing causes a depletion of the inventories of manufacturers within the region, causing new investment to increase production. New investment generally induces new employment within a region; and causes the regional output to increase through the multiplier. This enhances effective demand, consumption, etc. causing economic growth and development within the region.

The on-coming of a new industry in the region through, perhaps, discovery of new natural resources will create additional employment in a region. This increases the regional income Y through the operation of the multiplier. In the same way, increase in either local government or central government expenditure G within the region will create some employment. The newly employed personnel will spend their income on consumer goods; causing manufacturers to invest more in consumer industries, and thus creating some increase in the regional output through a multiplier operating in the regional economy.



In regional economies, however, increase in net exports is perhaps the greatest stimulus to regional growth. It causes regional economic development and growth to gather pace, if the level of employment of local resources in the region is below full employment. Even if the resources are fully employed, some increase in external demand for goods and services create a scarcity of the subject goods. This causes the price of these goods to increase both within and outside the region; inducing producers within the region to intensify production efforts; and to produce more of these goods for both sale and export.

In this case regional resources are diverted to produce the goods in high demand. Factors of production are offered high payments as their demand for producing the consumer goods rises. This way, most labour that is non-specific gets attracted by high wages to produce the kind of goods in highest demand. Assuming there is no more labour indigenous to the region, and that the high level of demand for export persists, so much labour will have been drawn in the production of these newly demanded export commodities that production for local consumption will drop. This causes scarcity of consumer goods and local services, and a general rise in prices within the region.

The rise in price causes all producers to increase factor payments, including labour - hence a rise in wages. This begins with an increase in the

wages for labour that produces local consumer goods and services; until such an increase in the wages overtakes the increase that was originally experienced in the export good sector. This way, the wage level in the subject region rises above that of the other surrounding regions. This tends to cause an influx of labour from the surrounding regions into the subject region to fill the job vacancies in the regions industries.

This influx of people into the region causes some population growth by way of immigration; and in effect brings into the region higher spending power - effective demand. The immigrants will want consumer goods. This will cause an increase in the demand for consumer goods; causing increased investment  $I$  in consumer good industries - thus creating more employment; and causing the region's output to increase through the multiplier. Influx of labour into this region usually continues, until the wage rates in the region equals that of the neighbouring regions. Before it does this, employment in the region will have increased; investment in both consumer goods for export and local consumption will have increased; and the region will have experienced economic growth and development. This growth : occurs also because influx of other factors of production takes place in the region in a similar fashion to labour; responding to higher demand, and higher factor prices. Overall investment causes growth of regional employment, regional output and income  $Y$ .

The phenomenon explained above can be illustrated graphically by figure 8-16 (A), (B), (C), and (D). In the diagram (A) demand for export increases from  $D_1$  to  $D_2$ , causing an increase in the price of exports from  $P_1$  to  $P_2$ . Diagram B is the Production Possibilities curve of labour, resources and other factors of production which are used to produce for two alternative markets - for export and local consumption. Increase in demand, and therefore prices for exports causes all resources to be diverted into export production from the production of locally consumed goods. The Isocost of resources allocation I-I changes to B-B; with a corresponding increase of available labour and resources for export from  $L$  to  $L^*$ . Labour for local services declines from  $L_1$  to  $L_2$ . Diagram (C) shows a decline of domestic consumer goods through the shift of the supply curve from S-S to S'-S'; since such consumer goods are not produced as much as before. The shift in supply leftwards causes the price of domestic goods and services to increase from  $P_1$  to  $P_2$ . Alongside this increase there is an increase in wages at Diagram (D) from  $W_0$  to  $W_1$ ; since this increase in price will cause producers of local goods to attract labour in this sector through a rise in wages. Wages will continue increasing until the wage level equals that of the labour employed for exports; which had increased due to increases in external demand of the export goods from

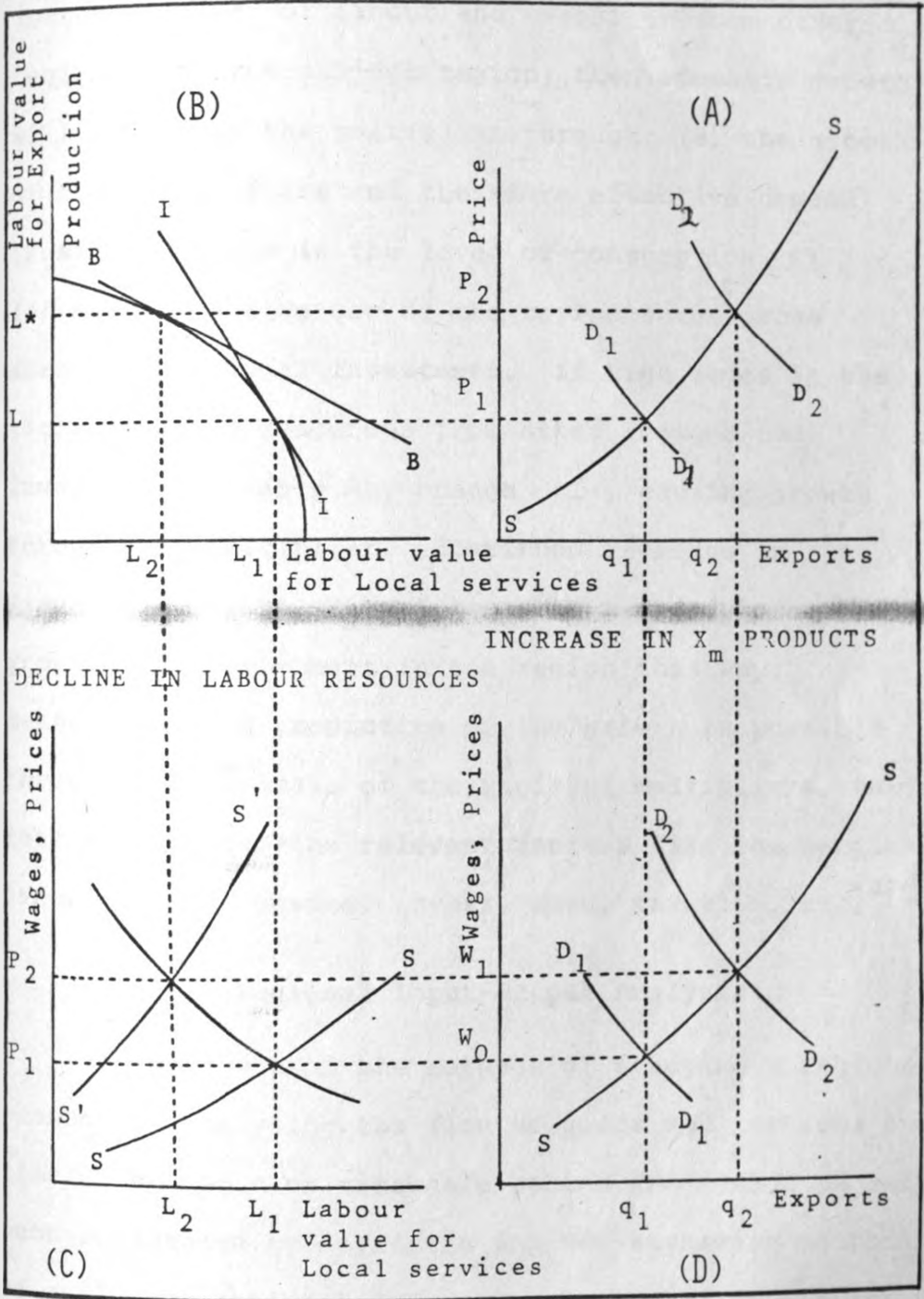


FIGURE 8-16: A regional growth model showing the effect of changes in export demand on changes in wages and price levels in a region.

$D_1$  to  $D_2$ .

If this new wage level  $W_1$  is high enough to induce mobility of labour and resources from other regions into the subject region, then economic growth will occur via the multiplier through: (a) the growth of the labour force and therefore effective demand causing a change in the level of consumption  $C$ ; (b) more intensive use of the region's resources through additional investment. If high wages in the region induces resources from other regions the investment variable may change  $I$ , causing growth through the multiplier. Continued increase in demand for export ( $X_m - I_m$ ) causes a steady economic growth and development in the region this way. Measurement and prediction of the growth is possible through the estimate of the regional multipliers, taking into account all the relevant factors like the marginal propensity to consume, invest, save, taxation, etc.<sup>47</sup>

#### Regional Input-Output Analysis

This is one of the methods of studying a regional economy by analysing the flow of goods and services over time. The logic or rationale behind the method is very much influenced by Keynesian and Neo-Keynesian methods of analyzing national and regional economies similar to the one above. The method has also got some relationship with the economic base theory. It uses some mathematical techniques developed by Wassily W.

Leontief<sup>47</sup> immediately after the Second World War. The technique has later been applied to Regional analysis by C.M. Tiebout.<sup>48</sup> It uses the framework of regional accounts in describing the transactions between the region and the outside world. The Keynesian concept of multiplier is used to calculate and to analyze the impacts of the entry of new activities into, or the exit of the existing activities from a region. This way these impacts can be estimated more rigorously; and (given adequacy of data) to a high degree of accuracy.

The population employed in each industry or each productive activity is first recorded; also the income earned by this population. Any new activity is analyzed on the basis of the new population it is likely to employ within the region, and the amount of money such population is likely to gain as a result of taking part in a new productive activity is calculated. After all the factors regarding these income/population growth estimates have been taken into account, a regional multiplier is used on the additional income to arrive at the change in regional output (Parallel to Net National/Gross National Product analysis). This change can then be added to the existing level to arrive at the new level of regional output.<sup>49</sup>

If growth can be measured in terms of new activities entering a region and a gain in their income, decline of a region is measured in terms of the activities leaving a region and a loss in income

resulting from their discontinuing activity in a region. The reverse calculation takes place where the amount of the decline in regional output can also be calculated, and a new lower level of income resulting from the exit of an activity can be found. Analogous to the neo Keynesian output analysis regional export multipliers can be used to calculate the contribution of increased demand for export goods (and increased production of such goods) to the growth of a region.<sup>50</sup>

#### Economic Base Theory

This is one of the many existing approaches of explaining the cause of regional growth first put forward by Hommer Hoyt, and later elaborated by John Meyander. The basic idea is that some services within a region (which could be an urban area, a countryside, district, etc.) are regarded as basic services. This means that the growth of these services stimulates regional growth. They are the causes of regional growth. In addition, there are other activities within the region called non basic services. These exist as consequences of the overall regional growth and development whose "motor" is "powered" by basic services.<sup>51</sup>

Basic activities have been identified as those that are involved in the production of goods that are in demand outside the region. They therefore comprise of all those activities specializing in producing goods for export. These export activities earn the external money (analogous to the foreign exchange in a national context) for the region. In keeping with the Keynesian and neo-Keynesian analysis it is clear to see that additional "foreign exchange"; or change in nett exports causes a growth in the economy in a similar fashion to that described above. This happens through the operation of the export multiplier in the economy.

Non basic activities, on the other hand are those that sustain the population of the region while some fraction of it is involved in producing goods for export. To use a simple analogy of an individual family we can see that while some members of the family are involved in earning a living for the family, some other members have to be left at home doing such essential services like washing clothes, cooking food, etc. (sometimes the same members of the family do all these things, but we shall see presently that it really does not matter) Those people that earn a livelihood for the family can in this example be said to be employed in basic activities. The cooks and the washers are employed in <sup>non</sup>basic activities. In a similar manner, those who earn the income for the region from outside the region



are involved in basic activities, and those that earn their livelihood by providing those services in demand within the region are said to be employed in non-basic activities.

In order to enumerate the number of participants in each activity, a census of activities is taken within the region. A number of employees in each productive and service activity is made; where every service is categorized under the two headings, basic or non basic. In doing this most activities taking part in a region will be found to produce goods both for export and for domestic consumption within a region. It is therefore difficult to obtain a clear-cut list of those services and productive activities that are basic and those that are non basic. This is why in the family example given the same family members can be involved in both the basic and non-basic activities.

This difficulty is overcome by taking <sup>an</sup> count of all the goods in each factory, productive activity, or services that are exported, and those that are consumed within a region. For example, we can take the Municipality of Thika (Kenya) as our subject region; and one of the industries within it as one of the many industries undergoing this kind of statistical investigation within Thika. Say a shoe-polish manufacturing factory. The investigator will then have to obtain data on how much shoe polish is sold in wholesale outlets within Thika; and how much of it is sold outside into Nairobi, and

other neighbouring regions. Along with these, the investigator would obtain the number of employees in the factory. Since they produce the same item (shoe polish) whether for export or for consumption within Thika without any discrimination, their proportion involved in producing "basic" and "non basic" shoe polish can only be determined through the surrogate of the product. The enumerator would then have to obtain the ratio of the exported and the domestically produced product. He would then use the same ratio to apportion the population. For the shoe polish manufacturing firm he would obtain the population employed in "basic activities" and that employed in non basic activities. He would give the required numbers in appropriate columns of his statistical take. The same process would be repeated throughout the city for all industries and activities. This would eventually give the total populations under each category of activity.

Having done this the enumerator is required by the methodology to compare the basic population and the non basic population. He would come out with a basic - non basic ration as follows:

1. Assume a town of 15,000 inhabitants

Total population	15,000
Population employed in Basic Activities	<u>10,000</u>
Population employed in non basic Activities	= <u>5,000</u>

2. Treat the basic population as 1.0  
so in this case the non basic

population becomes  $\frac{5,000}{10,000} \times 1.0 = 0.5$

3. Obtain the Basic/Non-basic (B/N) ratio

$$\begin{aligned} \text{B/N Ratio} &= \frac{1}{0.5} \\ &= 2.0 \end{aligned}$$

In this rudimentary form, the statistic tells us very little - namely that production in an urban area is either export oriented, or domestic - consumption oriented. One can, however, deduce that the more a region produces for export, the greater the rate of growth. So high B/N ratios indicate very fast rates of growth through export and domestic multipliers as explained above, while low B/N ratios indicate slow growth rates. Small urban centres with rapid rates of growth have been known to have very high B/N ratios - higher than 1.0; while large metropolises and urban areas have low B/N ratios, lower than 1.0. Table 8-6 shows some calculation done by Alexander in the U.S.A. for these ratios in different towns.

There are many more methods used in measuring regional growth and regional activities but cannot be adequately treated at this elementary level and in this volume. <sup>52</sup>

TABLE 8-5. BASIC/NONBASIC RATIOS FOR  
SELECTED CITIES OF THE UNITED STATES

City	Population (at Time of Study)	B/N Ratio
New York, N.Y.	12,500,000	1.0/2.2 - 0.45
Detroit, Michigan	2,900,000	1.0/1.2 0.83
Cincinnati, Ohio	907,000	1.0/1.7 0.57
Brockton, Mass.	119,000	1.0/1.8 0.56
Albuquerque, N.M.	116,000	1.0/1.0 1.0
Madison, Wisconsin	110,000	1.0/1.8 0.56
Oshkosh, Wisconsin	42,000	1.0/0.6 0.67

SOURCE: John W. Alexander, Economic Geography,  
Vol. XXX, No. 3 (July, 1954).

FOOTNOTES

1 The discussion in this section very closely follows George K. Kingoriah "Regions and Regional Delimitation as aids for Urban and Rural Development in Kenya." Ekistiks 304; Jan/Feb. 1984 pp. 18-26.

2 Harry W. Richardson, Regional Economics; New York, Praeger Publishers, (1969) p.223.

3 Ibid.

4. Edgar M. Hoover, An Introduction to Regional Economics; New York, Alfred A. Knopf, (1975) pp. 151-152.

5. H.W. Richardson, Regional Economics; pp.223-231.

6. Edgar M. Hoover, An Introduction to Regional Economics; p.152.

7 Douglas S. Amedeo and Reginald G. Colledge, An Introduction to Scientific Reasoning in Geography; New York, John Wiley and Sons, Inc.; (1975) pp.152-160.

8 Ibid.

9 In an earlier edition of his article on Regional Delimitation. George K. Kingoriah has made use of the gravity model to define the concept of contiguity and homogeneity. The unabridged edition of the article quoted in footnote (1) above is available from University of Nairobi Library.

10 Preston E. James, All Possible Worlds A History of Geographical Ideas; Indianapolis, The Odyssey Press and Bob Morrill Educational Publishing; (1972), p.468.

11 George K. Kingoriah, "Regions and Regional Delimitation."

12 James Heilbrun, Urban Economics and Public Policy; New York, St. Martin's Press (1974) pp.22 and 23.

13 Ibid.

14 Ibid.

- 15 A.K. Philbrick, "Principles of Areal Functional Organization in Regional Human Geography;" Economic Geography, Vol.33, pp.306-336.
- 16 Ray M. Northham, Urban Geography, New York, John Wiley, (1975), pp.107-119.
- 17 Preston E. James, All Possible Worlds, pp.244.
18. George K. Kingoriah, "Regions and Regional Delimitation."
- 19 The author is indebted to J.B. Foust and A.R. de Souza for this linear model, which is aptly explained in great detail in their Economic Landscape: A Theoretical Introduction; London: Charles E. Merrill Publishing Company, (1978).
- 20 Ibid.
- 21 Walter Christaller, Die Zentralen Orte in Suddeutschland, Jena, Gustav Fischer, 1933 - Translated by C.W. Baskin as Central Places in Southern Germany, Englewood Cliffs, N.J., Prentice Hall, 1966. August Losch, Die Raumliche Ordnung der Wirtschaft; Jena, Gustav Fischer, 1940; W.H. Woglom translation with the assistance of W.F. Stolper; The Economics of Location, New Haven, Conn: Yale University Press, (1954).
- 22 J. Brady Foust and A.R. de Souza, The Economic Landscape; p.68.
- 23 Walter Christaller, op cit., pp.17-18.
24. Ibid. pp.19-21.
25. Ibid. p.35.
- 26 J. Brady Foust and A.R. de Souza, Economic Landscape, p.71-74.  
David Segal, Urban Economics, Richard D Irwin, Inc., (1977), pp.38-63.
- 27 J.Brady Foust and A.R. de Souza, Economic Landscape, p.76.
- 28 David Segal, Urban Economics, pp.42-43.
- 29 J.Brady Foust and A.R. de Souza, Economic Landscape, pp.76-80.

- 30 David Segal, Urban Economics, pp.46-47.
- 31 Ibid
- 32 For a simplified neo-classical economic analysis of an individual firm see Hugh O. Nourse, Regional Economics: A Study in the Economic Structure, Stability and Growth of Regions: New York, McGraw-Hill Book Company, (1968) chapters 1 to 4; and especially chapter 3; pages 34-62.
- 33 Ibid
- 34 J. Brady Foust and A.R. de Souza, Economic Landscape; p.83.
- 35 Ibid
- 36 Ray M. Northam , Urban Geography, pp.107-119
- 37 David Segal, Urban Economics, pp.51-63  
John Bochert, "The Urbanization of the Upper Midwest," Upper Midwest Economic Study; Urban Report No. 2  
Minneapolis, Minnesota, February, 1963.
- 38 John R. Bochert, "The Urbanization of the Upper Midwest."
- 39 John E. Brush, "The Hierarchy of Central Places in Southwestern Wisconsin", The Geographical Review vol.43 (July 1953), p.388.
- 40 S.M. Kimani, Location and Functional Structure of Shopping Centres in Nairobi, Nairobi, Kenyatta University College - limited circulation - Department of Geography, 1970.
- 41 George K. Kingoriah, "The Causes of Nairobi's City Structure", Ekistiks 301 July/August 1983, pp.246-254.
- 42 Edgar M. Hoover, An Introduction to Regional Economics, pp.207-248.
- 43 Ray M. Northan, Urban Geography, Table 7-4, p.131, has been adapted to suit the requirements of this explanation and Table 8-5 below.
- 44 Josephine Olu Abiodun, "Urban Hierarchy in a Developing Country". Economic Geography vol.43 No.4 (1967), pp.347-367.
- 45 Hugh O. Nourse, Regional Economics, chapters 7, 8, and 9; in particular, see pages 155-207 (chapter 7).

46 The reader is referred to any standard text on neo-classical micro-economic theory. In particular refer to Thomas E. Denburg and Duncan M. McDougall, Macro-Economics: The Measurement, Analysis, and Control of Aggregate Economic Activity, London, McGraw Hill Kogakusha, Ltd., 1972.

47 Wassily W. Leontief, "Input-Output Economics", Scientific American, 185 (1951) pp.15-21.

48 Charles M. Tiebout, "The Urban Economic Base reconsidered", Land Economics, (February 1956), pp.95-99; Charles M. Tiebout, The Community Economic Base Study Supplementary Paper No.16, New York, Committee of Economic Development, December, 1962; W. Lee Hansen and Charles M. Tiebout, "An Intersectoral Flows Analysis of the California Economy", Review of Economics and Statistics, Vol.45 (November, 1963), pp.409-418.

49 Hugh O. Nourse, Regional Economics, pp.155-180, Edgar M. Hoover, An Introduction to Regional Economics, pp.207-248.

50 Ibid.

51 Edgar M. Hoover, An Introduction to Regional Economics, pp.207-248 - see the footnote on p.219.

52 The reader is referred to a concise and an informative summary and simplification of these methods as outlined by Avron Bendavid, Regional Economic Analysis for Practitioners, New York, Praeger Publishers, 1972.



# CHAPTER NINE

## DISTRIBUTION OF ECONOMIC ACTIVITIES OVER THE URBAN SPACE

### Introduction

We have seen how growth of a region - whether nodal or homogeneous - is stimulated by economic activities within a region, especially those of a basic nature. In urban areas, the process of growth is manifested through the development of superior infrastructure. This becomes necessary as more and more economic activities are attracted into the urban area by the economies of scale available within it, and the size of the complementary area that the urban area serves - i.e. the level of effective demand within an urban region. The economies of scale mostly available in an urban area are agglomeration economies and economies of urbanization. In this case, each utility benefits from one another, and from the infrastructure available in the urban area.

All those activities whose production efficiency depends on the central place location tend to locate in urban areas. This is because, as we have seen earlier on, most urban areas tend to nucleate in positions of spatial accessibility in relation to the general region. The ranking of the urban area, we have seen, depends on its accessibility relative to those of other central places in the area. In this connection, there is tendency for levels of

economic activities in each urban area to be positively correlated to the rank of the city. This implies that land values in each urban area of the region will vary in relation to this economic activity, and the relative level of demand and supply of space in each urban area. Each urban area of whatever rank can therefore be considered as having its own land value structure, with a land value peak different from all the other central places in the region. This structure is manifested through land value gradients from the urban core as examined in chapter four.

Thus, <sup>in</sup> the concept of the highest and best use of land, the Von Thunen and Ricardian models of rent are useful in analyzing the structure of land values and land rents in each urban area. This implies that following these principles urban land uses are theoretically arranged in some form around the centre of each city; and that the cause for such an arrangement is mainly economic forces that tend to allocate each parcel of land to the highest and best use over time.

It must be mentioned that the central place theory as discussed in chapter eight; and all the methods of urban and regional analysis have very little use in predicting the relative levels of the highest land values at urban cores of all central places within the region. The ranking of cities and

urban regional analysis methods only give clues (at least at an ordinal level) of the relative levels of economic activities in central places within the region. Land value levels within each urban area are determined by the particular economic forces operating within each urban area. In a similar way, we could conclude that spatial arrangement of activities within each central place depends largely on these forces; and on the aggregate social tastes and preferences of each urban community as reflected through the local governmental actions and legislation in each urban government.<sup>1</sup>

These social and economic forces are the ones that are responsible for shaping the land use mosaic in each city; or what geographers call City Structure. Studies in American and Western European cities have revealed that the land use relationships in urban area tends to be similar in all cities. Cities tend to exhibit structures that are somewhat identical in the sense that they are divided into zones of similar economic activities. The relationship of economic activities and its spatial distribution usually takes the form of easily distinguished areas, having common functions, depending on their distance from the city centre. The characteristics of land uses in these zones are outlined in the sections that follow.

Nature of Land Use in Urban Areas.

(a) The Central Business District.

This is usually found at the centres of urban areas, and surrounds the place where initial nucleation of the city took place. Urban nucleation takes place in the most <sup>ac</sup> accessible places within the complementary region, so that the urban economic activities locating in this area can minimize the costs of transportation; or so that they can maximize sales or profits as a result of attracting many customers from the complementary region. These customers are attracted to urban areas because they minimize transportation costs. The existence of a central place in some location implies that over time **the people in the region have found that particular** location to be the most convenient for their activity than any other location. It follows therefore that all the commercial activities that depend on maximum accessibility for their survival will want to locate in this most accessible area. This creates competition for location, reflected in spiralling land values as more and more economic activities are attracted to this location. The uses that derive the greatest economic benefit from locating in this area push all the "inferior" uses out. This means that in most Central Business Districts (CBD) are found the greatest concentrations of commercial firms

like banks, financial establishments, business offices, retail stores, etc.

The acute competition among these firms to locate here means that very high land values will result. This means that whichever firm decides to locate here must maximize its space use by using the land available to it most intensively. In most central business districts therefore land is utilized intensively through the construction of multi-storey buildings. Consequently, in most central places (urban areas) the most striking physical characteristic of the city centres (around where central business districts lie) is taller buildings than in all the other parts of the urban region. One of the rough visual methods of delimiting the central business districts is to examine the area occupied by the tallest buildings in any urban place.

Following from the foregoing discussion, the CBD can be delimited visually by examining the nature of activities in any urban area. It is the commercial area of any town. Land use is usually dominated by retail, office use and other commercial use. Some residential land use may occur at high levels; on top of office space, but such use is not dominant. This area also houses some hotels, restaurants; eating places, etc., that serve the daily population that

comes to work in the urban area, and any visiting executives and businessmen who may surjourn in the town temporarily on commercial or governmental missions

The high concentration of business activities means that the central business district (CBD) is likely to be a busy area, criss-crossed by thousands of pedestrians and motorists every day; as they go about in their shopping, business and other missions. In the modern age of individualized transport (the motor car) people tend to drive their vehicles to the nearest place next to where they undertake their business transactions. This brings about the demand for thousands of car parking spaces which tend to occupy much of the urban space that is unoccupied by either roads or buildings in the CBD. As an urban area grows, the volume of traffic becomes so much that parking space is never adequate for all motorists. Due to the scarcity of such space, it becomes economical for the municipal authorities (under whose jurisdiction any particular urban area is) to charge the motorists for parking; in order to avoid misuse of this rare space; and at the same time to collect some revenue. Thus, the parking metre has been invented to meet this purpose. The area where the level of demand for parking space is so high, and the supply of such parking space is so low that the motorists are willing to rent the available space for

as long as they require it (during their business activity) is therefore the identical to the area with the tallest buildings. It is the CBD. The CBD is therefore visually delimited as that area served by parking metres. Urban analysts agree that the outer limit of parking metres from the urban core is also roughly co-incidental with the boundary of the CBD.<sup>2</sup>

In East African cities the CBDs are areas of the highest development activities. This reflects the influence of city planning techniques over urban spaces of relatively young metropolises. Most CBDs in East Africa owe their existence not so much economic forces as to legal and zoning regulations and governmental action over time.<sup>3</sup> For example in any East African urban area, even before any buildings go up, the physical planners and land administrators already know where the CBD is likely to be.<sup>4</sup> In those areas where the planners expect fast urban growth CBDs are made deliberately spacious. This means that in most East African towns there are likely to be many empty spaces in areas which have been officially demarcated as CBDs. Any new commercial activity coming into an urban area is likely to be directed by the planning authorities to locate in the CBD. At the time of writing urban areas in East Africa, especially Kenya are experiencing very high

levels of construction activities, most of which are centred in CBDs: hence the peculiar characteristic, that the CBD is the area of the highest development activities. Nairobi CBD for example, in 1980-1981 had more than ten multi-storey office complexes under construction.

In Western Europe and the Americas most of the land in the CBD has been developed. In recent times the central business districts are experiencing exit of urban activities because of the influence of the motor car. The development of suburbs and their shopping centres, and the tendency to have the CBD functions decentralized due to easier transportation; together with the peculiar racial and economic stratifications of western societies are making most activities flee the CBDs. In contrast to East Africa, the CBDs are congested; and some areas are seriously in need re-development. The density of population working and living in western CBDs has tended to decline in recent decades. The land values and levels of economic activity have flattened out; and in some cases even fallen. Due to the extensive fragmentation of local governments, the CBDs and their immediate vicinities - the whole areas being known as "central cities" - are run by separate municipal corporations from those of the suburbs. These central city corporations are running into



financial difficulties due to the erosion of their tax base by the exodus of the well to do from the central cities, The exodus has tended to leave only the poor minorities in central cities, whose tax paying ability is not as much as that of the middle class.<sup>5</sup>

(b) The Transportation Zone.

This is the zone usually occupied by transportation termini; e.g., the railway terminus, the railway marshalling yards; the parking facilities for large trucks and lorries; etc., These areas lie in close proximity to the CBD, but are not parts of it. In most cities the visual characteristics of these zones is the physical layout of transportation infrastructure - such as numerous railway sidings forming the marshalling yards, a concentration of go-downs and storage facilities; large handling facilities like cranes, conveyor belts, oil tanks, garages, parking costs for trucks and lorries, repair shops and engineering works. During the hey-day of the railways this zone used to be homogeneous, and located in a specific area of the city that the railway lines passed. However, the development of the motor car has tended to decentralize the sector and its functions into other areas of the city, apart from the traditional railway-line approaches. Therefore, in some cities, only patches of this land use are

recognizable in various areas of the urban space - but these could be regarded as the de-centralized parts of the former homogeneous transportation sector.

Nairobi has a definite transportation sector to the east of Haile-Selassie Avenue, where most land use activities are devoted to transportation and cargo handling. Despite this, some areas of the city - just outside the CBDs - are temporarily occupied by lorries and trucks. Others have a network of railway trunk-lines and sidings. Some areas of Kirinyaga/Kijabe street (former Grogan road) and Ngara road fall into this category see Figure 9-1. In Mombasa, lying by the sea-side, is a large transportation sector dominated by the Kilindini harbour and the old port. The whole area adjacent to Kilindini harbour has typical characteristics of the transportation zone. The same applies to Kisumu, Nakuru, Thika, Nanyuki and other railway served urban areas. Sometimes, this transportation zone merges into the industrial area in most of these towns. In all cases the area is occupied by light industrial activities and warehousing.

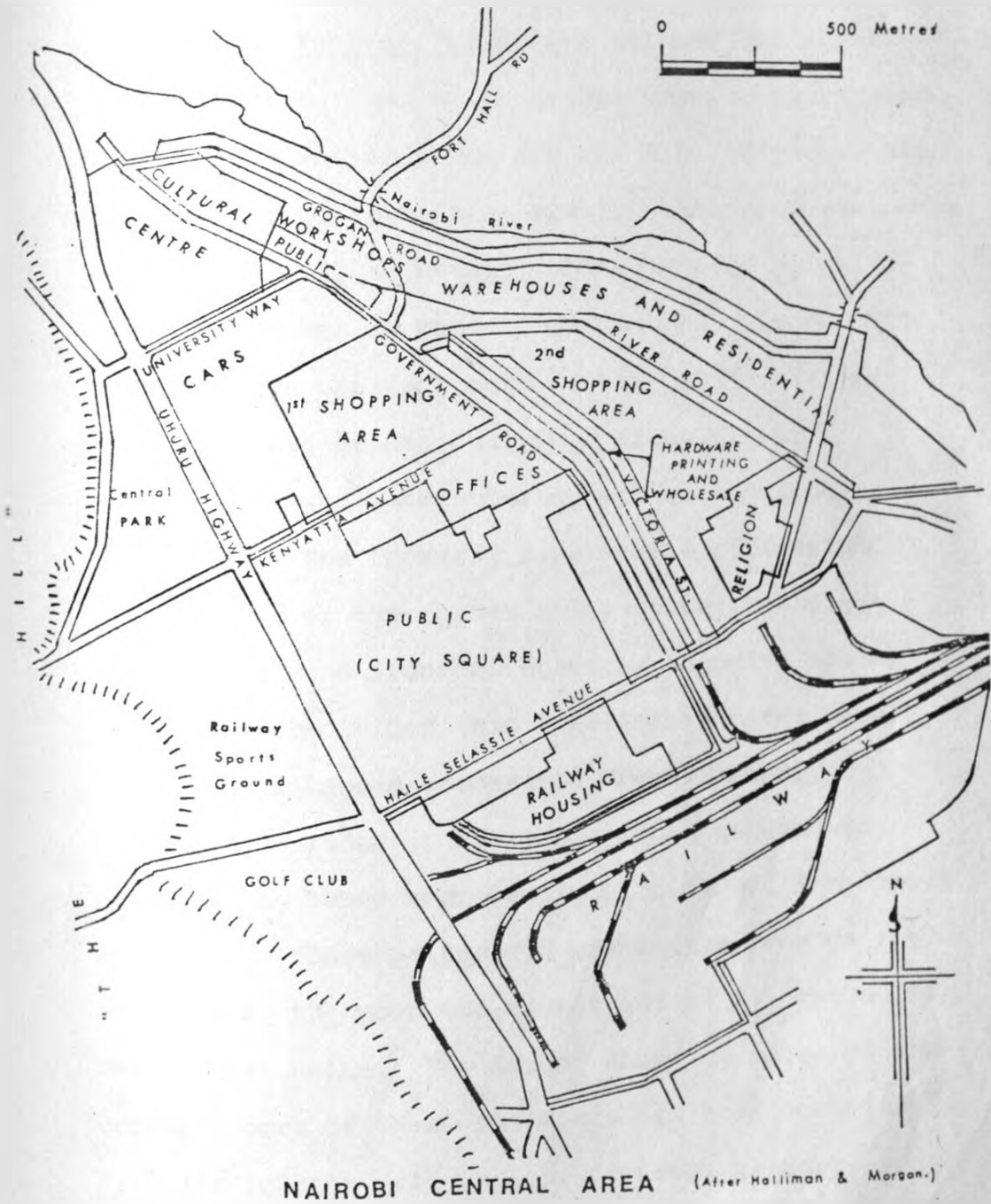


FIGURE 9-1. The Functional Structure of Nairobi's C.B.D.

(c) The Zone of Transition.

This zone surrounds the Central Business District. It is called Zone of Transition because its physical characteristics tend to be transitional between high density residential areas and the CBD. There is also some element of transition between the industrial area and the CBD. It is usually characterized by multi-storey buildings in poor run-down conditions. This area, perhaps thriving part of the CBD in earlier times of urban growth, displays signs of being invaded by light manufacturing and warehousing activities. The formerly fashionable offices and flats on top of the former multi-storey buildings (that had ground floor occupied by shopping space) have been sub-divided into dwellings for the people in the lower income brackets. These formerly fashionable blocks of flats have been reduced to tenements by being temporarily partitioned into small dwellings. These balkanized residential spaces are occupied by the poor who cannot afford to rent unified residential units. The former shopping space on the ground floors of these buildings has been occupied by light industry, laundries, dairies, garages, and warehouses. Generally industry is in the nature of simple processing and packaging. In some cases this space is used for wholesale activities. Nairobi's Duruma road, Kirinyaga road and some parts of Ngara

road falls into this classification.

(d) Low Income Housing and Small Factories Zone.

This zone is visually recognized through the numerous high-rise blocks of flats; with cheap rents per unit dwelling, but a high overall return per hectare of housing. This is because many units can be accommodated per hectare of land by substituting capital, materials and labour for the expensive land near the CBD. The residents - usually low and medium income workers - are usually within easy reach of their working areas in the CBD. Within this locality there may be light industrial activities such as warehouses, simple assembly and processing firms. This zone forms a large residential sector of Nairobi's Eastlands beginning at Muthurwa, and ending around Dandora.

(e) The Industrial Zone.

Contains many heavy industries; and the main economic activity is manufacturing e.g., Nairobi's Industrial Area.

(f) High Class Residential Zone.

In this zone are found single family dwellings occupying individual plots that afford the amenity of private grounds for each residential unit. The area of plots occupied by a single residential unit increases the farther away one moves from the inner city. This area gradually gives way to the outer

suburbs of the city with low densities of residential development intermixed with agricultural activities - market gardening, etc. Nairobi's North Western residential sector starting from the National Museum takes on these rough physical characteristics. It tapers off into residential - Agricultural Zone in the neighbourhood of Kiambu, Gigiri and Lower Kabete.

(g) The Commuter Zone.

In most urban areas this forms detached residential suburbs and satellite commercial centres. Most of these detached suburbs and satellite towns have their own miniature characteristics of the large city. They usually have their own local governments. However, most of their residents work in the big city; and commute to their places of work daily using the transportation system between the big city and these suburbs. Sometimes these areas are indistinguishable from the outer fringes of the high class residential areas. In Nairobi the outlying towns of Kikuyu, Dagoretti, Kiunga, Uthiru, Wangige, Kiambu, Ruiru, Athi-river and Kahawa fall in this zone. A large fraction of the area between these little towns and the cities is undeveloped; or is occupied by ribbons of uncontrolled development. This reflects the fact that municipal regulation and planning of land use has not been rigorously enforced here for a long time or is not applicable at all; because most of these

lie either just within, or just outside the municipal boundaries; and have not yet felt the full impact of the city expansion. In these areas the phenomenon that we called Urban Sprawl in chapter six is most noticeable. This is true because the land tenure system has not managed to adjust itself to the demand for urban space as dictated by economic forces of urban expansion.

#### Theories of City Structure.

The foregoing discussion on the nature of land use in urban area reveals the existence of various kinds of specialized areas, which tends to reflect the sifting of economic activities in accordance with the highest and best use occupying each part of the urban area. The zones tend to reflect the tendency for human activities to specialize; and therefore to locate themselves in clusters. This would be necessary - if not for the purposes of realizing economies of scale in production - at least for the sake of the socially and economically stratified societies of the western world. Urban geographers social and physical scientists have been interested in the factors influencing land use patterns in cities. Many descriptive and causal theories of city structure have emerged from their studies. Most of these theories attempt to generalize about what causes the land use arrangements

in the city, and in which areas such land uses may be expected to occur. A few generalizations could be made from these studies; that there is a marked tendency for the intensity of land use to decline the farther one goes from the city centre. Residential living densities decline with increasing distance from the city centre. A systematic relationship exists between the location of retail shops, consumer service units and spatial distribution of residences; a tendency for the structure of land values - themselves largely a result of competitive forces - to mould the pattern of urban land use and influence spatial distribution of land uses within the city considerably. The theoretical causes of the arrangements of these land uses have been examined in chapter four. We must now refer to three classic attempts to describe city layout patterns. These are generalizations, partly based on observation; but partly reflecting the competitive economic principles outlined above; and partly reflecting other principles drawn from sociological and human ecological theories.

These classical city structure theories attempt to advance ideal patterns, in that they express views of how cities have developed under the operation of market forces in an institutional environment limiting - if not ruling out - the intervention of city planners. The theories also ignore



inter-city differences in the composition of urban activities, topographical irregularities, constraints imposed by irregularly developed transportation networks, and so on.<sup>6</sup>

The three main models to be outlined are: the Concentric Zone theory, elaborated by E.W. Burgess ; Homer Hoyt's Radial Sector theory; and the multiple nuclei concept; developed by C.D. Harris and Edward L. Hurlman from a suggestion by R.D. McKenzie.<sup>7</sup> The first two models can be used to describe, and possibly predict, changes in the basic structure of land use patterns; while the multiple nuclei theory was intended as a summary of the total urban land use pattern in an average large city at a given point in time. However, there is no reason why the latter theory should not be made dynamic so that it can deal with urban growth and expansion. Another important point to note is that the radial sector concept was developed mainly to explain urban residential patterns - while the other two theories refer to the structure of all urban land use. A characteristic common to all the three theories, is that although they require interdisciplinary analysis for a complete explanation, they rely heavily on the operation of the economic forces in a market environment.<sup>8</sup> All of the three were inspired by empirical investigations of the city structure under

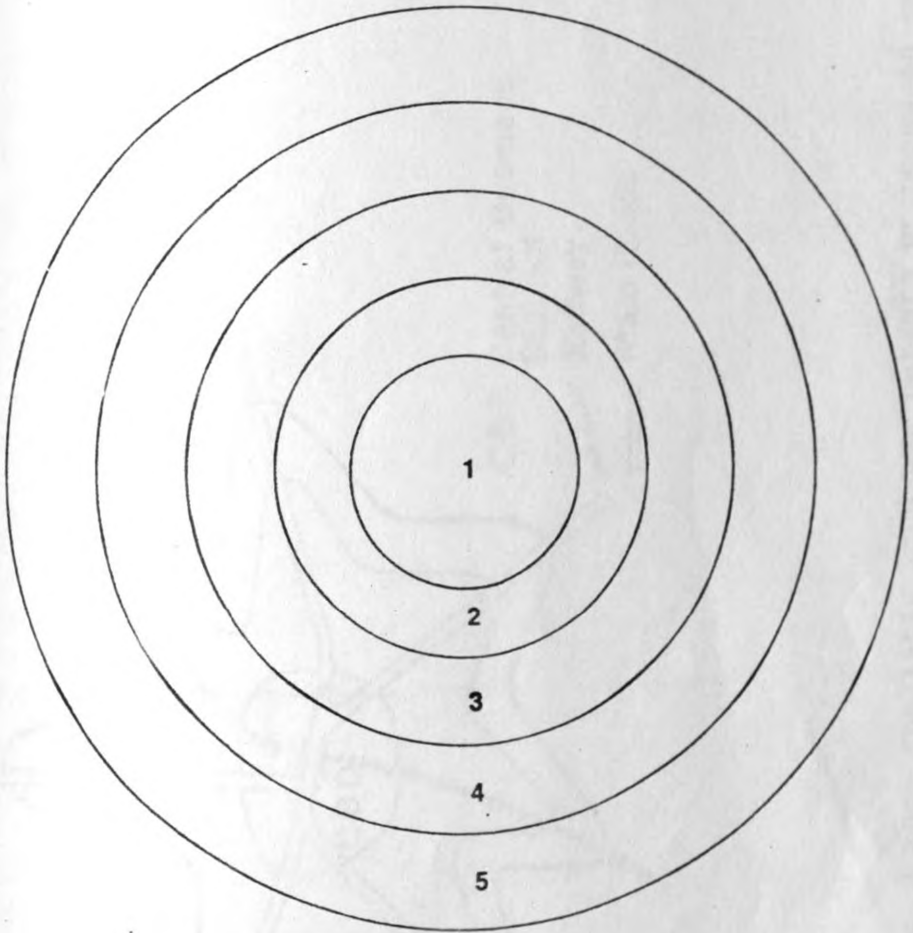
the "market economy" socio-economic systems.

#### The Concentric Zone Theory.

This is the first major conceptualization of urban land use advanced by a sociologist Ernest W. Burgess in 1925. According to him, cities could be divided into 5 main districts (Figure 9-2) that follow the pattern of concentric zones surrounding the city centre. The lines shown in his diagram served the purpose of classification only; and did not mean that land use transitions and boundaries within any city are in any way abrupt.

When the assumption of unitropism is relaxed urban areas have been observed to develop in an octopus shape rather than as concentric zones as stipulated by Burgess. An off-shoot of the concentric zone theory known as axial development hypothesis has developed as a result. It states that an urban area could have its development take place fastest along transportation routes.<sup>9</sup> This reflects higher accessibilities along the transportation network as stipulated by Von Thunen, when he allowed his unitropism to be influenced by cheaper transportation, like a canal or a river. (This has been discussed in detail in chapter 4). Each land use, instead of forming a circular ring about the CBD would form a "tentacled" zone of homogeneous activities; as shown in Figure 9-3.

## THE CONCENTRIC ZONE MODEL



1. CENTRAL BUSINESS DISTRICT
2. ZONE OF TRANSITION
3. LOW INCOME HOUSING ZONE AND SMALL FACTORIES
4. HIGH CLASS RESIDENTIAL ZONE
5. THE COMMUTER ZONE (After Burgess.)

FIGURE 9-2. The Concentric Zone Model of Urban Land Use Pattern (After E.W. Burgess, 1925).

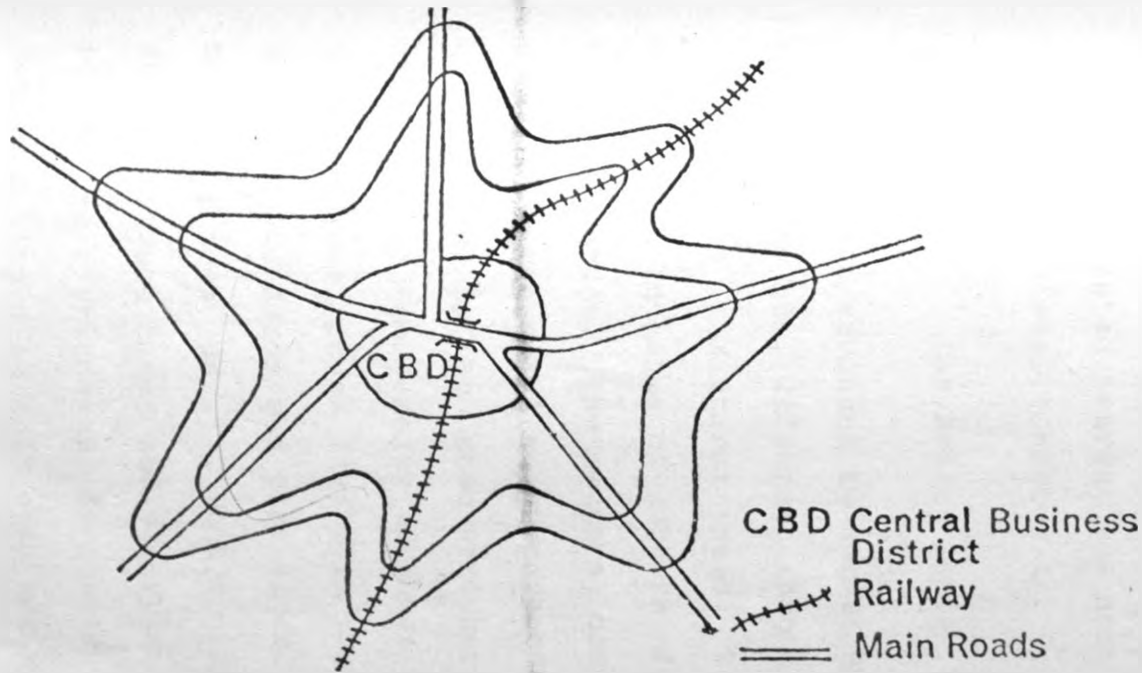


FIGURE 9-3. A more realistic land use pattern proposed in the Axial Development Hypothesis. (SOURCE: W. Lean & B. Goodall, Aspects of Land Economics, 1968).

The economic interpretation of the concentric zone model calls attention to a land value gradient from the city centre, and an arrangement of land uses reflecting the tendency for the highest bidder land allocation mechanism to have the most profitable land uses located nearest the most accessible points in an urban place. (Chapter 4).

### The Radial Sector Theory

This was advanced by Homer Hoyt in 1939.<sup>10</sup> According to him, different income groups in a city tend to live in distinct areas. These areas are discernible in terms of sectors of a circle around the city centre. The sectors, comprises homogeneous **types of residential neighbourhoods**, that tends to grow outward towards the urban periphery in their respective directions. Homogeneity of these sectors is in terms of the income groups living in them; and uniformity in building standards and plot sizes. High rent residential neighbourhoods (usually with the most expensive dwellings in the subject city; and occupying the largest land plots) are instrumental in shaping the land use structure within a city. In this city the work places are assumed to be the central business area, and an industrial area laying directly opposite the high income residential neighbourhoods also expanding gradually, as the city grows, towards the urban periphery in a homogeneous sector of its

own.

The growth of high residential neighbourhood proceeds from a given point along established transportation routes towards the urban periphery. The high income, through their high spending ability on land, tend to choose the best locations for building. Therefore the growth of their residential area progresses in the direction of high grounds, free from floods and water-logged conditions. The high income bracket takes advantage of the panoramic views in the urban area such as oceans, beautiful river fronts, mountain sides, bays etc.

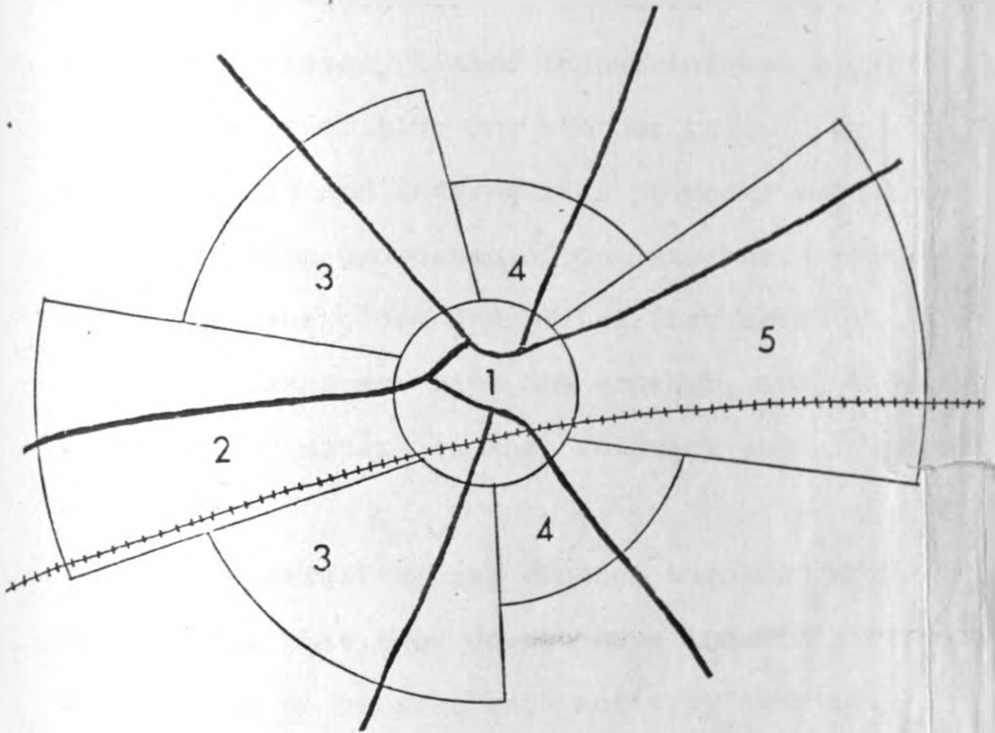
Land users with lower rent paying ability tend to occupy both flanks of the outward growing high income residential sector. They immitate the architectural style of buildings and ammenities of their richer counterparts; but at a cheaper level. Thus, in this area one may find a small building built so that it can have similar architectural external and internal features to those of the mansions in the high income residential sector. However, either the materials used in the construction of these features, or the building area, or the area of the land occpied by individual buildings may be smaller. In a similar fashion, the low income residential sector tends to develop following the medium income sector, but on those flanks of the latter

that are farthest from the high income residential sector. The low income bracket the most unable to afford transportation, and therefore will tend to be attracted towards the work places. Thus these sectors are usually hemmed between the industrial area, the CBD and the medium density residential areas. The outward growth of the sector tends to be slower than all the rest (figure 9-4); reflecting the inability of this income group to afford acquiring new building sites outwards, and to afford travelling costs.

#### Multiple-Nuclei Theory

In 1933, R.D. Mackenzie, in his book Metropolitan Community<sup>11</sup> observed that most major cities have **several centres or "nuclei" rather than one core only;** as suggested by the 1922 Burgess Concentric Zone Theory. This suggestion was expanded and elaborated in 1945 by Chancy D. Horris and Edward L. Hulman<sup>12</sup>; who are usually associated with the formulation of the popularly known Multiple Nuclei hypothesis. (Figure 9-5) These two theorists observed that some nuclei of any city may have started as single centres of small urban areas. These small urban areas may have fused together to form one city or metropolitan area. In this process (over time) other nuclei may be formed in response to new opportunities and demand for activities generated by metropolitan growth.

# THE RADIAL SECTOR MODEL



1. CENTRAL BUSINESS DISTRICT
2. HIGH INCOME, LOW DENSITY RESIDENTIAL AREA
3. MEDIUM INCOME RESIDENTIAL AREA
4. LOW INCOME, HIGH DENSITY RESIDENTIAL AREA
5. MANUFACTURING AND WAREHOUSING ZONE

--- RAILWAYS

— ROADS

(After Hoyt.)

FIGURE 9-4. The Radial Sector Model of Urban Land Use Pattern. (SOURCE: Homer Hoyt, The Structure and Growth of Residential Neighbourhoods, 1939).

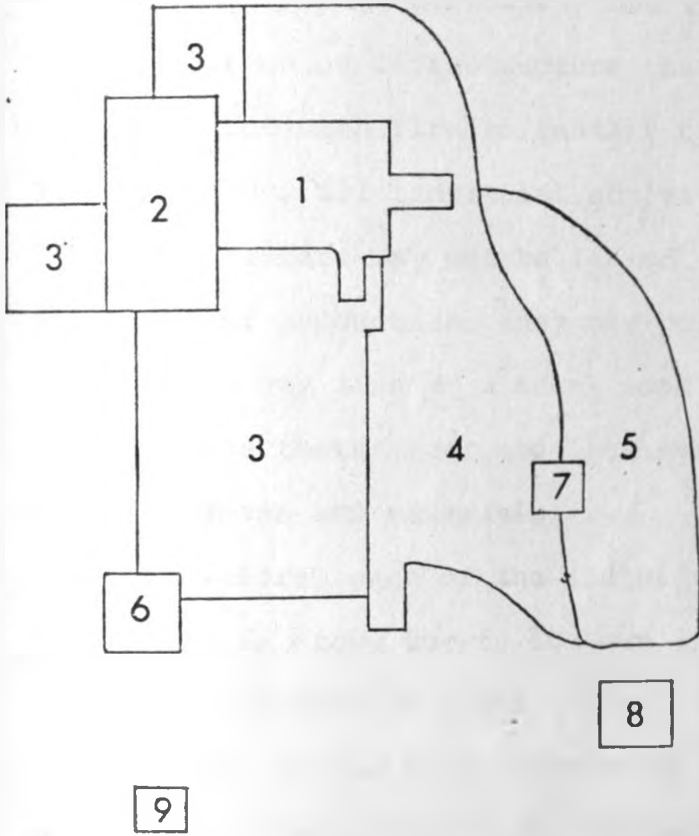


The existence of such nucleations is explained by three major factors:

(a) Some types of activities seek close proximity to one another because <sup>of</sup> interdependence in their operations - agglomeration economies. These become nuclei of closely linked industrial and service activities benefiting one another through providing raw materials and intermediate products required in the production processes of one another. They therefore have close industrial "backward" or "forward" linkages; with one another, depending on what type of materials each activity uses from the other.

(b) Other activities may cluster together in spite of the fact that they do not have industrial linkages. They may do so because each activity attracts business for other activities. For example, most activities in the retail area of an urban area are not linked with one another. However, they are positioned so that while an ordinary person does regular shopping he can also purchase individual goods and services. This way, city centre restaurants benefit from the retail outlets, because shoppers would like to refresh themselves after long strolls that go from store to store in the downtown. The shopper may also want a haircut, hair plaiting, etc. hence the proximity of hair dressing saloons to

## MULTIPLE NUCLEI MODEL



1. CENTRAL BUSINESS DISTRICT
  2. WHOLESALE AND LIGHT MANUFACTURING
  3. LOW CLASS RESIDENTIAL
  4. MEDIUM CLASS RESIDENTIAL
  5. HIGH CLASS RESIDENTIAL
  6. HEAVY MANUFACTURING
  7. OUTLYING BUSINESS DISTRICT
  8. RESIDENTIAL SUBURB
  9. INDUSTRIAL SUBURB
- (After Harris and Ullman.)

FIGURE 9-5. The Multiple Nuclei Model of Urban Land Use Pattern. (SOURCE: Harris and Ullman, "The Structure of Cities", 1945).

shopping areas. Other activities, like car sales, locate near one another to facilitate comparison between different prospective deals by potential buyers.

(c) Other activities may nucleate together to obtain urbanization economies; not from one another, but from items of infrastructure that could be expensive for each firm to install by itself. Thus, although all industrial activities in an industrial estate may not be linked in their processes of production, they may position themselves along a railway line or a trunk road so that they can minimize their inter and intra-urban shipping costs of goods and materials.

Therefore, each of the individual nuclei in an urban area grows due to its own internal and external economies of scale - like a micro-region; (see chapter 8) and these eventually fuse to form one multi-nucleus metropolis. As the metropolis grows more and more of these may be annexed using governmental machinery or through the economic processes that cause urban sprawl. The space in between them may eventually be built up, and may later form parts of a continuous urbanized area. In the early stages of growth (1900-1926) Nairobi had three of these nuclei: the city centre, Muthaiga and Eastleigh. Each of these was gazetted as an

individual "Township". The Feetham Commission of 1927 recommended joining all these into the Nairobi Municipality. Since then the areas in between these nuclei have been developed; and the former nuclei are no longer separate from one another. The extended 1963 city boundary similarly joined several nuclei like Ruaraka, Karen, Embakasi, Kibera, Kit'suru, and other outlying areas. The spaces in between these will eventually be built to homogenize urban development in between and among the nuclei. Indeed, by 1981 the space between the old city and Kibera is being sealed fast. Soon Ruiru, Athi-River, Kiambu, Kikuyu, etc. - formerly independent urban nuclei may be engulfed by the expanding metropolis through the processes of urban sprawl,<sup>13</sup> and similar means.

#### Critique of City Structure Theories.

The concentric zone model was a generalized land use model that assumed away transportation differences within the urban area. However, no area is perfectly uni-tropic; land uses are likely to be influenced by the transportation pattern. This model, and all the others are also based on a broad assumption of a perfect market for land, goods and services operating within the urban space.<sup>14</sup> Any market imperfections in each of these things or in all of them are likely to have profound influences on the land use patterns within urban areas. No land market is perfect. Therefore there are considerable

departures from ideal situations.

As we have seen, later models of city structure have been modified to various extents to correct the basic assumptions of the Burgess model. For example, the axial development hypothesis takes into account varying accessibility differences in different parts of the city in relation to the Central Business District. The radial sector theory is also an attempt to incorporate influence of the motor-car (largely owned by the wealthy) on the urban layout. At the time it was proposed, the motor car and its noise were signs of economic advancement and development - hence its suggestion that the rich would expand their residential area outwards along transportation routes. Later suggestions in the second half of the 20th century oppose this view; and suggest that while the transport axes may lie on the flanks of these high class neighbourhoods, the car is largely a nuisance in terms of its noise and fumes. The premium high class residential areas are therefore likely to be the hinterlands of the areas flanked by these transport networks. In other words, the rich tend to develop their residences away from main highways.<sup>15</sup>

The environmental conscience has thus overridden the then new excitement of the motor car as the symbol of individualism and progress. The Radial

sector theory also takes the work places into account. Hoyt included an industrial area in his model - which was not emphasized by Burgess. Thus Hoyt's model is more realistic with regard to the work-places' location within an urban area.

The multiple-nuclei theory is an elaboration of the two main theories, the concentric zone, and the Radial Sector. It fits the more common situation in which most cities are too complex to be easily described structurally by means of either the two theories. It incorporates the aspect of concentric zonation about each of the nuclei, while allowing for the specialization of each of the nuclei. The spatial distribution of the nuclei allows for an implicit use of transportation network as a means of inter-nucleus communication.

In real life, all the assumptions underlying these generalized models may not apply; or may apply in varying degrees within individual urban areas. Thus, empirical evidence suggests that urban areas can be complex in structure due to physical and socio-economic variables dominant in each individual urban area. This means that each urban area has its own unique shape and land use pattern. Various researchers in different parts of the world have been able to identify the causal effects of the urban areas they

were studying on the social and economic plain. Kingoriah, studying the city of Nairobi found economic forces secondary to legal and social factors in the shaping of the structure of this city. Mabogunje - in Lagos, Akinbade in Abeokuta, Nigeria; and Firey in his study of Boston also hold this view.<sup>16</sup>

#### City Structure and Land Values.

Theories of city structure suggest various land value gradients, depending on which cross-section of the city is taken through the central core. These, as discussed in chapter 4 may have a single peak, or could have a series of peaks, as suggested by Alonso, Warren Seyfried, and others.<sup>17</sup> This assumes peaks of land values in areas of greatest accessibility, and implies peaks of land values along trunk roads; especially if axial development-theory holds true.

#### Location of Retail Centres

##### in Urban Areas.

We have explained in chapter eight that the basic economic forces that determine the spatial distribution of retail centres in urban or nodal regions are analogous to those that govern the spatial distribution of retail centres over homogeneous regions. Urban retail centres serve mainly the population living within the urban region. The size

and spacing of these outlets therefore is effected by the number of people they serve - the level of effective demand over their complementary areas. Transportation costs, usually measured in terms of travel time between the retail outlet cores and the farthest areas of their complementary regions are also instrumental in determining this size. Since the aim of the suppliers and the consumers is to minimize these costs, retail nodes that are located at points of minimum transportation costs from various parts of urban areas are likely to grow fastest and assume higher orders in the service node hierarchy than most of the others. The process of growth generates agglomeration economies, which may aid **the firms located in achieving less costs of** ~~some~~ production of both goods and services. The resulting expansion of these firms causes the overall expansion of the retail nodes.

A fast growing retail node will attract many firms this way, and in the process the demand for land around and within it increases; as the firms that seek to locate in this place compete for the most accessible places. If land around this retail node is allocated to the highest and best uses, a pattern of land uses around the node is going to develop governed by similar economic factors to those discussed in chapter four. Land use relationships



at the points where the boundaries of trade areas exist will be as demonstrated by figure 4-9. The land value gradient cross section will be as in figure 9-6.

Retail land use in most urban areas is usually dominated by a four-level hierarchy of shopping centres; (a) The neighbourhood shopping centre, (b) The suburban shopping centre (c) the regional shopping centre and (d) the Central Business District. The rank and spatial distribution of these over the urban space has been found to follow the Christalleran and Loschian pattern of central places. This pattern may not be well pronounced in some cities, but in the largest metropolises like Chicago, trade areas of the different orders of central places have been identified and mapped. Kimani has found rudimentary trade areas of retail nuclei in Nairobi.<sup>18</sup>

(a) The Neighbourhood Shopping Centre.

Such centres are occupied by three to five shops and serve populations of about 7,000 to 10,000. These centres sell the first order low threshold goods and services, and contain outlets like a provision or a grocery store, a butchery, a bar, a petrol station, shoe repairer, tailor, etc. The area occupied by this kind of trading centre varies from about  $\frac{1}{2}$  hectare to 2 hectares. Activities are arranged so that general grocery shops and provision stores occupy the most

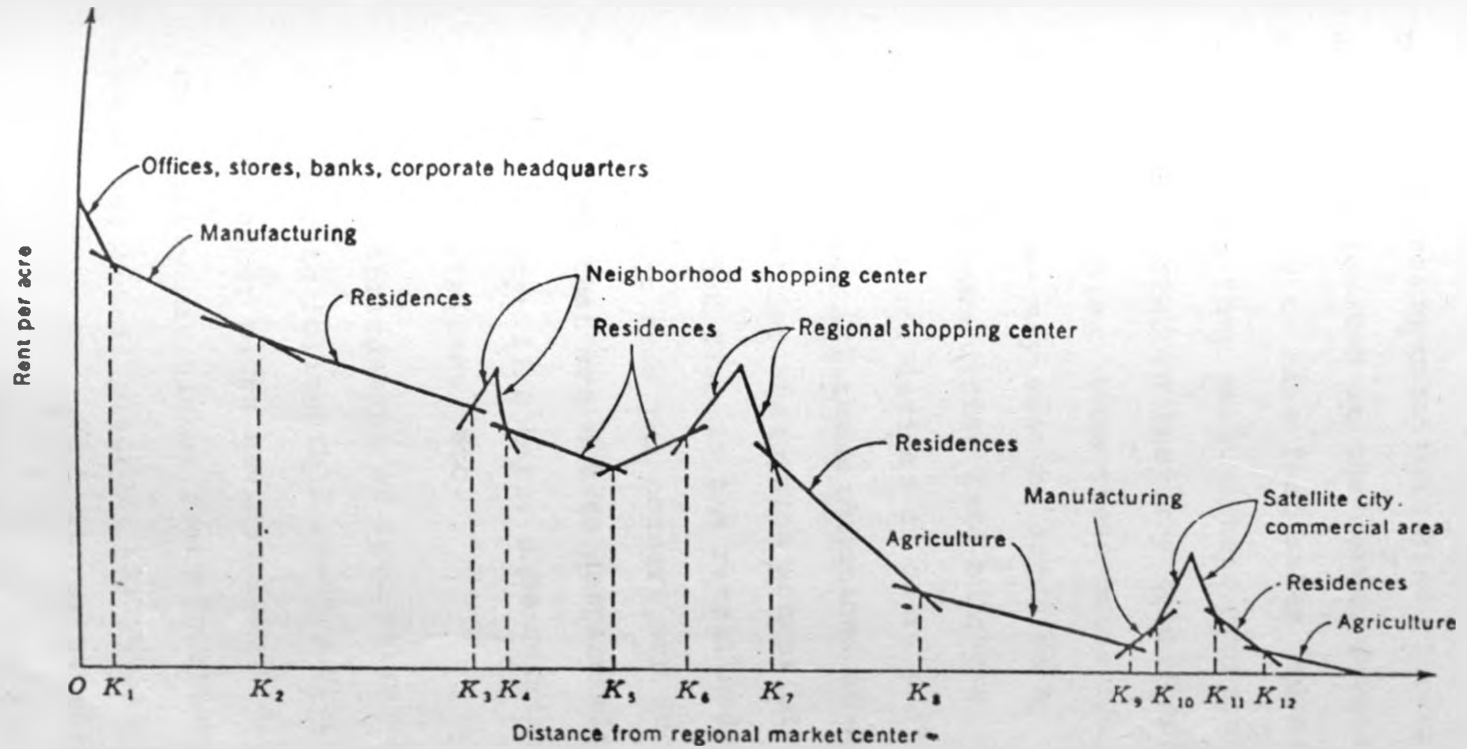


FIGURE 9-6. Land Value Gradients and Land Use Relationships where boundaries of trade areas meet. (SOURCE: H.O. Nourse, *Regional Economics*, 1968).

accessible places - the corners between the axial roads converging onto this kind of retail node. The activities located at the corner depend mostly on their ability to have fast sales and high turnovers of the goods they sell. Their profits depend on this; and therefore they try to compete off all the other activities from these prime retail places. Corner places may also be occupied by vendors of perishable commodities like butchers, green-grocers, fishmongers, and dealers in dairy products. If any firm combines all these functions it will be in greater need for these high accessibility location than any other firm in the retail node. The spaces lying farther from the corners are occupied by other activities that are not so desperately in need of accessibility; like bars, shoe repairers, tailors, hardware retailers, etc.

The arrangement of land values in these centres is likely to follow this rough patterns. Occupiers of the corner plots have to outbid all the others; and usually pay higher rents in attempts to occupy these key retail places. This means that in terms of rental value and capital value corner plots are likely to have higher values than those plots that lie farther away from axial access roads within the retail nodes.

Among the land uses competing for corner plots

are the petrol stations. For the petrol station to survive it will depend on how many cars are serviced in it. A petrol station will therefore be located in a place where it can capture the greatest number of cars passing by the retail node. Due to the high revenues earned from petrol sales, the petrol station firms have higher rent paying abilities than ordinary retail firms. They will therefore tend to occupy the most accessible corner in a retail node; after outbidding all the potential contenders for this accessible place. This prime location is likely to be the junction between the main trunk road passing by the retail area, and a major feeder road into the area. This means that cars passing via the neighbourhood ~~retail node or branching into it~~ can be serviced in the petrol station. This prime site, because of acute competition, is likely to be the highest valued in a neighbourhood shopping centre.

A centre like this could have more than one petrol station if the level of petrol demand is high enough. In case this happens, these stations tend to occupy places farther removed from one another; so that each one can command its own individual traffic. Competition may result, and the most inefficient one may be forced to close.

(b) The Suburban Shopping Centre.

At the second order level is the suburban shopping centre. This is about 4 hectares in area, and could serve as many as 20,000 residents. It includes all the services found in the first order retail node and second order type of services like supermarkets, cinemas, chemists, restaurants etc. The activity that can afford the highest rent will compete the others out of prime locations; and therefore land values and rents are likely to be highest at corner positions between major axial roads. Petrol stations may occupy these prime corners, or such other high turnover retail outlets like supermarkets and fast food joints. Land values are likely to be low for plots lying farther from these prime locations.

This kind of centre is usually situated in more accessible positions within the urban space, and has a higher peripheral area than the first order shopping centre. The goods offered will therefore be a mixture of low threshold and fairly high threshold types. In here we can expect second order goods similar to those offered in a second order rural retail node as discussed in chapter eight. The peak of land values in this node will no doubt be higher than that of the first order centre; since the land user acquiring the most accessible site here will have to bid for the location higher enough to compete off all the uses

that originate from a wider complementary area; and that aim at serving an equally large trade area.

(c) The Regional Shopping Centre.

The regional shopping centre is the highest in the retail centre hierarchy of urban areas, and ranks only below the highest node overall - the Central Business District. Such a centre would occupy several hectares of land, just like a small township. It would be occupied by major supermarkets, clothing shops, shoe shops, bookshops, restaurants and speciality shops like florists, lawyers, doctors, etc. The centre would be patronized by people who would ordinarily want to go to the CBD but are hindered by high transportation costs between the outer suburbs and the CBD. In this case the patrons may visit the CBD if they have real urgent reasons to do so; otherwise, all their shopping would take place in the regional centres. These centres are best developed in the largest cities where distances from their outskirts into CBD are great enough to necessitate creation of alternative high order shopping nodes in the suburbs. Some of the goods offered in regional centres have as wide threshold areas as those of the CBD. In fact, there is some retail and service competition between the CBD and regional centres in the provision of some of the goods. Each of these regional centres could therefore carve itself a specific trade area for any type of good; which would

be different from any other centre, and from the CBD. In addition to these higher order goods, the regional centres would contain all the lower order goods and services in the manner elaborated by Bochert, (chapter 8).

(d) The Central Business District.

This is the highest in the hierarchy of urban retail outlets. The district offers all those goods available in all lower order nodes, but also provides the services for the entire metropolis and the complementary area of this metropolis. Top order commercial and business activities, such as headquarters of banks and financial institutions are situated here. The local and central governments for the urban area and the surrounding countryside also are usually situated in the central business district. Its physical characteristics are as described earlier in this chapter. Land values should be highest in this area because of the accute competition for land caused by its high acessibility from the entire city and its complementary area. The internal arrangement of land values is such that the centre of the CBD has the highest land values in the city and its surrounding region;<sup>19</sup> as shown in figure 9-7.

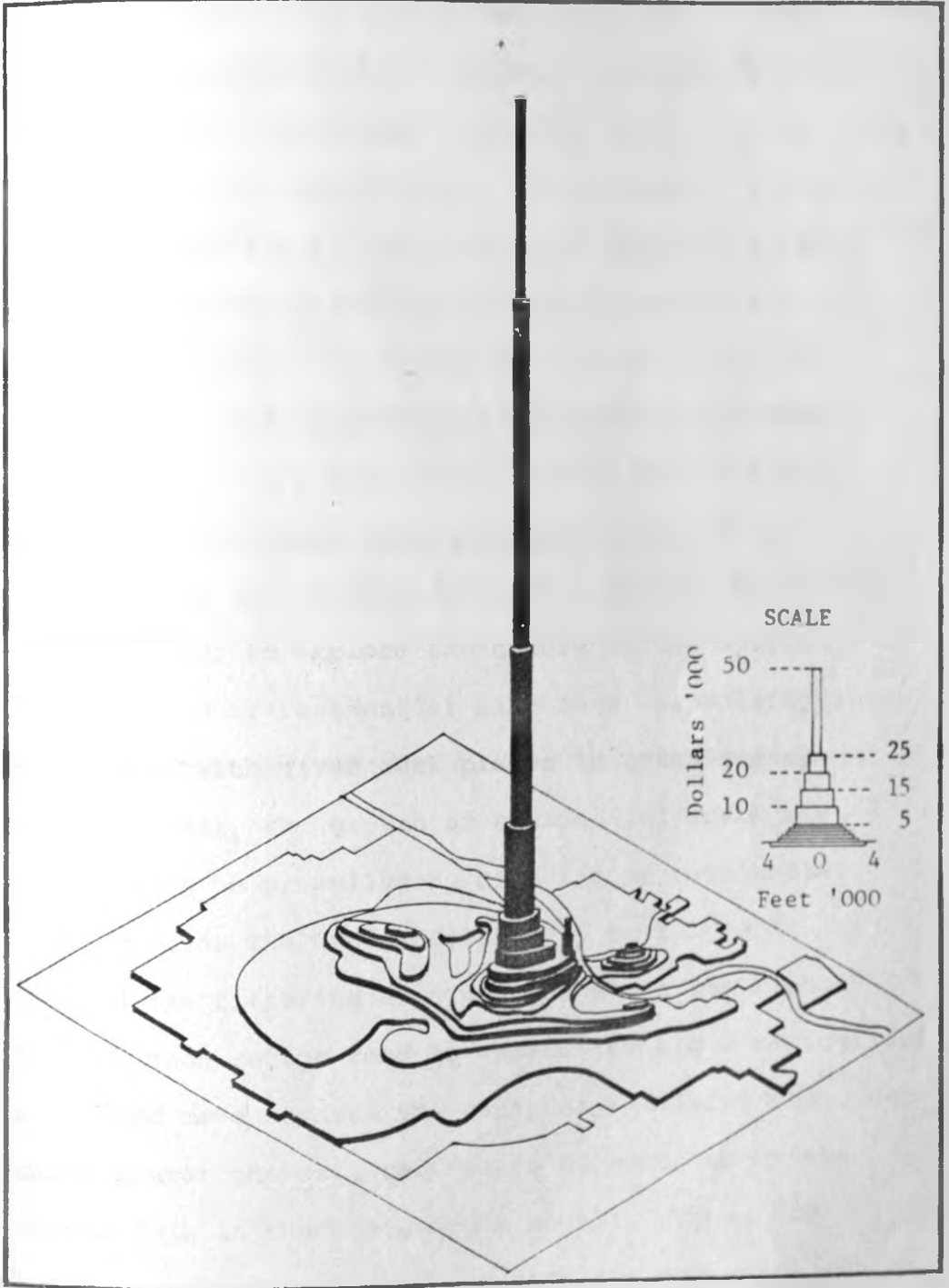


FIGURE 9-7. The Internal Arrangement of land Values in Topeka, Kansas. (SOURCE: Duane S. Knos, Distribution of Land Values in Topeka, Kansas, Centre for Research in Business, The University of Kansas, Lawrence, Kansas, May, 1962).



Residential Location in Urban Areas.

The pattern of residential location in urban areas is embodied in E.W. Burgess' concentric zone model; and in the general rent model within urban areas as explained in chapter four. These models, assuming perfect competition, postulate that residential land use would be compeated off the urban central areas into the periphery by higher rent paying land use activities. They hypothesize homogeneous residential zones arranged concentrically outside the zone of transition; as shown in figure 9-2.

Hommer Hoyt's radial sector model was the first major attempt to explore the nature of the spatial distribution of residential land uses; especially in connection with given work places in urban areas. In this model, the growth of residential areas was supposed to be propelled by high income residential areas towards the urban periphery. Hoyt's model assumed the filtering down process where the richer folk in each sector tend to vacate the older residential areas and move towards the periphery; leaving the older units nearer the city centres to be occupied by the poorer folk in the homogeneous sector. Thus, for example, in the high income sector the new units (which would lie in the sectoral periphery) would be taken over by the richer folk within the income bracket. The now vacant units are left to the poorer folk among

this income bracket. The high income residential sector thus proceeds to grow outwards by "invasion succession". This same phenomenon would occur in the middle and the low income residential sectors.

Most of these city structure derived theories deal with the general pattern of residential location, and do not provide sufficient micro-economic explanation why this residential zonation, or invasion succession takes place. In all these cases there is usually the unexplained paradox that the poorer people tend to live closest to the city centres where land values are highest. Hoyt and Burgess models received much criticism on the grounds that they did not probe deep enough into the causes of the spatial distribution **of residential neighbourhoods; and that they adduced** generalized causes of such distribution which by them themselves were not wholly sufficient.

It was not until 1960s when a true micro-economic theory of urban land use was brought forward by William Alonso. As we have seen in chapter four, Alonso built his model from the existing theories of rent, dating back from the days of J.H. Von Thunen. His theory deals explicitly with the location decision of all urban land uses, given the profit and utility maximizing motives of urban firms, and their resistance to distance friction - desire for accessibility.

His theory on residential location considers the residential decision of the individual household. Like it does for all urban land uses; it employs ordinal utility analysis (indifference curves); focussing specific attention on the complex trade-off between the desire for necessities, the desire for accessibility, and the desire for the amount of living (or activity) space. The theory, as it applies to residential location, examines this trade off at varying income levels. In order to simplify the subject matter of study, i.e., the complex urban space, Alonso based his study on several simplifying assumptions:-

- (a) that the city lies on a featureless plain;
- (b) that it has a single centre in which all employment is located and in which all goods and services are sold;
- (c) transportation costs are equal in all directions;
- (d) that land rent declines with distance from the urban core; as claimed by all the regional scientists preceding him.  
(Later, in his chapters five and six he proves rigorously why land values ~~should~~ should decline with distance).

Given this simplified situation, the theory examines where a household with fixed income and

accessibility preferences, space preferences, and a desire to consume other goods would locate its residence in relation to the city centre. He examines the quantity of land that any household of this nature (at all income levels) would like to consume; where such land would be located, and how this location decision is affected by the level of income of the household - given the prices of transportation, space and other goods. A similar approach is adapted to all other urban and agricultural land uses.

After rigorous formal analysis he shows that lower income households will tend to locate their residences in the central locations of urban areas; and that upper income households would tend to occupy peripheral areas. This happens because the rich can afford to buy more land than the poor in the social system where land is sold in plots of specific large areas in hectares. Thus, while land in peripheral areas could be cheaper than land in the core areas on a per-unit basis; the poor cannot afford such land as it becomes available in the market, because it is not sold in individual units, but in large tracts.

In addition, the upper income groups can be able to afford the transport from the urban fringes to the CBD every day; because this is where their work places are assumed to be situated. Therefore, the rich can purchase large parcels of land in

peripheral areas (which would serve as amenity space around their residences) at cheap per unit area prices. The saving in land costs can easily compensate transportation costs and they are then left with much more to spare.

The lower income brackets, on the other hand, cannot afford the increased transport costs the farther away one moves from the city centre. Neither can they afford to purchase large tracts of land available in the periphery areas. They would only afford it if it was available in small units to match their low purchasing power; given the income they have to spare for the purchase of space from their meagre earnings. Even if the land in the periphery were available in the small units that they could afford, their saving in land costs would be easily offset by the cost of transportation from these residential areas in the periphery to the work places. Anyway, because no small units of this kind are available the low income would have to search elsewhere in the city for areas where they can "purchase" the land in very small units befitting their income. Ideal locations would have the cheap residential units for their occupation that would again be commensurate with their income levels, and at the same time be near their work places to economise on transportation costs.

The only places where economic forces are such

that this "fractional division" of land parcels is possible are located in the areas near the central business district. Such an arrangement (fractional land parcel apportionment) is possible through the construction of multi-storey blocks of flats where several residential units situated on top of each other can occupy the same area of urban residential land. In this case, although the cost per unit area of land in these areas is high, the fact that such land is occupied by many residential units on top of one another reduces the cost of land "occupied" by each dwelling; because several dwellings "share" in the cost of one unit area of this expensive residential land. Thus, economically, the land costs are shared by many dwellings of low cost construction within the multi-storey blocks of flats; and these are available for occupation by the low income.

The theory therefore predicts that although two households may have the same preferences for space and accessibility, the lower income households will locate nearer the centres of urban areas on smaller parcels of land that have been partitioned through the zoning system and the construction of multi-storey blocks of flats. The richer household will locate farther from the centre on large parcels. This way the low income inhabit the residential areas with higher density of dwellings per hectare (high density

residential areas) near city centres; and the high income occupy the low density residential neighbourhood in peripheral areas.

Alonso showed that his theory can be used to prove that as income rises within the high income bracket the optimal location of their residential areas does not necessarily move away from the centre continuously. In fact, at a certain income level, the distance from the city centre and the accompanying spatial amenity at the peripheral areas become some kind of inferior good. This implies the very high income tend to reverse the direction of the trend of residential location, and to move towards the city centres. This is because at these income levels, these residents can afford to purchase large parcels of land even relatively near the city centres for amenity purposes and for their convenience. By so doing they can eliminate transportation costs altogether.

Alonso's theory is a more rigorous elaboration of the concentric zone theory; and explains the rationale for the location of the "working men's homes" in the proximity of the CBD. It also provides economic answers as to why "better class residences" are situated away from the CBD; using rigorous mathematical analysis.<sup>20</sup>

However, the model is highly simplified, and cannot be used to predict whether the rich will, in fact,

continue to live in the areas they are supposed to live; or whether any other income brackets will continue to occupy their respective places. Space and accessibility may be over-emphasized in the model in quest for simplification. When the complex urban space is considered, a long list of factors affecting real residential decision other than these two may be drawn. These, Alonso pointed out that they exist; but he did not explain them because he was interested in the general theory of land rent. Empirical studies have found out that while the trade off between land quantity and accessibility may be important it is not overwhelmingly so. The sources of employment, infrastructural layout, location of schools and hospitals, physical features, special scenic beauty locations, etc., all play some role in influencing the sum total of urban residential location decisions. These act to distort the patterns as proposed by Alonso, Hoyt, Burgess, etc; and give greater conceptual insight to the Multiple Nuclei model of city structure - where the nuclei are determined by some of these factors.

Location of Urban Public Service Facilities.

There are different types of public service facilities, depending on their operational and spatial characteristics. There are those that are available through a system of centres (i.e.; points in space)



like schools, government offices, hospitals, etc. Others may be provided through a network of inter-connecting lines like roads, telephones, electricity, etc. Those that are provided through centres can be farther sub-divided into pick up services and delivered services. A clear example of pick up services are hospitals, government offices and schools. Delivered services are like health visitors, agricultural extension services, etc. Network services fall into two categories; Transportation services (Roads and railways) and non transportation services.<sup>21</sup>

#### Pick-Up and Delivered Services

To receive pick-up services the public must travel to the centres that offer the services. The size and spatial distribution of these services has to be related to the equity and efficiency considerations of the public body providing the service. The aim of these bodies is to maximize social welfare through the provision of any of the services; and this can only be done when these services are allocated efficiently and equitably to all the citizens for whom they are intended. The most efficient location of these services, therefore, is that which maximizes their consumption, subject to the budget constraint of the local authority or the public body financing the services.

A public body considering locating these services for its citizens will therefore be faced with two alternatives. If it decides to offer large, but distantly spaced centres it may realize economies of scale of operating large centres. However, some sections of the population may be unserved - or served inoptimally in the way that does not minimize their transportation costs; and therefore does not maximize their welfare. On the other hand, a system of small but closely spaced centres increases overall accessibility and minimizes transportation costs to the recipients of the services. It ensures greater enjoyment of the services by the community; but at the expense of large scale operational economies. These two factors have to be weighed carefully, and a decision has to be made so that the social benefits in each case balance out social costs.

Similar considerations are borne in mind by the public body offering delivered services. The difference is that large depots or stations widely scattered in space increase the transportation costs borne by the public body; and may not cover the population supposed to be served adequately. This tends to increase social costs in terms of transportation expenses borne by the public body; and to decrease efficiency in the provision of the service. However, economies of scale of running large

stations or depots are realized. If, on the other hand, small depots are provided all over the space to be covered there are diseconomies of scale incurred in running many small centres. However, the service is more efficient, and the public authority saves in transportation costs. In this case also social costs have to be offset by social benefits.

The criteria for measuring social costs and benefits is largely subjective, but could be estimated by trying to calculate each item of cost and each benefit analytically. There are inherent weaknesses in cost/benefit calculations which we do not have space to discuss here, but which the reader is referred to any textbook on this subject.<sup>22</sup> However, we may generally conclude that for both pick-up and delivered services, very many small service centres are more equitably distributed than a few large centres. Transportation services to obtain or take services borne by the consumers, or the government respectively are minimized. On the other hand very small centres may be inefficient. Efficiency rises with the size of the firm the manner of the total product curve; and declines later when the centres are too large and very widely spaced. Equity declines with the spacing of the centres, despite their size. Obviously, the more widely spaced the centres are the bigger they are required to be in order to serve the population they

are meant for.

For both types of services, the most efficient location is where the marginal savings due to economies of scale in their operation equals the marginal increment in transportation costs to the community being served. This occurs at the intersection of equity and efficiency curves where these marginal values are equal; size and spacings in figure 9-8. The level of equity and efficiency is at  $E_1$ .

It must be mentioned that the services may not be of that exact size; and may not lie exactly that distance from the centre. Donald McAlister gives their size and locational distribution a 5% tolerance on each side of the optimal. This is because of the other items of infrastructure, and other economic activities that may be situated in places where the exact location of the services may be required. If the land neighbouring this location is also required by other economic bodies the size may not necessarily match the spacing. The areas these services occupy and their levels and scales of operation could be a little smaller or a little bigger.

Other authorities have suggested that these services would tend to be located in central place areas in accordance with their service hierarchies as discussed in chapter Eight. The government or public authority, having already been used to the physical

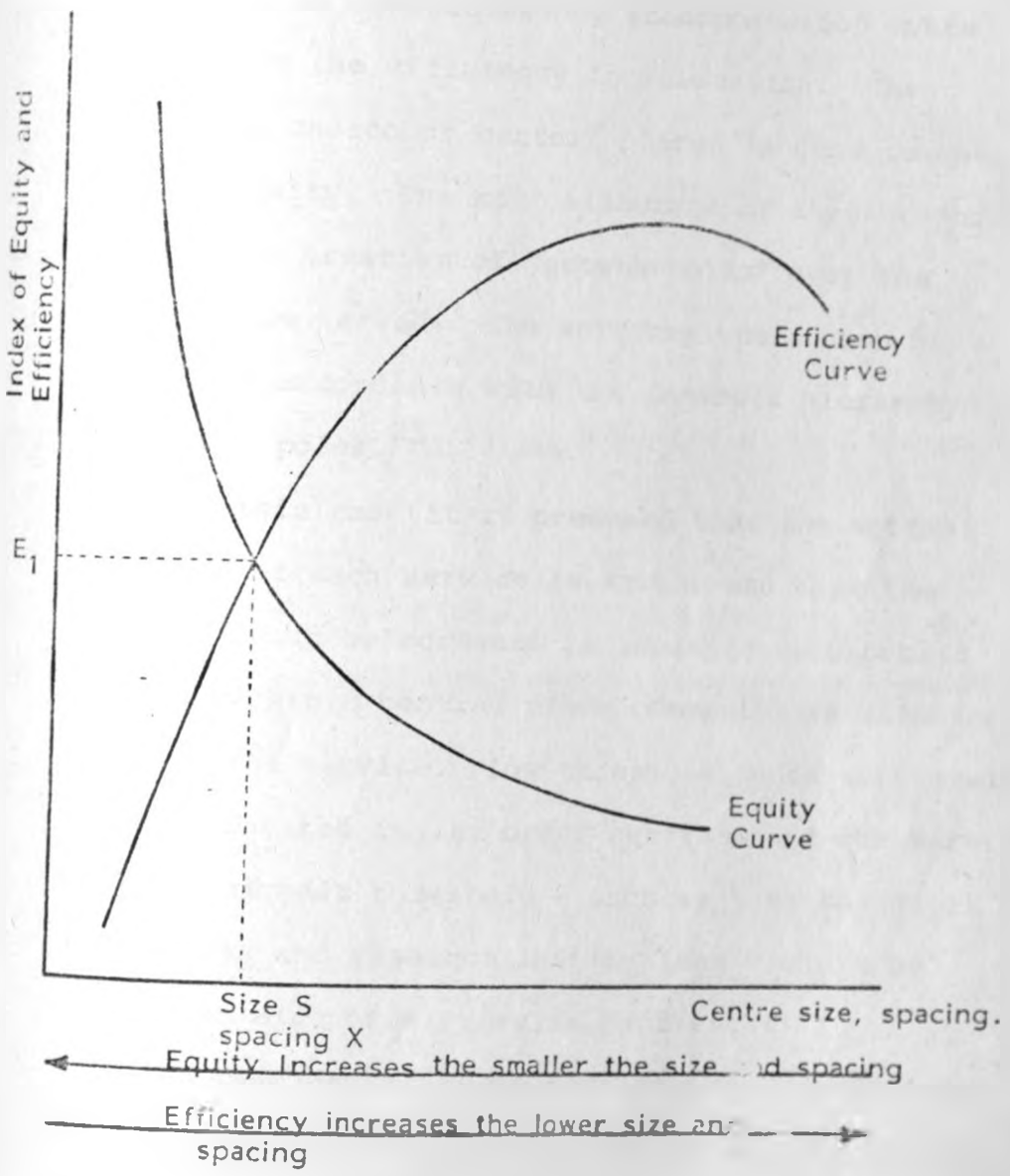


FIGURE 9-8. Intersection of Equity and Efficiency Curves. (SOURCE: Donald M. McAlister "Equity and Efficiency in Public Facility Location", 1976).

hierarchy of central places, may deliberately locate these services in appropriately ordered central places; hoping that the economic forces of supply and demand as constrained by transportation costs will govern the efficiency in allocation. The deliberate choice of central places is done to ensure maximum equity. The most elaborate of these theories suggest the creation of "growth poles" over the region to be served. The services would then be located in accordance with the intended hierarchy of the growth poles.<sup>23</sup>

In this case it is presumed that the optimal threshold of each service is known; and that the planners would be accurate in locating each public service within a central place commensurate with the order of the service. Low threshold goods and services would be located in 1st order centres; and the services with the highest threshold - such as meteorological departments and research institutions - would be located in high order service centres.

In case any of these services are provided by private bodies, these private bodies tend to choose the places of location in accordance with how much the demand for the service is over the space intended to be served. Widely spaced services that are too large may be inefficient and may attract competition in the unserved spaces in between as discussed in

chapter Eight. If the services are too small they may be driven out of operation by the diseconomies involved in operating too small and too many services. In this case the firm would seek to maximize profits. If it was the only one allowed to provide these services it may have a spatial monopoly; and its profit levels would need to be carefully regulated by the government to make sure that the public is not overexploited by the firms' pricing policies.<sup>24</sup> It must be mentioned in passing here that the amenities available in a neighbourhood affect the demand for land in the neighbourhood. The higher the level, quality, (etc.) of amenities, the higher the value of land around these amenities.

#### Location of Transportation Network

In a hierarchical order of central places within an urban or a rural region the transport network acts as a link between the various central places. Central places, on the other hand, would not require to be linked if there is no interdependence amongst them. This interdependence, or "interaction" has to exist in between central places for there to be a demand for linkage through transportation network. Along these links the public authorities, in response to similar demand, run the other types of network services; non transportation services like power lines, telephones, etc.<sup>25</sup>

This interaction among central places is the so called complementarity of central places. It refers to the distance between central places and the supply and demand relationships for goods and services **between** central places. The distances between the central places influences the cost of transport between them; and the supply and demand relationship is the attraction to interact between central places. Both these two factors have been studied extensively, and can be summarized by means of the gravity model - borrowed from Newtonian physics - to help explain the attraction between central places. In the model, central places are considered as masses of differing magnitudes measured in terms of population sizes and any other variable under consideration.<sup>26</sup> In its simplest form the gravity model is as follows:-

$$I_{ij} = \frac{P_i P_j}{d_{ij}}$$

Where

$I_{ij}$  = the amount of interaction between two central places of size  $i$  and  $j$ .

$P_i, P_j$  = Population of centres  $i$  and  $j$ . respectively.

$d_{ij}$  = Distance between centres  $i$  and  $j$ .



The model simply states that interaction between the two centres  $i$  and  $j$  would vary directly with the product of the number of people living in both centres; and inversely with the distance between the central places.  $d_{ij}$  Is the so called distance friction - the smaller the distance friction, the greater the interaction; and vice versa.

The gravity model is used by transportation planners in many modified forms, but it takes this basic mathematical relationship. These planners are interested in finding the inter-central place traffic generators or the demand and supply relationships as manifested by the desire to travel among the populations of both centres. It is after finding these generators that they can determine the size and the location of transportation lines in urban and rural areas.

It is envisaged that in between central places there are traffic generators or population attractors manifested by the services offered within these central places and their demand on either side. These cause backward and forward movements of population along the shortest routes between the central places.

The nature of the behaviour of public bodies in providing this network is that there is a delayed reaction; especially in capitalist economies. Since the public network and transportation services are provided through taxation, there is usually political resistance to increased taxation; so that, may be, each central place may not be served with transportation and network services as fast as it should be. In most cases the demand and supply relationship causing the volume of traffic between central places has to grow to such a scale that the volume reaches almost emergency proportions before the public bodies respond to the need for these infrastructural services. Traffic between the existing lines of shortest communication has to be congested or nearly so to attract the public opinion favour and votes for widening or building better roads and other transportation network.<sup>27</sup> However, when the decision is made, the location of this network of transportation and non transportation services tends to lie in the shortest distance between the two central places. The amount of land used depends on the volume of traffic - which in turn is determined by the expected interaction between the two nodes as measured through the surrogates of "traffic generators". The location will however be subject to physical and socio-economic constraints like the land terrain political choice and the budget of local authorities.

Once the traffic and non transportation network is located, it affects accessibility, and land values in accordance with the theoretical framework described in earlier chapters, especially chapter 4. Central place relationship, land value gradients and the entire arrangements of economic activities may be affected. The nature of the land use arrangement may change overtime this way. Some areas may experience economic growth, and others may decline. The resulting trend will depend on the impact of the newly created accessibility; and can only be predicted depending on the prevailing social and economic circumstances of each case.

FOOTNOTES

1 Within Nairobi and very many urban areas social tastes and preferences have played a great part in shaping the city structure. These form the component parts of the city's political opinion, and in most cases are the chief determinants of the city structure. Economic forces have been found to be secondary in shaping the city structure. See George K. Kingoriah "The Causes of Nairobi's City Structure," Ekistiks 301 (July/August 1983), pp. 246-254.

2 D. Hywell-Davies, "The Hard Core of Cape Town's Central Business District," Economic Geography, Vol. 36 (1960), pp.53-60; R.E. Murphy and J.E. Vance, "Delimiting the C.B.D." Economic Geography Vol. 30 (1954), pp.189-222; Harm J. de Blij, Dar es Salaam: A Study in Urban Geography (Evanston, Illinois, Northwestern University Press, 1968); Harm J. de Blij, Mombasa: An African City, (Evanston, Illinois, Northwestern University Press, 1968); Akin L. Mabogunje, "Evolution of Retail Structure of Lagos, Nigeria," Economic Geography, Vol.40 (1964), pp.304-23; Harm J. de Blij, "The Functional Structure and Central Business District of Lourenco Marques, Mozambique," Economic Geography, Vol.43 (1967), 347-67.

3 George K. Kingoriah, "Policy Impacts on Urban Land Use Patterns in Nairobi, Kenya: 1899-1979" (Unpublished Ph.D. Dissertation, Indiana State University, Terre Haute, Indiana 1980); chapter I.

4 Ibid: The entire work emphasizes the role of the planner and decision maker in the shaping of City Structures.

5 Arthur F. Schreiber, Paul K. Gatons, Richard B. Clemmer; Economics of Urban Problems; (Boston, Houghton Mifflin Co., 1976), pp.26-29. There is, however, a reversal of this trend since 1973 because of increasing costs of motor transport caused by rising fuel prices.

6 Harry W. Richardson, Regional Economics; (New York, Praegar Publishers, 1969), pp.145-146.

7 Ibid: Footnote on page 146.

8. Ibid: p. 146.

9 Ray M. Northam; Urban Geography;  
(New York, John Wiley and Sons, 1975), pp.188-191.

10 Hommer Hoyt, The Structure and Growth  
of Residential Neighbourhoods in American Cities,  
(Washington, D.C., Federal Housing Administration,  
1939).

11 R.D. Mackenzie; Metropolitan Community,  
(New York, McGraw Hill, 1933).

12 Harry W. Richardson; Regional Economics;  
pp.145-159.

13 Colony and Protectorate of Kenya:  
Report of the Local Government Commission, 2 Vols. by  
Mr. Justice Feetham. London, The Crown Agent for the  
colonies, 1927. George K. Kingoriah; "Policy Impacts;"  
chapter 3.

14 Harry W. Richardson; Regional Economics;  
pp.145-149.

15 Ray M. Northam, Urban Geography,  
pp.188-196.

16 George K. Kingoriah, "The Causes of  
Nairobi's City Structure," Ekistiks 301 (July/August  
1983), pp.246-254. Harry W. Richardson; Regional  
Economics, p.146. Akin L. Mabogunje, "Evolution of  
Retail Structure of Lagos, Nigeria" Economic  
Geography, Vol.40 (1964), pp.304-23.

17 William Alonso; Location and Land Use;  
(Cambridge, Mass.; Harvard University Press, 1968);  
Warren R. Seyfried; "The Centrality of Urban Land  
Values," Land Economics, Vol. 39 (1963) pp.275-284.

18 S.M. Kimani; Location and Functional  
Structure of Shopping Centres in Nairobi; (Nairobi,  
Kenyatta University College - limited circulation -  
Department of Geography, 1970).

19 Warren R. Seyfried; "The Centrality of  
Land Values." Ray M. Northam, Urban Geography, p.202.

20 William Alonso, Location and Land Use.

21 Donald M. McAlister; "Equity in Public  
Facility Location in Public Facility Location;"  
Geographical Analysis Vol. 8 No. 1 (January 1976),  
pp.47-63.

22 A.R. Prest and R. Turvey, "Cost-Benefit Analysis: A Survey," Economic Journal, (December 1965), pp.683-735; provides an excellent introduction to the theory and practice of Cost-Benefit analysis.

23 David M. Smith Industrial Location: An Economic Geographic Analysis; (New York, John Wiley and Sons, Inc.), chapter 24.

24 Monopoly regulation is a major subject of study in neo-classical economics; and the literature dealing with is too wide to deal with in this footnote. Interested readers may want to look at E.K. Hunt, and Howard J. Sherman, Economics: An Introduction to Traditional and Radical Views; (New York, Harper and Row, Publishers, 1978), pp.467-490.

25 Ray M. Northam, Urban Geography: chapter 14.

26 Ibid: pp.116-119, pp.322-351.  
Christopher N. Omare, "Gravity Model and its Application to Regional Planning." Ardhi: Journal of Land Development, Vol.1 No.2 (September 1981), pp.21-27.

27 For example, Nairobi's traffic along Juja road, Ngong road and Jogoo road is now in a crisis stage. There has been remarkably slow response on the part of Nairobi city authorities to deal with the situation. A clear socio-political rationale on the negative attitude by local and central authorities to environmental and infrastructural degradation is given in E.K. Hunt and Howard J. Sherman, Economics; whole work; especially, pp.499-511, J.K. Galbraith also explores the same phenomenon in his Economics and the Public Purpose (New York, Penguin Books, 1983); the entire volume.

## CHAPTER TEN

### LOCATION OF INDUSTRY

#### Survey of Industrial Location Theory

This chapter aims at looking briefly into the theory of the location of industry, and examining the relationship between it and the general land economics theory. The theory of the location of industry is an involved subject that demands independent treatment in a textbook of its own. Therefore it is difficult to be able to cover it exhaustively in a brief chapter. However, an attempt will be made to highlight the development of this theory; and its current applications.

Industrial location theory is just another sub-branch of location theory - and therefore falls under the scope of study of land economics because it examines the economic factors that determine the spatial distribution of industries; and how this distribution affects regional economies and land use. These location factors are not unlike those that govern the location of all other activities, which have been dealt with under the general theory of land economics earlier in the text. Whereas the general location theory examines the economic determinants of the location of all other activities over space, industrial location theory forms a

specialized sub-branch of it; and concentrates on the areal dispersion of manufacturing activity.

Both theories have developed nearly independently of one another because of the different emphases that they lay in their terms of reference. It is only recently that a general synthesis of the two has taken place; especially as economists tried to examine the nature of spatial distribution of rents and land values. Despite their near independent development the scholars formulating them kept referring to published literature on both sides; and were always aware of the interrelationship between the two. This explains why in recent times it has become easy to synthesize them in one branch of knowledge - Location theory and Land Economics - when all the related subjects are taken into account.

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



In the 19th century, however, very little work on industrial location was done by economists; because they were pre-occupied with the questions of values and prices of commodities. This trend changed during the end of the 19th century. In this period there were industrial depressions in those areas where industry had mushroomed in the height of the industrial revolution earlier in that century. These depressions made the economists to begin speculating that some of the industries experiencing decline were actually victims of bad industrial location decisions made without regard to important physical and socio-economic factors by the machine-min industrialists of this period. At this time, also, patterns of industrial localization were developing in most parts of Europe and the United States. Economists were also wondering whether these patterns were not the result of favourable factors attracting all industries in specific localized areas.

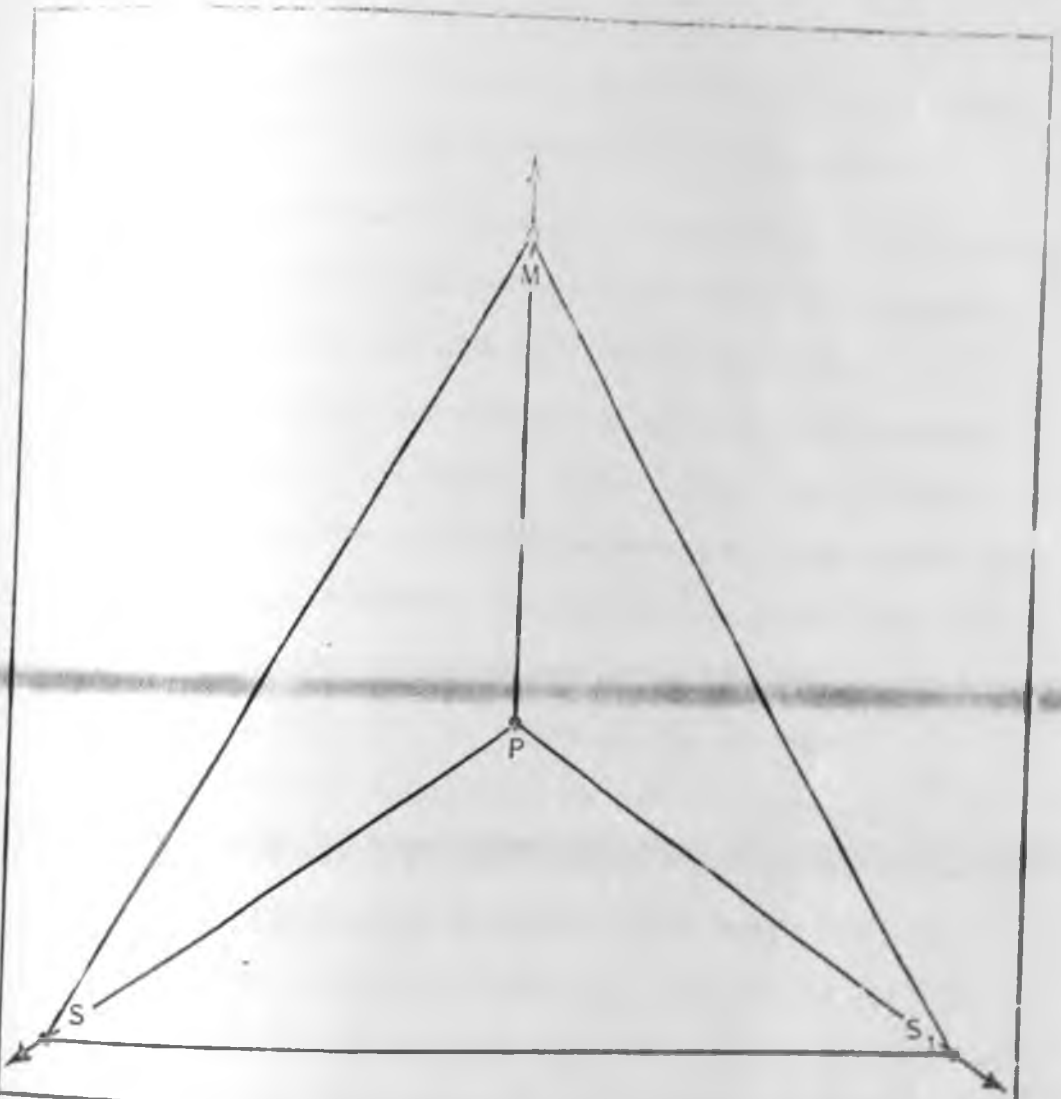
The first positive development of industrial location theory was undertaken by a German economist, William Launhardt in 1882 and 1885. He explained that the spatial distribution of industries was determined by variations in cost and demand factors at alternative locations. He attempted to demonstrate how optimum location of industry could be found in a simple situation with two sources of raw material

inputs, and a market centre of the manufactured product. This was the first attempt to analyse the location of industry using a simple model that has come to be popularly known as a location triangle. In addition he became the initiator of the concept of ton-mileage as it applies to raw materials' and finished products' transportation; through his emphasis on the transportation costs in industrial location theory. According to him, the manufacturer would locate at the point of least transportation costs.<sup>1</sup> (Figure 10-1).

His analysis provided the basis for the theory of industrial location as later stated, and developed by Alfred Weber (below). One of his other contributions was the idea - later upheld by most regional scientists - that theoretically, the hexagon provided the ideal fit for the market areas of identical and equal order of industries over a hypothetical homogeneous plain; but that in reality the market areas tended to be irregular polygons bounded by complex boundaries. He was also one of the early economists to utilize the gravity model in spatial analysis.

Alfred Weber (1909)

The next significant step in the development of industrial location theory was taken by another German economist by the name Alfred Weber. In his Über den Standort der Industrien. (On the Location of Industries) he expanded the theories of his



LEGEND

S; S<sub>1</sub> Raw Material Sources

P Least Cost Location of Industry

M Market: Concentration of consumers of products from this industry

Arrowheads: Indicate direction of pull by cash locational determinant

FIGURE 10-1: The Location Triangle that was developed by Weber as an improvement on the work of Launhardt.

predecessors in Germany, notably Launhardt, with the aim of deriving pure rules of location which could be relevant in real world situations by their ability to hold up to empirical investigation.<sup>2</sup>

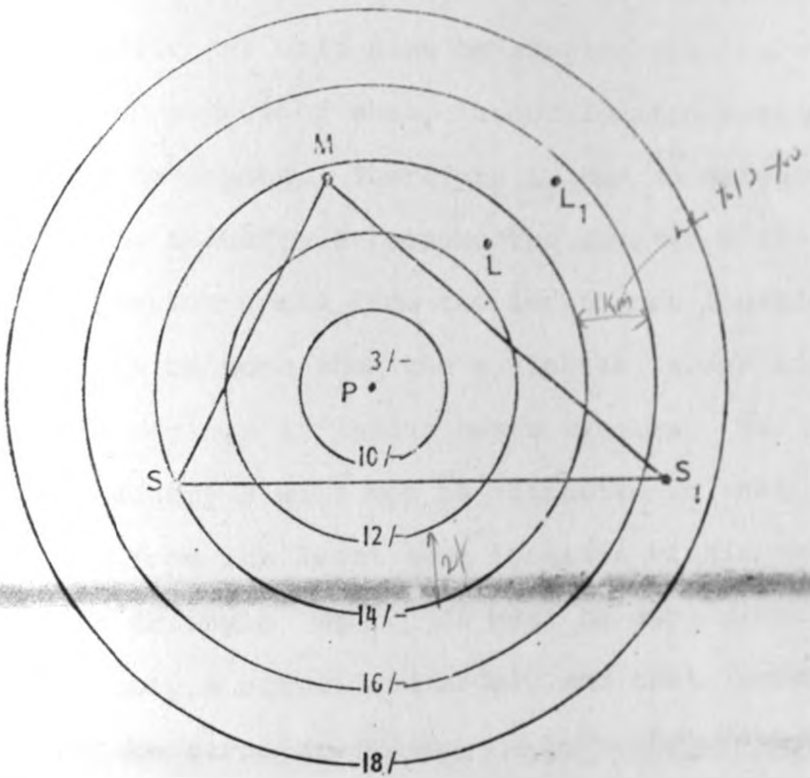
Under carefully stated assumptions he formulated an industrial location model based on the location triangle, and arrived at a conclusion that transportation costs were the primary determinants of industrial location. These costs were a direct function of the distance between the place where the industry is located, raw material sources, and the market for the finished product. The new aspect in his model was the use of isopleths of equal transportation costs that he called Isodapanes. He described these as hypothetical lines joining places of equal additional transportation costs from the least cost location of industry that would be located somewhere within the location triangle. Using these isopleths he demonstrated how an industry would face increasing costs the farther away its entrepreneurs decided to locate it from the least cost location. This is in fact the rationale behind the concept of Isodapanes.

Weber extended his analysis using isodapanes to include the effect of labour costs on industrial location. He showed how cheap labour availability in other places than the least cost location would

influence the decision of entrepreneurs in the choice of the location of their industry (labour orientation). The savings realized in labour costs would determine the position of the critical Isodapane (with respect to labour costs) among the continuous isodapane map around the least cost location (figure 10-2).

The critical isodapane was defined as the locus of all points around the least cost location whose level of transportation cost increases from the least cost location would be equal to the unit saving in labour costs. This meant that the industry would be attracted or oriented to cheap labour until the saving in labour cost diminishes to equal the value of transportation cost increase from the least cost location - the critical isodapane. Beyond this hypothetical isopleth the attraction of cheap labour would end.

The critical isodapane is shown as isopleth 14/- in figure 10-2. Along this isopleth the saving in labour costs per unit is assumed to be equal to total additional transportation costs from the least cost location P, per unit of output. (This is given that the cost of manufacturing product P goes up two shillings 2/- per unit distance travelled from the least cost location points. The horizontal interval between isopleths is assumed to be one kilometre. The vertical interval per horizontal distance is 2/-).



LEGEND

- S; S<sub>1</sub> Sources of Raw Material Inputs
- M Market for finished Product of Industry P.
- P Least Cost Location for this Industry
- L; L<sub>1</sub> Sources of Cheap Labour Input
- 14/- Critical isodapane

FIGURE 10-2: Weber's Isodapanes map and Location Triangle, showing the sources of cheap labour, L and L<sub>1</sub>.

A source of cheap labour L is located within the critical isodapane (14/-). If industry is to be attracted to cheap labour location L the saving in cheap labour per unit must be greater than 14/-.  $L_1$  is another source of cheap labour located outside the critical isodapane. Therefore  $L_1$  has no effect in attracting industry P because the increases in transportation costs from the least cost location are assumed to be more than the saving in labour costs - i.e. if savings in labour costs are less than 14/- at  $L_1$  industry P will not be attracted to that location from its least cost location within the location triangle  $MSS_1$ . It must be emphasized that this is only a simplified model, and that isodapanes need not be circular.

Using model and critical Isodapanes, Weber introduced the concept of Raw Material and Market Orientation; where an industry would be attracted to the factor input that is most dominant in transportation costs - the most costly input to transport. The industry also would be attracted to the market if the finished product demanded in that market is bulky and would increase the transportation costs significantly, the farther the industry is located from the market. This meant that an industry could be raw material or resource oriented if its finished products were "weight loosing" through the process of manufacture.

Examples of this kind of industry are copper smelting, aluminium smelting, and saw milling. On the other hand, if the process of manufacture adds weight to the finished product, the industry would be producing "weight gaining" finished products. Such products would be bulky to transport to their markets if they are located some distance from it; and their transportation costs would increase accordingly. To avoid this, that kind of industry would be located near the market of its finished products. It would therefore be market oriented. He revealed many kinds of orientation, labour orientation, raw material, market orientation, transportation orientation, etc.

In analyzing orientation using the Weberian model, the closeness of isodapanes would determine the direction of highest transportation costs, in the same way as the contours on a map help determine the direction of highest physical inclination on the physical plane. The industries would tend to be located towards the direction of low transport costs to avoid the payment of high transport costs - hence the orientation principle.

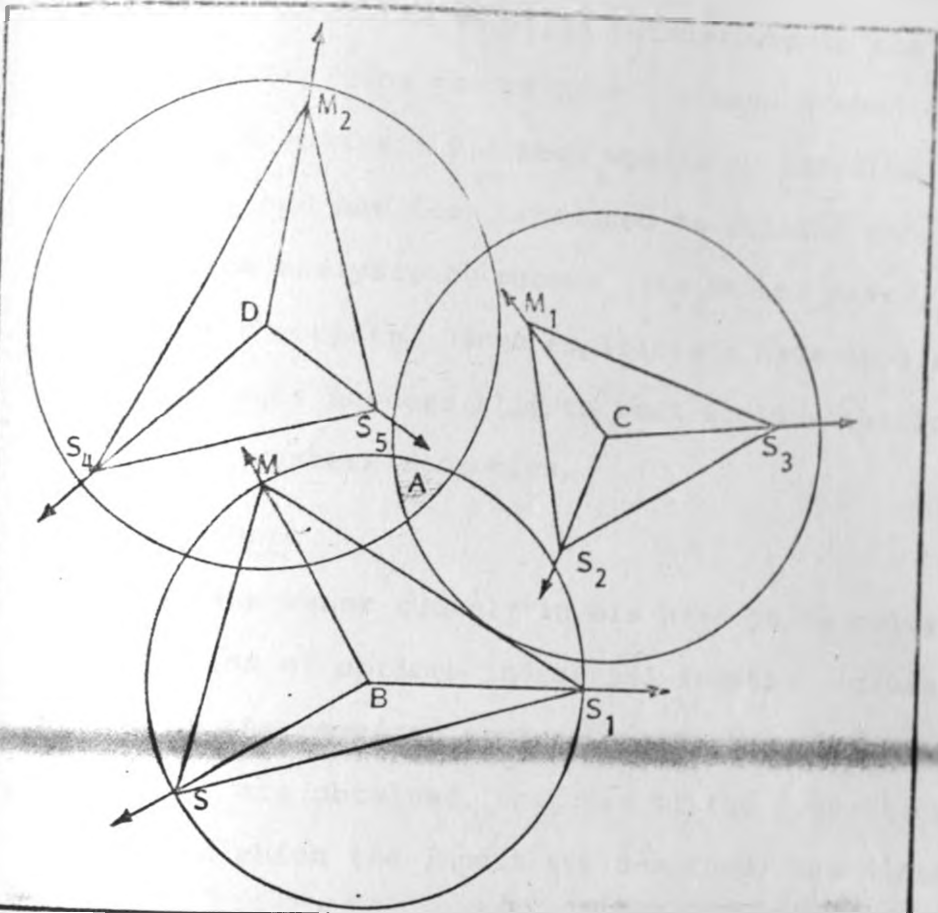
In similar fashion, Weber introduced the concept of Agglomeration; where industries tend to cluster together to benefit from the external economies - linkages with one another; and from savings in transportation costs. If an industry



was using a raw material produced by another industry for example, it may decide to locate next to the industry that is the source of this raw material to bring about savings in transportation costs; and therefore cut down substantially on its production costs.

Weber asserted that industries would be induced to co-operate if their savings resulting from external economies generated by suitably linked industries were bigger than the transportation costs due to the least cost location of every one of the industries involved. This would be determined using the critical isodapane analysis. In figure 10-3 Weber's Agglomeration the benefits of locating at an intermediate location A are greater than the transportation costs from the least cost locations of the three industries "agglomerating", which lie at B, C, and D. As a result of not locating in their least cost location, each industry would incur extra transportation costs. However it would benefit from agglomeration economies by locating at point A if these transportation costs incurred by each industry would be smaller than the value of the benefits due to agglomeration. Note that each industry B, C, and D have their own unique locational triangles.

Weber's analysis is monumental, and forms the backbone of the modern industrial location theory.



LEGEND

- S; S<sub>1</sub>...S<sub>4</sub> : Raw Material Sources
- B; C; D; : Least cost locations of industries B, C, and D
- M; M<sub>1</sub>; M<sub>2</sub>; : Markets: Concentration places of consumers
- Arrowheads : Indicate directions of locational pull by each locational determinant for each industry: B, C, and D.

FIGURE 10-3: Weber's illustration of agglomeration between Industries B, C, and D.

Despite criticism and penetrating review by economists and geographers, the Weberian foundations to the industrial location theory have not been shaken even today. His analysis has been upheld by location theorists, and has been broadened to fit the general equilibrium analysis by people like Walter Isard, and later theorists. Some empiricists have applied his constructs successfully to real world situations within the western economies.

#### Tord Palander

Follows Weber closely in his attempt to solve the question of optimum industrial location; given the **prices of the required production inputs, the area** ~~fi~~ where they are obtained, the cost of the production process in which the inputs are combined, the distance of the market of the finished product, and the cost of transporting the good to the market. In his analysis he brought forth the concept of threshold areas to describe the extent of market areas of the manufactured goods from an industry located in a hypothetical least cost location within the Weberian triangle. Thus, he introduced a new dimension in the Weberian analysis.<sup>3</sup> In figure 10-4 Palander illustrates how boundaries between the market areas of two competing firms can be ascertained using a simplified linear market model. This model looks at the vertical dimension of the Weberian least

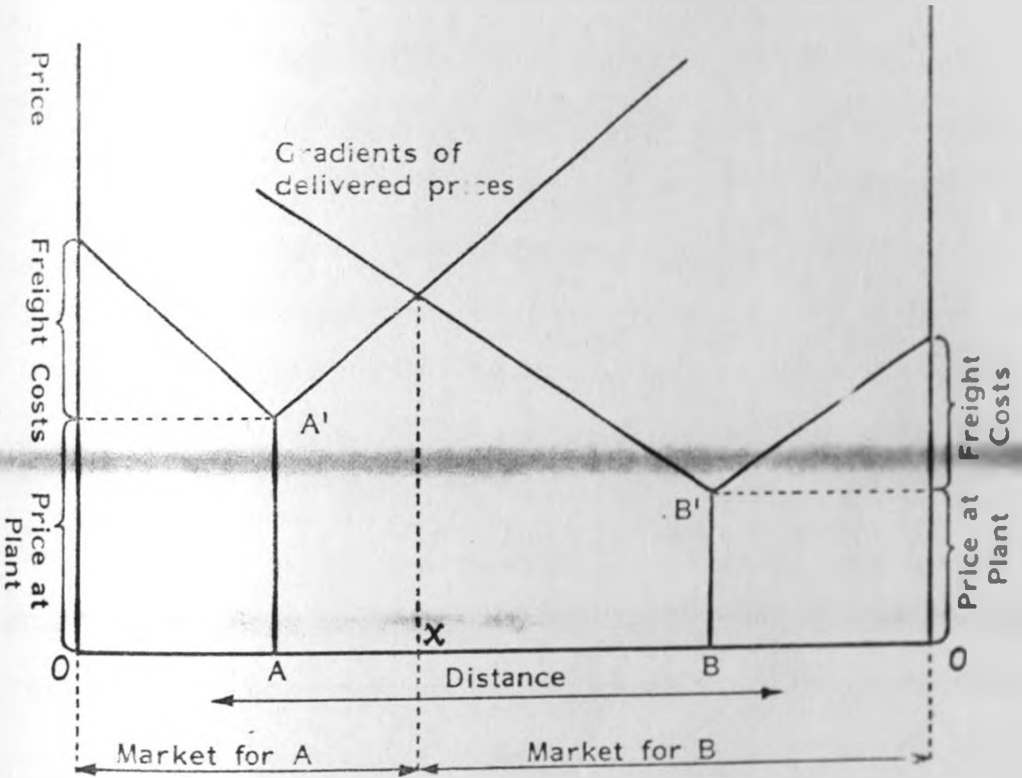


FIGURE 10-4: Tord Palander's "Threshold Areas."

(SOURCE: D.H. Smith, Industrial Location p.120).

cost triangles that happen to be within close proximity of one another (see a similar analysis in chapter 8 based largely on Palander's analysis). They are, in effect, cross sections of isodapane maps of two industries producing the same commodity. The price of each commodity increases with distance from the point of production and forms some kind of a cost gradient that meets that of the neighbouring industry above X. In his opinion, one firm would have a threshold area XA0 and the other one XB0.

Palander saw transportation in terms of these surfaces, those of the Weberian triangle, points. His major concern was with the effect of transport costs on Isodapanes. Although his approach was clearly Weberian, he criticized Weber's concept of agglomeration on the grounds that no firm would leave the least cost location to a position of potential agglomeration, unless it was sure that other positively linked firms would do the same.

His view of location was dynamic, and took into account the changes in locational causal factors over time. The fact that his work was never translated into any other language than Swedish, except for a summary available in French, made it to miss the direct impact it should have had in the early formative stages of industrial location theory. His views were discovered much later in 1947 by Edgar Hoover,

and have been appreciated through Hoover's elaboration.  
(below).<sup>4</sup>

Walter Christaller, 1933 and August Losch, 1939.

Smith identified Walter Christaller's work as the first major geographical contribution to location theory. Although Christaller was not primarily interested in industrial location, and his viewpoint was not entirely geographical he was a geographer by training; and he stands high above others in this discipline who tried to explore and theorize into locational concepts - like Richard Hartshorne (1926, 1927), and George Renner, 1947 - 1950).<sup>5</sup> The disciplinary orientation of geographers prior to 1950 had the tendency to make them concentrate largely on the empirical investigation of the real world. Industrial patterns over space were explained in terms of the physical environment, or as evolutionary trends of the general spatially distributed phenomena. "Consequently, the findings of (their) studies (particularly those with environmental bias) were usually highly restricted in their validity and, on occasions, quite erroneous. Their contributions towards a theory or principles of (industrial) location was very limited."<sup>6</sup> Christaller, however, was the exception during these

evolutionary days of geographical thought (see chapter eight). He laid out a conceptual model with a definite set of assumptions that enabled him to deduce a geometrically regular pattern of central places of different hierarchical orders. Despite the failure of some elements of his model to withstand empirical testing the model is generally accepted as a valuable formal statement of the spatial arrangement of towns and service centres in market economies under his assumptions. Manufacturers in a special demand situation, whose production is **punctiform in location, and whose products are** marketed areally, would find his model as a useful guide to their understanding of the spatial pattern that can be adapted by their kind of manufacturing firms. Through his model these manufacturers would understand better their spatial margins of production in case they made a decision to locate on any point over any physical space.

August Losch improved on the Christalleran model, and described the general spatial relations in a series of simultaneous equations that gave a general equilibrium system to describe abstract interrelationships of all locations.<sup>7</sup> He was interested in giving an orderly general descriptive model of spatial interaction of economic activities following his deep belief that there must be order and

reason underlying the apparent spatial chaos in the world. In a simplified model of spatial equilibrium he arrived at an ideal distribution of homogeneous producers best fitting over a homogeneous, unitropic space - arranged in a set of hexagons similar to those of Walter Christaller. Both him and Christaller believed that the hexagons have the geometrical characteristics that best fit a spatial plane in a market economy where firms are located in equilibrium; so that each is equidistant from the other; and so that each minimizes the total distance from its point of location to the market area.

His conclusions were more rigorously derived, but similar to those of Christaller; although the latter arrived at his from above - the biggest Losch rigorously tackled his unitropic plain from the smallest firms, and incorporated competitive and optimizing economic rationale' to show spatial interaction of producers of homogeneous products; and consequent location of the so called first order firms. He then introduced specialization and agglomeration economies to explain the formation of higher order firms; where each successive order would be arranged in a hexagonal pattern similar to those of the first order, but with commensurate trade areas to fit the order under scrutiny.

He rejected the Weberian least cost approach



in his profit maximizing axioms, and concentrated on the demand side of the problem. Consequently, he became so preoccupied with the demand side that he neglected the supply side of the problem. He elaborated on the supply side (cost function) briefly due to the fact that he considered its main shortcomings as associated with the availability of data, and problems of data separation into their basic and non-basic components - the identification problem.

Melvin Greenhut (1956)

Greenhut made the first attempt to integrate locational interdependence of firms with the least cost approach, after examining both schools of thought that had developed from Weberian analysis on the one hand, and Christaller-Loschian analysis on the other. He attempted to harmonize the two approaches by examining how both cost and demand factors influence plant location. He identified the major location factors and subsequently singled out the costs of transport as the major locational determinant; to be distinguished from the other locational determinants rather than be confused with them. He identified spatial differences in demand elasticities for industrial output as the main cause for either dense or dispersed distribution of the same kind of industry over space. Infinite elasticities of demand for products tend to yield punctiform locations,

while zero or near zero elasticities would tend to disperse firms over space, given spatial variations in transportation costs - and their influence on the delivered price of the product. Greenhut also considered externalities and agglomeration economies as important causes of industrial location; and added another new and ordinal dimension in industrial location theory hitherto accorded insignificant attention - namely - personal considerations of the entrepreneurs in industrial location decisions.<sup>8</sup>

Walter Isard, (1956, 1960)

Isard attempted with plausible success and rigour to integrate location theory with general neo-classical economic theory - attaching great importance to such integration; because he was convinced that industrial location decisions are, after all, economic decisions. He used the principle of factor substitution (isocost/isoquant analysis) as what he deemed to be the "missing link" between industrial location theory and other branches of economic theory. His work<sup>9</sup> is a great synthesis of all location theorists preceding him like Von Thunen, Ricardo, Launhardt, Weber, Palander/Hoover, Christaller/Losch; and other general equilibrium theorists. It forms the "meat" of the skeleton of modern neo-classical industrial location theory that was constructed by Weber.

### Other Contributors

Since Walter Isard the number of location theorists has increased tenfold. It can be said that the field is now well occupied by able researchers who, often, have published authoritative findings on various aspects of location theory in general, and industrial location theory in particular. New techniques of analysis in all aspects of location theory have been developed by aid of the electronic computer and new statistical techniques. The parade of these social scientists is endless; but a few deserve to be mentioned in this brief outline without necessarily be-littling all the other social scientists in this field.

#### **E.W. Rawston**

E.W. Rawston (1958, 1969) was interested in finding out to what extent the choice of industrial location is restricted by various factors in its adjustment towards economic optimality; and how such restriction comes about. He identified three factors that constrain such location as physical restriction, economic restriction and technical restriction. Physical restriction to viability would define the extent to which natural resources are available; economic restriction - the spatial margins of profitability, technical restriction would encompass the need for specialized factor combination -

machinery, labour, etc., how such need has been satisfied, and constraints in the way of such satisfaction. His analysis was geographical in approach, and managed to bring geography closer to economics by getting close to the root of the subject - the emphasis on industrial cost structure.<sup>10</sup>

#### Allen Pred

Allen Pred (1967, 1969) used his new concept of Behavioral matrix to explain the causes of sub-optimal industrial location decisions in the real world, which cannot be explained by theoretical **deterministic models. Variat** information available to each entrepreneur and each entrepreneur's ability to utilize such information (which also varies between entrepreneurs) would determine how each entrepreneur behaves in his choice of what he thinks is the optimum location for his industry. This - coupled with Greenhut's Personal Considerations concept - gives a more comprehensive view on the sub-optimality in industrial location that is so prevalent in real world situations of market economies at the moment.<sup>11</sup> These two agree with recent advances in neo-classical economic theory which concede that an entrepreneur need not aim at profit maximization only, but he could also be a satisficer<sup>12</sup> aiming at a minimum level of profits, so long as his other non-economic considerations

(like being in his hometown, near good sporting facilities, near his girlfriend, etc.) are satisfied.

David M. Smith (1971)

D.M. Smith, from whom this "parade" of locational analysts has been abstracted,<sup>13</sup> (and to whom I am indebted for most of this chapter) synthesized all the earlier work in his authoritative text Industrial Location and developed the concept of the space cost curve based on Weber's Isodapanes and Palanderan threshold area analysis. He incorporated this in his variable cost model of industrial location; and the production costs as affected by variables like entrepreneurial skill, locational subsidy, external economies, substitution between inputs, scale of production and personal considerations.

F.E. Hamilton and Others

In the work edited by F.E. Hamilton called Spatial Perspectives on Industrial Organization<sup>14</sup> is a sample of the current research into industrial location theory. Some of the major concerns of the modern regional scientist and industrial location analyst are highlighted throughout the 1970s decade. The scientists of the latter half of twentieth century are concerned that hitherto industrial location theory has concentrated on the analysis of uni-product firms, which are unconstrained in their

financial resources; and could choose to locate anywhere in an idealized homogeneous unitropic space. Citing cases from the 20th century developing countries and Western Europe during the early stages of industrial revolution the contributors in this work show that the multi-product multinational firm has not been sufficiently analyzed. They show that a gap exists in the neo-classical analysis of the often dominant transnational or multinational industrial firms. In their opinion, locational determinants for these, and their relationship to the developing and developed economies, needs greater treatment in industrial location theory. One of the authors poses the question satirically and theoretically, in the form of a hypothetical corporation called Gismo Inc.; a mushrooming multinational that changes its operational headquarter locations several times as it achieved new trading roles overtime.<sup>15</sup>

The authors manage to demonstrate that the uni-product firm, constrained by both spatial and financial parameters, would behave differently from the classical/neo-classical profit maximizing firm by having no alternative regarding the space of operation and the financial constraints. This kind of firm would focus its attention on what to produce, given the constrained locational consideration rather than where to produce the particular product. This

is the case with the embryonic industries in 20th century developing countries and in the 17th, 18th and 19th century industries in the industrial revolution Western Europe and North America. In the other extreme end the multinational would be so diversified in products that the individual location of one operation in any one country may carry very little weight as long as it does not violate the overall business policy of the multinational concern. The country of location and the financial risks in them would be of greater relevance to the multi-product and multinational corporation. Tendency monopolistic concentration would affect the locational considerations and the scale of operations.

Two of the authors in this work suggest that the multi-product multi-factor input corporation would locate at a position where it equalized all marginal rates of factor transformation with the marginal revenues realized in the sale of the combined outputs produced in a multi-product situation. The marginal rates of transformation by these authors also include input transportation substitution, residue disposal substitution (under different technologies and ratios of product output) or pollution control. These would be equalized to the marginal revenues of different combinations of output for equilibrium to be attained in this kind of the firm.<sup>16</sup>

Inter-city input/output multipliers and industrial linkages are also explored by Allen Pred in this work. He suggests a general probabilistic model for inter-city/inter-industrial interaction, in the place of the simplistic Loschian-Christalleran hierarchical model so prevalent in contemporary neo-classical industrial location analysis. He emphasizes on the behavioral pattern of the industries in the process of spatial interaction and diffusion.<sup>17</sup> Organizational behaviour is explored as it affects the spatial distribution of hierarchically ordered parts of a multinational. The phenomenon of information flows in market economies is given focus; case studies are reviewed to impart reality in the analysis of the process of industrial location decision making; and suggestions for farther studies are given some focus.

In general neo-classical industrial location analysis is an area where active research is now progressing, with new findings coming out every time that have exciting implications and consequences. Current research has been greatly aided by use of the electronic computer in multi-variate analysis of the numerous factors that influence industrial location complicated situations and alternatives can be simulated. "The struggle continues...."



## INDUSTRIAL ORIENTATION AND LOCALIZATION

### Spatial Distribution of Industrial Activity

In chapter eight we explored the Central Place Theory, and discovered how in market economies activities of different orders tend to locate themselves in central places of equivalent orders; so that they may command a spatial market - commensurate with their threshold - for their goods and services. This way, the largest city in a region would contain industries and production activities of the highest order in that region; and its role as a service centre would be enhanced by **housing as many of these acti**

Similarly, it would be expected that in the socio-economic setting the smallest central place would house very low-order and low-threshold types of activities befitting its market area.

Under the assumptions of the central place theory a hierarchical arrangement of central places over the regional space is the result. Similarly, as far as industrial activity is concerned, if any activity had differing orders, or a hierarchy of activities, it would be expected that the lowest hierarchies of these activities would be located in low order central places; and this would continue until the final process would be completed in the central place of the highest hierarchy - if the final

output is a high order threshold good. The reverse would be true for a low order good - administrative activity for example. As an example, it might be hypothesized under these conditions that small components of a large machine could be located in low order central places, and the transportation system would facilitate collection and assembly in a central city, within a specific region. Similarly, a high order good may be distributed to consumer centres from high order central places - e.g. the filtering of administrative activities.

**However, this is not exactl**

real life. The virtual or apparent pattern is only possible if all the assumptions of the central place theory were to hold true. One of these assumptions of this theory is that all industrial activity is market oriented, and locates centrally, so that it can serve a spatial market. The other is that because of this market orientation, industry would tend to 'measure itself up' to its market area; and the entrepreneurs will select that area that maximizes sales, revenues, profits, and at the same time minimizes costs. The costs to be minimized include transportation costs - hence the logic of their locating at the centres of their threshold areas.

On the other hand, the Weberian approach to industrial location assumes that the markets for

industries are punctiform, and that industries need not locate at the market centres because of the desire to minimize the costs of transport.

Weberian analysis suggests that industries could be raw material oriented, if it is more costly to transport raw materials to the place of production than the product to the market. This happens if the industrial product loses weight and bulk in the process of production. The reverse is true if the final product is weight or bulk gaining. This causes the industry to locate near the market or consumption centres in order to economize on the

transport. Thus an industry like saw milling will tend to locate in the forests, where logs would be cut down, shorn of all bark, branches and twigs, and sawn down to convenient timber sizes; which can be easily carried to towns and consumer centres. By contrast, a furniture making industry will locate near the market centres because it is bulk gaining and because transporting furniture is expensive over long distances. Furniture tends to be delicate in nature <sup>this cannot be</sup> if transported over long distances.

Therefore, location nearest the greatest number of purchasers is the most logical decision for an investor in a furniture making industry.

Using the same analysis - or the same logic of orientation - answers have been found to why

smelting industries (like copper smelting, aluminium smelting, etc) are located near the mining areas because of the weight loosing nature of their final product. Soda water industries, beverages such as beers, whiskies, etc are located near their markets because of the bulk gaining and weight gaining nature of the final product. Thus, the Weberian analysis, at first sight, does not seem to be related to the general location theory of industrial and economic activities as postulated through the Central Place theory, and the related location theory.

Moreover, using statistical methods such as the analysis of geographical coefficients "g" (or the coefficients of localization) it has been found that industry is rarely located in response or in relation to the market centres. This is because whereas the system of cities postulated in the central place theory assumes the homogeneous distribution of natural resources, unitropic transportation, homogeneous distribution of population the location of industry theory focusses itself on the location of production activity in a plain where all these assumptions are relaxed. Natural resources are located in punctiform locations in real life, which are unevenly dispersed. Transportation costs increase unevenly with distance; because of the fact that the actual plain is far from being unitropic.

In real life, population is located in areas of concentration, such as cities; or fertile agricultural regions; and sparse in areas that are unfavourable for supporting it - like deserts, swamps and marshes, mountainous areas, etc. Thus, production would be located only in areas suitable for it; and it is assumed in the Weberian analysis that the location of people would tend to follow production activity, and live near their jobs.

The coefficient of localization (coefficient of "g") therefore examines the actual setting of industries under real life situations.

construction of this statistic are irrelevant for this elementary introduction.<sup>18</sup> However, it can be said

here that the statistic varies from zero to 1.0

If the coefficient is zero for any industry or productive activity it means that such activity is located in exact correlation with the market centres, that the industry is directly related to the central place hierarchy (as postulated by Weber, Christaller and Losch). This is because the statistic relies on comparing the differences between the percentage of industries for the whole region that is located in a specific sub-region with the percentage of disposable income distribution of all consumers of the whole region - that are located in that sub region. (The percentage of disposable income is used

as a surrogate to measure the spatial distribution of consumers.) The difference turns out to be zero, in the latter case; and any subsequent mathematical manipulation according to the requirement of this statistic still brings the final result to zero if industry follows the patterns of the disposable income and therefore the product market. Such a distribution of the location of industrial activity is described as disperse or "dispersed" distribution.

If the coefficient is 1.0 it shows that industrial activity is concentrated in one region where there is little or no income <sup>that</sup> little or no consumer effective demand. The location of that particular industry would be at deviance with central place theory. Again, the differences are compared, and figures near 1.0 are obtained in this case. Farther manipulation according to the requirement of this statistic would bring the figure close to 1.0 under these circumstances. The results imply that all the industrial products manufactured in the region are shipped out of the region; and are consumed in market centres situated out of the region. In other words, the coefficient, at all values between zero and one, indicates the proportion of the industrial products that is shipped interregionally to other markets that are not within the regions producing the product - the region wherein the industry is located.

The statistical analysis and other real life experiences have revealed first order industries that are located in the highest hierarchies of central places and very high order industrial activities that are located in or around first order, second order or third order central places.

The problem now remains on the attempts to reconcile the two approaches of the location of industrial and economic activities over space. Beginning with the Weberian Orientation principle, one can assume punctiform markets, punctiform sources of resources and all other industrial inputs. One can then concentrate on the total revenue and total cost functions and find the least cost location of industry. The input combination would be such as to bring about the substitution of those inputs that are more costly than the others; See figure 10-5.

Consider two alternative sites, (1) and (2) where (1) is at the centre of the firm's market and (2) is in any other place that is not in any way related to the market, but is near a raw material source or any other place where some vital input X is least costly. The production process may require the two inputs X and Y where X is concentrated in one location away from the market; and its price is lowest there. Y is uniformly priced everywhere.

The lower price of input X at, any site (2),

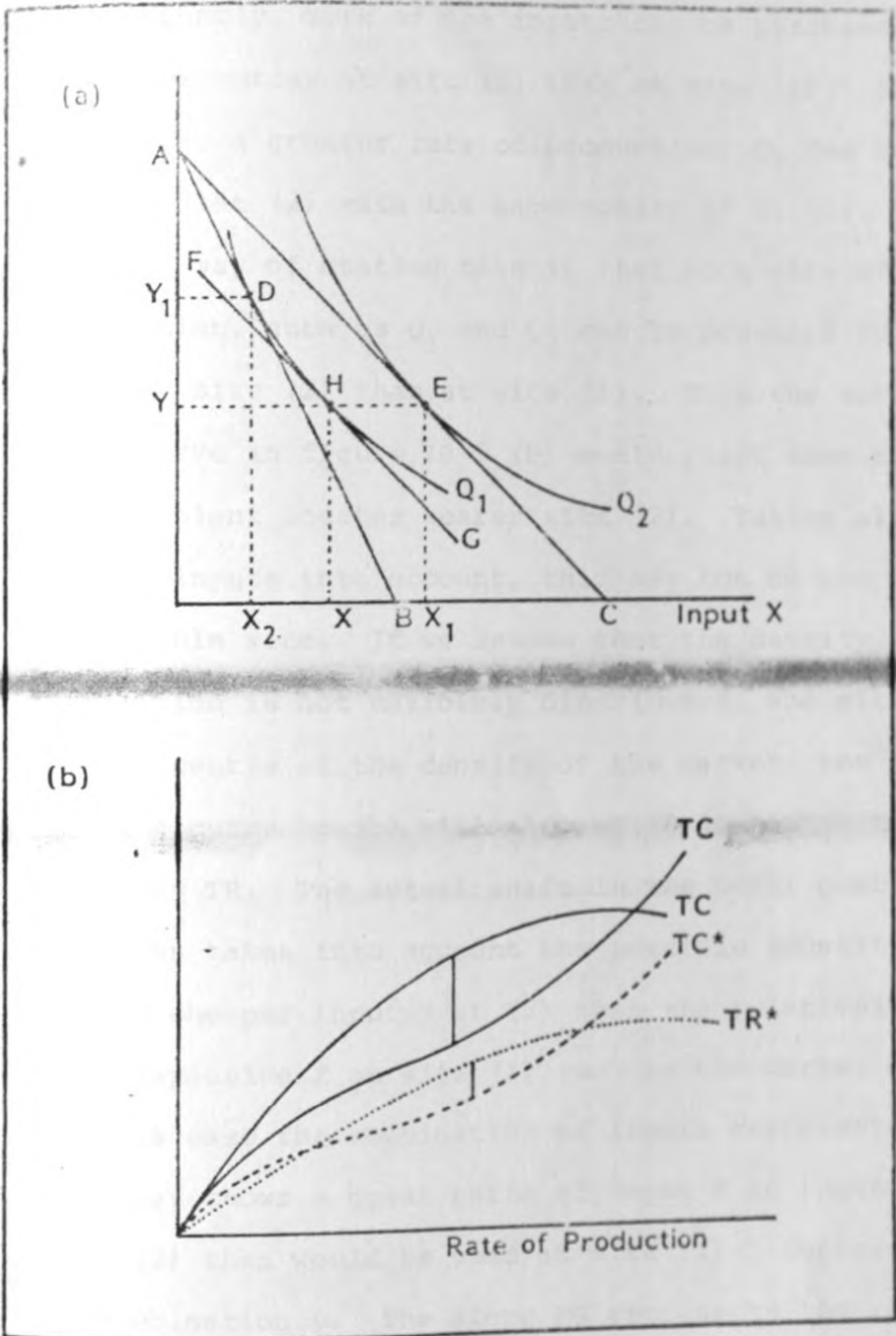


FIGURE 10-5: Illustrating what happens when location change is considered. Any shift in location means that new cheaper inputs will be substituted for those that have been rendered expensive by the shift. (SOURCE: H.O. Nourse, Regional Economics, p.82).



causes isocost lines such as AB to shift to AC. Consequently, more of the inputs can be purchased with the same outlay at site (2) than at site (1). In addition, a greater rate of production,  $Q_2$  can be produced at (2) with the same outlay as at (1). Another way of stating this is that each rate of production, such as  $Q_1$  and  $Q_2$  can be produced for less at site (2) than at site (1). Thus the total cost curve in figure 10-5 (b) would shift down to IC as the plant locates nearer site (2). Taking all factor inputs into account, this may not be the most profitable site. If we assume that the density of population is not uniformly distributed, and site (1) is the centre of the density of the market, the total revenue curve in (b) will also shift downwards to possibly TR. The actual shift in the total cost function takes into account the possible substitution of the cheaper input X at (2) than the relatively more expensive X at site (1) that is the market centre. In this case the combination of inputs represented by H in (a) shows a great ratio of input X to input Y at site (2) than would be used at site (1) - depicted by combination D. The slope FG represents the ratio of input prices at site (2). The line AC at this slope also represents persistence in this input combination that yields a higher level of satisfaction E; than either D or H. E lies on isoquant  $Q_2$ , while

D and H lie on  $Q_1$ <sup>19</sup>.

This theoretical illustration demonstrates what happens in the case of all instances of orientation as described in the Weberian analysis. Any shift in location means that in the new location the expensive inputs will be substituted for other cheaper ones at the new location. "The test, then, of whether the shifting of the plant centre to the input source is an optimum solution, depends on the profitability of the new production process at the new point of industrial location." This is what is aimed at during the comparison of cost structures of this industry at the both locations. Cost structure means a list of input costs for alternative location points that is compared to see which location has the least overall input cost; and therefore the least average costs of production per unit of output.

Assuming, then that the cost structure at the new location (2) that is not at the market centre is low enough to allow the product to be transported to the market (1) and still remain cheaper than the products produced at the market centre (1), this industry will be located away from the centre of market concentration. The transportation network will be used to ship the products to the market; and the inhabitants located at this centre (which has so far been assumed as punctiform) will prefer this product

to the one produced at the market centre (1). Thus (2) will be the seat of the industry of this good and (1) will be supplied with it from (2).

In most cases, market concentration centres are also distribution centres, such that the good produced at (2), shipped to (1) will be distributed to all consumers surrounding (1). This means that the consumers may either come to pick it, or wholesalers may arrange for its transportation to its numerous points of consumption. This way, we are assuming that centre (1) is a central place that serves a spatial area of a specific hierarchical order. Thus the two theoretical approaches are reconciled by taking all the market centres or central places as centres of distribution that need not necessarily be the same as centres of production. The central places play the role of collecting all goods produced within their thresholds and farther a field, if the costs of transportation allow. They then distribute these goods to the consumers surrounding them, or settled within them; according to their hierarchical order. Thus, cement produced in Athi River, near Nairobi but not within the boundaries of Nairobi (Kenya) will be transported to Nairobi and then distributed all over Kenya and East Africa - Uganda, Burundi, Tanzania, etc. Similarly, cement from Bamburi near Mombasa goes into Mombasa

first, and then it can be shipped abroad, or into the Kenyan and East African hinterland of Mombasa. Therefore, although cement is raw material oriented, the transportation and distribution system probably makes it be distributed in accordance with the hierarchy of central places once it has been transported to the nearest central places. It must be noted here that most consumers of cement in Kenya get it from the nearest divisional or district trading centres; which in turn would have obtained it from Nairobi or Mombasa through the transportation network.

This way, industry can obey the principles of the least cost location as explained by Weber, and at the same time the theory of the hierarchical distribution of central places can have empirical relevance. The Weberian approach considers the situation where the assumptions of the central place theory are relaxed. However, the transportation and distribution system serves as the unifying link between the two approaches and retains the validity of the central place theory as well. With this in mind we can go to consider the factors affecting the industrial cost structure in various locations in greater detail. These would be the real life variables that would disturb the assumptions of the central place theory, and that would cause industrial

activity to be located in other places than in direct correlation with the distribution of the market, and with the consumer disposable income - as detected using the Coefficient of Localization statistic.

### Industrial Cost Structure

We have seen in the foregoing analysis how cheaper factors may be substituted for more expensive inputs when an industrial plant decides to locate in some least cost location. These more expensive inputs are the kind that the least cost location is not endowed with, despite its greater productive comparative advantage in relation to every other location. The shift in isocosts and isoquants that results, and the shift in revenue curves (figure 10-5 (a) and (b) is an indication of a change in costs and revenues as a result of movement between the two locations (1) and (2). It is an indication of the change in the relative costs of production between the two locations). The isocost-isoquant analysis is a theoretical method of comparing the relative costs between the two locations. However, this method assumes perfect knowledge of technology - different methods of factor combinations; perfect knowledge of demand and supply functions of all the factors and perfect ability to substitute all factors so that smooth isoquants can be the result. The analysis can also be plausible geometrically in a maximum of three

dimensions. Mathematical conceptualization in a multi-variable situation is handicapped by lack of data and variable identification problems. Current operations research techniques can reveal optimal combinations to near perfection, (especially using the electronic computer) but most of these methods operate within the constraints imposed by simplifying linearity assumptions and assumptions of constant returns to scale and constant input coefficients. In most cases indivisibilities of inputs become difficult to deal with; and are reflected in slack magnitudes and residuals demonstrated by the solutions of these models. Although some entrepreneurs may have access to these methods, and the use of the computer is on the increase, most location analysts have confined themselves to choosing the location for their industry through simple analyses of industrial cost structures (in different locations) that border on intuition.

These analyses entail researching into (collecting) all cost data in various prospective locations, adding those costs together, and obtaining totals for each individual location. If necessary, these could then be divided by the amount of output (quantity) to obtain the average cost of producing one unit of output in each location. The location where the average costs are least then qualifies as

the optimum and the most suitable location of the subject industry, where costs are expected to be minimized (while at the same time maximizing profits).

Table 10-1 illustrates in a simplified manner the way in which the cost structure of a particular firm can vary between locations. This example is based on the requirements of a manufacturing concern in steel products industry, and shows the percentage distribution of costs among five spatially variable input categories in seven cities in Ontario, Canada. The proportion accounted for by labour costs can be seen to vary from a high 42.4 percent down to 35.3 per cent; while transportation, which is generally less important than labour in percentage terms, has a greater variation - from 33.4 per cent to 24.8 per cent. The costs of utilities (services) and of land and buildings vary much less between alternative locations. However, regarding the local taxes, the variations are more extreme in relative terms than for any of the other inputs or necessities. The differences in proportions reflect the variations between the seven Canadian cities in the costs of the production inputs under consideration.<sup>20</sup>

In this case the total costs have been computed, and the average costs probably compared between the seven cities. For a deeper understanding, each input has been reduced to a percentage of the total

PERCENTAGES OF TOTAL SPATIALLY  
VARIABLE COSTS

LOCATION	Labour	Trans- portation	Utilities	Land & Building	Local Taxes
Barrie	36.6	32.2	17.1	8.7	5.4
Brahamton	42.4	24.8	18.2	9.4	5.3
Georgetown	41.8	26.6	20.6	8.8	2.2
Lindsay	38.6	30.9	19.7	7.0	3.8
Orangeville	35.3	33.4	19.7	7.5	4.1
Preston	38.0	28.8	19.6	7.	
Stratford	36.8	33.4	19.7	7.5	2.7

Table 10-1: The cost structure of typical small steel products Manufacturer in alternative Ontario Locations.

(SOURCE: The Fantus Company, Location Consultants (unpublished); cited in D.H. Smith, Industrial Location: An Economic Geographic Analysis, p.31).



cost in each location. This enables the entrepreneur to know which input will be more frequently purchased than the other one. If any of the inputs that is frequently purchased by the industry and is an important production component happens to be expensive in a specific location, this affects the level of the total costs. The best location therefore would be that which offers this input at costs that are relatively less in percentage terms than all the other locations.<sup>21</sup>

The costs of production between various locations differ for a variety of reasons: ~~\_\_\_\_\_~~ differ in different locations for other reasons than the quality of the work force - for reasons of ~~\_\_\_\_\_~~ cost of living between different locations. Food may be expensive, clothing, furniture, housing, childrens' schooling, mode of travel to work, etc., and this may cause labour to demand more wages in this particular location than in other comparable locations. Land may be expensive in some localities than in others. The type, quality and quantity demanded by an industrial process may be available in some locations at greater expense than in others. Fixed capital, equipment buildings, machinery, etc., may be expensive at varying degrees between locations, and their maintenance costs may vary from place to place. Raw materials, energy requirements,

transportation rates, and entrepreneurial ability may vary in costs between alternative locations. Different locations may be under the jurisdiction of different governmental bodies providing specific or differentiated varieties of services, and therefore having different types of tax structure. Although industry may benefit from additional services in high taxation regimes the benefit may not be so direct as to influence the level of costs significantly. In most case, taxation is regarded as a net cost.

Financial capital may be highly mobile between locations; and industrial concerns can often get development capital from the bond market. However the expectations, or psychological attitude of financiers - their aversion to risk - may have some bearing on this mobility, so that in different parts of a large country various lending rates have been known to prevail at different locations. In East Africa the bank rates - hence lending rates - vary from country to country; and within Kenya they may vary from town to town, depending on the bankers' policies. Small firms that are just beginning production therefore tend to locate in the home areas of the entrepreneurs, where the later can benefit from their being known by home bankers. Despite this, the cost of financial capital could vary from place to place, and may influence the cost structure.

Patterns of transportation costs are generally more predictable than those of the costs of other production inputs. One complicating factor from the regular location theory is that these are not merely a function of distance, but depend even on the mode of transportation, the kind of good, and the number of trans-shipment points on the journey from the location of the industrial firm to the market.

The way in which transport cost per unit distance is related to the total distance and the transport mode is that some transportation modes have greater initial loading and terminal unloading costs; but then an overall cheap rate of transport per unit distance travelled. For example, the rates of lorry transport tend to be proportional to distance because the loading and terminal unloading costs are minimal; and the fuel consumption of lorries varies directly with distance. On the other hand, railway rates tend to increase at a decreasing rate with distance. The rate of decrease is not as much as water transport. Figure 10-6 shows the three rates mapped together in a graph; and reveals that for short distances - say up to 300 km - it is most economical to use lorry transportation. For medium distances ranging from 300 km to 1,500 km the railway transport is the cheapest, and for very long distances over 1,500 km the water transport is the cheapest.

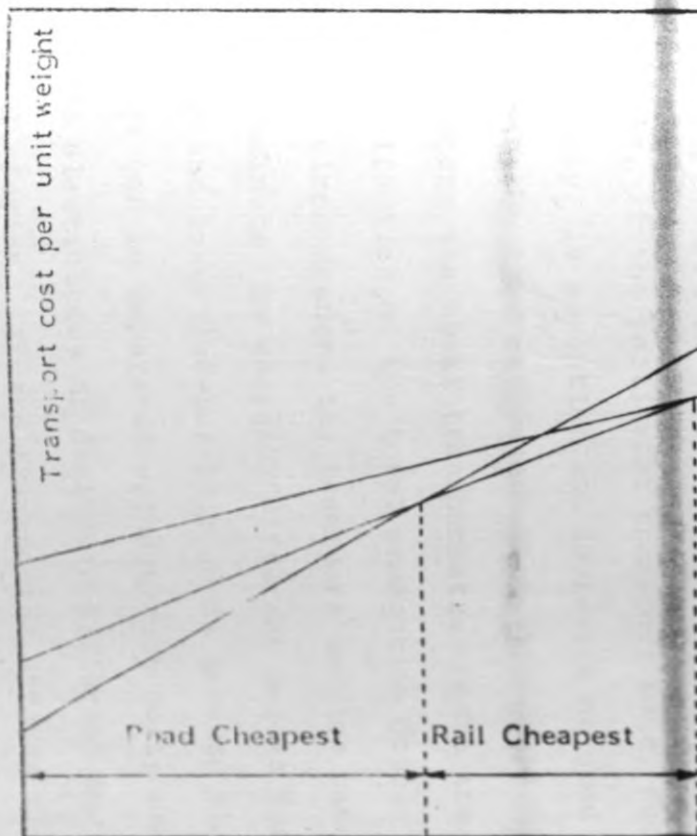
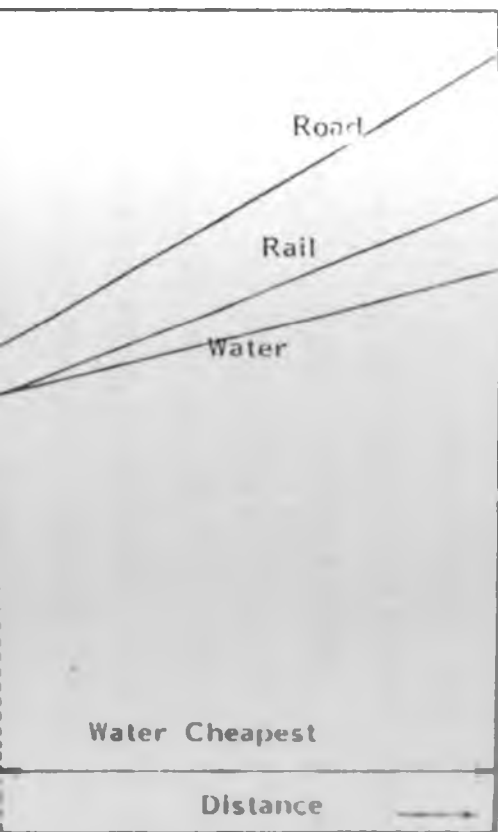


FIGURE 10-6: Hoover's concept of transport costs with distance and mode of transport.



ption of Variation of  
ng different modes of

Perishable or fragile goods (such as fruit, household appliances, and furniture) cost more per unit weight to ship a given distance because the likelihood of loss is greater; and increases the insurance rates. A higher value of some commodities per unit weight also affects these costs because of increasing insurance rates. The practice has been to discriminate against goods with high values per pound due to the fact that the demand for transportation services is derived from that of the goods to be transported. Thus the demand for transport services will be more inelastic, ceteris paribus, if the particular transport mode, such as a railway, is essential and there are no good substitutes ~~like~~ <sup>for</sup> railways. Also this could be the case where the total transportation costs are a small fraction of the total production cost. Under these circumstances the transport service can discriminate by charging different prices for high value and low-value-per-kilo goods because the market can be separated without much cost; and the price elasticities of demand in different markets are different. If the transporter offered the same price for the two markets he would obtain less marginal revenue in more inelastic high-value-goods market than in the more elastic low-value-goods market. Revenues would be increased by increasing

the transport price to the high value goods and lowering the price to the low value goods - thus shifting the business from high value to low value goods.<sup>22</sup>

Under these circumstances the location of industry will depend, to a considerable extent, on the type of goods to be produced, the expected transportation costs, and their significance and affect on the cost structure of the industry. One entrepreneur may decide to incur high transport rates if by so doing he can forgo one major item in the costs of inputs. The costs of transport may be considered by a local authority, or the central government, if they want to decentralize industry from the main industrial areas to depressed regions. In this case, the subsidies they give for re-locating industry must be more than the transportation costs that would be incurred by the particular industry to be attracted.

#### Agglomeration Economies

These are economic benefits arising from firms deciding to locate near other firms that produce the same kind of good - that are dependent on other firms' outputs or from sharing common items of infrastructure with other industries; although these may produce a different kind of good.

Industries that benefit from agglomeration economies may save in transfer costs if their major inputs are produced in the location of their agglomeration; and they do not have to purchase these from a long distance. These kinds of economies are called Transfer economies. Industries may reduce operational costs as a result of growing in the same place, and using the same infrastructure. This kind of agglomeration economies are called infrastructural economies. Urbanization economies are obtainable in certain urban areas if as a result of the complex interrelationship of activities certain materials and services can only be available in urban areas.

All kinds of agglomeration economies can be derived from public policy such as land use zoning, taxation, and financial inducements. A local authority or a central government could designate various areas within cities or regions as industrial zones; and could equip them with specialized items of infrastructure to such an extent that whereas no industry would be permitted to be located anywhere else, the industries located in the designated zones would benefit from these infrastructural facilities and other policy-created incentives and subsidies. In the same manner, a taxation policy could be designed favouring specific locations and penalizing others. This would tend to induce industry to be



located in the favoured locations. An example of this is Kenya's de-centralization (from Nairobi) policy.

Where industries do not benefit from agglomeration, but incur losses instead, we can talk about deglomeration economies or negative externalities. Social cost, pollution, traffic congestion, growing public consciousness against certain industries that induce adverse zoning, taxation, and location policy guidelines, etc., are some of these deglomeration forces. Scarcities caused by competition for resources, infrastructure and other facilities would cause agglomeration diseconomies, or deglomeration tendencies.

Figure 10-7 shows how agglomeration economies operate by reducing the average costs of production in every firm within the location of agglomeration. TAC is the total average cost of the firm. AC is the average cost of providing some specialized service. This decreases with increasing demand for the service as determined by the number of industries demanding this kind of service. A few firms only would face higher average costs OC for this function, and many firms would pay only OD. When there are many firms located in one place, each will pay only OD for this service, and the total costs will be reduced by the amount that this function changes

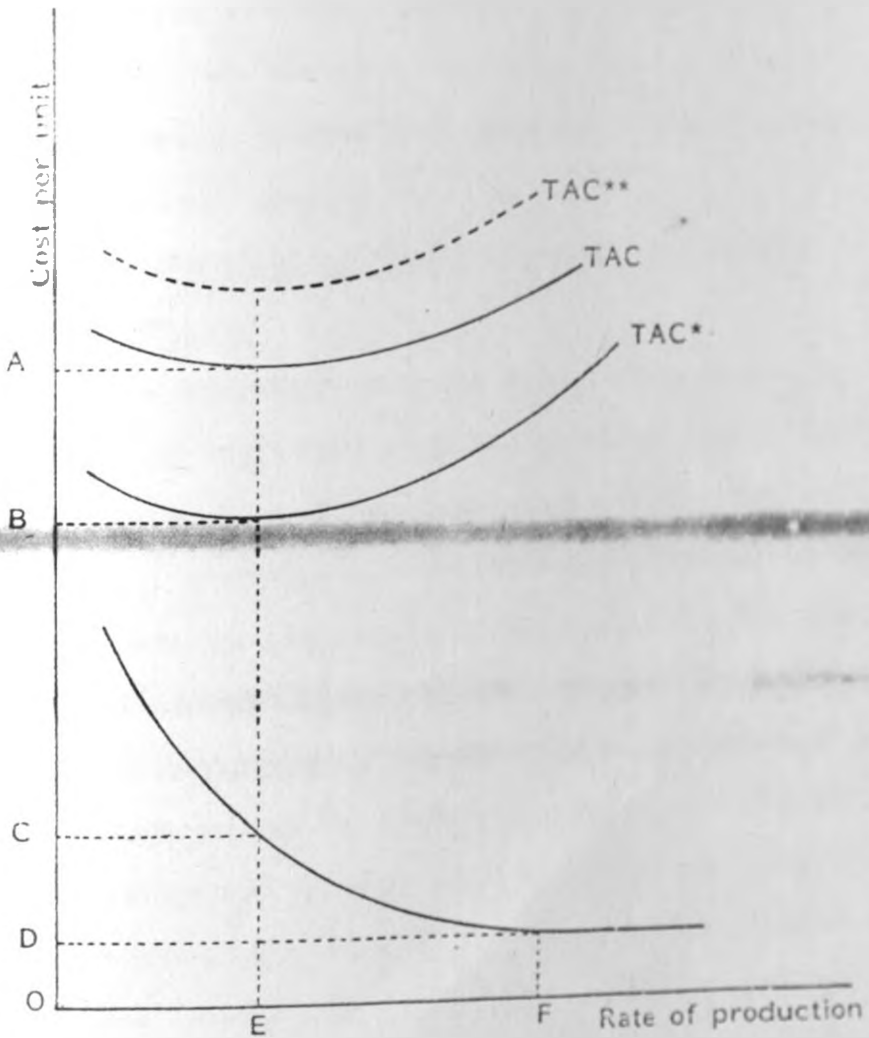


FIGURE 10-7: How agglomeration economies operate by reducing the average costs of production in every firm within the location of agglomeration. (SOURCE: Hugh O. Nourse, Regional Economics, p.88).

from OC to OD. Deglomeration occurs if the AC takes an upward direction and pushes up the TAC to, say, TAC\*\*<sup>23</sup>

Other factors affecting industrial location would be such things as personal preference of entrepreneur, historical accident - and the resulting geographical inertia.

### INDUSTRIAL LOCATION AND REGIONAL GROWTH

#### Public Policy

In chapter eight it was shown how the rate of growth of any region can be measured using various techniques like input-output, economic base and multiplier analysis. In the same chapter, attempts were made to illustrate in simplistic terms how growth occurs in any region, whether "nodal" or "homogeneous". It was demonstrated that the major determinant of regional growth in market economies was the availability of employment in the region through the location of activities that tend to be horizontally linked with others. As a result of these linkages, these activities locate in some specific region and tend to attract other economic activities, and the population employed in such activities. In this section an attempt will be made to show in theory how public policy may induce these "growth - kindling" activities in a region; and how such policy can be implemented.<sup>24</sup>

A public policy could be defined as any

programme of action set forth by the people and their representative government in pursuit of economic or social objectives. A policy defines the actual implementation methods; it has goals and objectives to be achieved through any defined methods. It operates in a definite area that could take as many sizes as the region. It could be restrictive if it defines those actions that must not be allowed only, leaving the community or population to choose any of the remaining unrestricted alternatives. It could be permissive; specifying these measures that may be carried out in the area of its domain. A policy may be implemented using different strategies; depending on its objectives. Methods of implementation vary from uncoordinated local village actions to complete regional and metropolitan plans based on sophisticated econometric models.

✓ As an independent variable, the policy affects the spatial arrangement of economic activity by modifying economic conditions under which numerous choices of plant and activity location are made. By inducing a specific pattern of industrial and economic activity, the policy may cause a significant trend, pattern and rate of regional growth that would affect demand for various activities - space to locate these activities - demand for land - and ultimately, the value of land, on this regional space.

As a dependent variable, policy may be subject to the existing characteristics of land use patterns, economic development trend, and industrial location patterns. Public policy is made within the existing physical and socio-economic constraints, which determine the limits of what planners and policy makers can hope to achieve through the implementation of policy dictates.

### Regional Economic Problems

Policies are made to solve certain problems that are evident in certain regions. The existence of these problems depend on the tastes and perceptions of the inhabitants or citizens of each region or country. Existing conditions are cited - and the disadvantages caused by them are defined. These disadvantages are relative to whatever goals and concepts of social justice the inhabitants of the region hold.

A regional problem can therefore be defined as some unsatisfactory condition associated with a region in view of the goals and concepts of social justice within a region. The existence of slums in cities and areas of poverty in the countryside regions are some of these problems. Adjectives such as dipressed, poor, underdeveloped, blighted, etc., have been used to describe regions with that kind of a problem. An underdeveloped area has low medium incomes as

compared to better off regions. It lacks in industrial activity, employment; and at times it has underutilized resources. To correct these, the timing of development policies is important. In addition, appropriate resource development technologies have to be devised. These have to utilize the resources available within the region rather than those obtained from other regions. This would create employment, and at the same time bring about economies of scale through saving on transfer costs. The industries that should be located in such a region should be propulsive - such that have many linkages, and would tend to attract many related industries and economic activities - thus creating employment, increasing income and welfare of the population of the region.

A depressed region has already experienced a high level of development, resource utilization and industrialization, but during the time under consideration it has unsatisfactory economic performance as compared to other regions - judged from the norms of the community occupying the region, and the nation. Causes of such depression are numerous, but can be due to decline in demand for a region's exports, decline in comparative advantage in regional industrial activities - i.e. increased production costs in the region; or exhaustion of regional raw materials.

2144

The depression is typified by manpower, capital and other factor unemployment within the region.

Public policy for solving the problems of such a region revolve around economic re-development, using similar strategies as those of an underdeveloped region; but bearing in mind the causes of regional decline and the state of affairs in the region generally.

A congested region is one in which development has reached a point of diminishing returns. In such a region the aggregate average cost of production is increasing due to diseconomies of scale of various descriptions. These may occur because input and raw material costs are pushed up by transport costs, scarcities are created by congestion - such as lack of office space, traffic and transportation "bottlenecks", lack of additional skilled labour, air pollution and environmental deterioration, etc. Industries that have vital linkages to the others may begin to leave the region, causing adverse externalities on the remaining industries and the economy in general.

Such a congested region would require high capital outlays in re-organizing production and economic activities in such a way as to reduce the congestion and the concomitant adverse externalities. Cost-benefit analytical approach has to be adapted to

see what impact the replacement of the existing industries with new ones would have on reducing the degree of congestion and on regional growth.

4 Generally, regional underdevelopment of any kind in a market economy reflects uncertainty in the economy. discourages investment; and reduces effective demand for goods and services. The relevance of this to land economics is enormous; because anything affecting the general level of demand will ultimately affect the level of investment, and the property market.

Underdevelopment can only be perceived through the societal norms - which are likely to change through time. This is because value systems that are utilized in identifying the problem are subjective, and vary between individuals, systems of government and nations; and each or all of these are subject to change over time. Assuming that these norms are kept constant, or retain a plausible level of reliability, modern multi-variate techniques like factor analysis, areal grouping, etc., make it easier in modern times to define problems and problem areas more objectively; because they help analyse the interaction of numerous variables simultaneously, and in producing comprehensible results immediately.



## Regional Development Strategy

The process of problem identification gives the planning body a clear view of certain economic and social objectives. After this goals and targets are identified, depending on the socio-economic objective. Some of these overall goals could be aimed at maximizing national income, equalizing regional growth rates, reducing regional unemployment, re-vitalizing regional economic activities, etc. Once any, or a series of goals have been preferred, an exemplary model is constructed defining the functional relationship between the main variables that account for the magnitude of the problem. The problem, with its magnitude, will have to be solved by influencing these variables in some definite way or another. This influence is brought about on each problem variable by invoking policy instrument variables that overcome each deficiency. Once these instruments work, then the economic and physical planners could say they have reached their required targets.<sup>25</sup>

Some of these instruments could be aimed at conquering and internalizing adverse externalities through taxation, zoning, pollution control, traffic regulation, etc: - or creating positive external economies through infrastructural or environmental development. Allied to this would be the process of

attracting investment capital through financial subsidies, loans and tax exemption; and discouraging development in some regions through zoning and taxation. Allied to all these would be the location of propulsive industries with positive linkages in specific areas where regional growth is to be encouraged. Different approaches of achieving these objectives have been taken and can only be discussed in greater detail in a more advanced work. The reader is referred to other texts of land economics or industrial location for detailed analyses and examples.<sup>26</sup>

Whatever policies of regional revitalization are adapted, it must be borne in mind that they would be expected to have economic and social impacts that would affect the general level of employment in the region, effective demand for goods and services; and eventually the demand for space on which to locate economic activities. This, ultimately would be expected to mirror itself on the land demand. The supply of the latter - being inelastic - would contribute to increases in land values. So what happens in the region (either caused directly by government intervention, or by the general economic forces) is of great interest to the real estate analyst. Most of the positive or negative economic policies have direct effects on the expectations and

psychologies of investors in land; and this may trigger speculative moves, which have direct effects on land values - even before economic forces have their full impact.

FOOTNOTES

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19 Ibid, pp.82-103.

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21 Ibid, pp.29-56.

22 The Old East African Railways and Harbours has been observed to use this kind of differentiated charges. See I. Livingstone and H.W. Ord, Economics for Eastern Africa, (Nairobi, Heinemann, 1980).

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PART III

APPLICATIONS OF LAND ECONOMICS

## CHAPTER ELEVEN

### ORGANIZATION OF EAST AFRICAN REGIONAL SPACE

#### Introduction

Having examined the nature of the spatial distribution of economic activities in regions, we now turn our attention to what actually has happened in East Africa. As we shall see shortly, this spatial pattern that has developed in Kenya, Uganda and Tanzania is somewhat typical of the spatial patterns of developing countries in general. Our examination of the East African case will give us a small scale geographic picture of the arrangement of land use; which will look complete by the end of chapter twelve. We are aware that in East Africa some of the available land is put to urban use. The spatial distribution of urban areas will be our focus. We need to understand how come such land use came to be allocated to specific nodes on the general East African space. After this analysis the nature of the land uses that fills the space between urban nodes and its interconnecting transportation infrastructure will be examined in chapter twelve. In the same chapter the nature of land use - the spatial distribution of different land uses - within East African cities and urban areas will be explored. In reading through

these analyses, the reader must bear in mind that they are meant to serve only introductory purposes; and that research into the spatial systems, rural and urban land use distribution is still going on.

### The East African Spatial System

Land use in East Africa can be classified into two; (a) rural land use and (b) urban land use. The former type of land use is largely a function of the East African physical environment as we shall see in the next chapter. It comprises farmland, forests, national parks and unused land - such as deserts, scrubland, etc. Scattered among the space occupied by rural land are urban areas of different sizes, interconnected by communication network - roads, railways and telephone lines. The spatial distribution of land use, urban areas and communication network is what is called a spatial system. The term connotes the way urban areas of different sizes are spaced from one another, and how they are interconnected by communication infrastructure through which trade and other innovations flow from one urban area to another. Such a meaning lays less emphasis on the distribution of rural land use; but does not exclude such distribution altogether; because, as we saw in chapter eight, rural land use forms the spatial hinterland of urban areas; and urban areas cannot exist without the hinterland that they serve. In view of this, the Losch-

Christaller model and its later elaboration by people like Walter Isard and others is an attempt to propose a normative spatial system over some specific landscape.

An enquiring reader would then wonder whether in view of the Losch-Christaller models the East African cities have the definite spatial order approximating these models. The reader would want to investigate the nature of, the causes of and the differences between the East African spatial system and the ideal spatial systems of these models. However, before we can discuss the East African spatial pattern and landscape, it is useful to know what is meant by an urban place, or an urban area in an East African context. D.R.F. Taylor defines an urban place from the Kenyan context as "... a place that offers services in at least four of the following five main urban function(s): administration and protection, social services, communications and transportation, commerce, industry and power. All the settlements offering these services, no matter what the size are defined as urban places.<sup>1</sup> Taylor does not obviously overlook the definitions offered earlier regarding the smallest urban places. We can therefore say that urban areas of population 2,000 and above are urban places in accordance with the definition offered by Taylor, as long as they perform the stipulated functions.



Although made in the Kenyan context, this definition of urban place or urban area is applicable to Uganda and Tanzania because of the similarity of the socio-cultural and economic backgrounds of these two other countries to Kenya. The three countries have had similar colonial experiences from the British with the exception of a brief period during the first two decades of the Twentieth century when Tanzania was under German rule. This is not significant - as we are about to see - because the two colonial systems had one thing in common, i.e., colonization; and the fact that two colonial powers were involved makes very little difference. The only significant difference between the three socio-economic systems occurred recently, during the post independence times; when Kenya opted to adapt the capitalist "social democratic" socio-economic system - as Tanzania went socialist under the Arusha Declaration of 1967 and the subsequent Ujamaa policy. Uganda has experienced considerable political strife during the Idi Amin regime (1971-1979); which disrupted the socio-economic direction towards socialism that had began under the first Milton Obote regime (1966-1971). These changes are, however, fairly recent; and the nature of the spatial system has not experienced considerable impact from these changes in the socio-economic direction. The spatial conception of urban place or urban area as advanced by Taylor

therefore applies to the spatial systems of all the three East African economies.

A discussion of the nature of the spatial system that embodies the hierarchical arrangement of urban places and their interconnection by transportation network will therefore take urban places as defined by Taylor. The inclusion of the communication network in the discussion is essential, because the network forms the avenues of growth for both the rural areas and the urban area hierarchy by facilitating trade in the form of flow of goods and services, together with diffusion of ideas and innovations between urban areas of different ranks; between urban areas and the rural regions. In chapter eight we discussed how export trade causes the stimulus of growth for all regions. Export of goods, ideas and innovations from either urban or rural regions creates high levels of employment within the exporting regions through multiplier effects that are generated from incomes earned from the sale of these exports. We can say in simplistic terms that the communication and infrastructural network is the tubes or avenues along each urban place, and into each rural region. It would therefore be immature to talk about any spatial system without including such networks.

### Colonial Spatial Systems

The spatial systems of the three countries bear heavy imprints of the histories of economic development of each of the three countries - colonial penetration, and colonial development - that could be said to be typical of all those countries in the third world which have been under colonial domination. In discussing regional development and regional planning in the countries of the third world, Galina V. Sdasuk outlines how the spatial systems of these third world countries that have been impacted by the institution of colonialism. The colonial administrative process and economic system that introduced western civilization into the third world countries worked mainly with the interest of exploiting natural resources, and obtaining raw materials from colonies to fuel the industries of the metropolitan (colonizing) countries. After goods have been manufactured they would then find markets within colonies - thus enriching the economies of the colonizing powers. This basic fact led to the development of the spatial system and communication network that allowed the extraction of natural resources and the marketing of goods manufactured in the colonizing countries only; with very little regard to the development of indigenous inhabitants. Areas within colonies that were not endowed with natural resources were thereby neglected. Consequently,

regional development within colonies took place only at the nodes where natural resource extraction was taking place; and along the transport network through which the westerners passed. This is because western ideas and innovations that could be allowed to diffuse into the socio-economic systems of native tribes by colonialists could only do so involuntarily through contact; and such contact only occurred in the areas where the colonialists lived - extraction bases - and those through which they were interested in passing in search of raw materials to fuel the factories of the metropolitan countries.<sup>2</sup>

Evidence in East Africa and elsewhere shows how location of economic activities over space was affected by this process of colonial penetration and exploitation. The locational pattern of industries and economic activities was often at variance with the widely held neo-classical theories of industrial location and the concepts of orientation embodied therein. For example, I have pointed out elsewhere that the concept of raw material orientation for chemical industries did not apply to cause a chemical industry to be located near Lake Magadi, Kenya, when soda deposits were discovered there in the early part of the Twentieth century. Instead, the British colonialists just built a railway to Magadi - the source of the chemical raw material - in 1913; and used the railway to carry away the

material to Europe and elsewhere for use in the manufacture of chemicals. Therefore no regional development took place around Lake Magadi as may have perhaps taken place arising from industrial linkages with a chemical industry that should have been developed at the lake, or elsewhere nearby within Kenya.<sup>3</sup> Other examples of colonial extraction and exploitation quoted elsewhere in this chapter display naked interest in raw material exploitation for colonial purposes only, and very little else besides that.

Taafe, Morrill and Gould, when considering the development of transportation in the countries of the third world with special reference to West-Africa explain the construction of transportation infrastructure in terms of such colonialist objectives as (a) the desire to reach areas of mineral exploitation; (b) the desire to connect administrative centres at the coast with an interior area of political and military strategic importance and (c) the desire to reach areas of potential agricultural production. In addition, their study also reveals an awareness of colonialism. They postulate that, as far as transport development was concerned, the situation in Ghana and Nigeria could be characterized into different developmental stages from the time the colonists established initial trading posts at the coast to the time when the colonial economic system was in full bloom within these former

colonies.<sup>4</sup> In their study, they also cited cases of East Africa, Brazil and Malaya as examples where their model could function; and concluded that the same pattern of spatial economic development occurred in North America during the early era of colonial penetration by Europeans.<sup>5</sup>

The Taafe-Morril-Gould transportation model starts with the colonialist landing at the coast; and establishing a series of sea ports. These ports form a series of urban nuclei scattered along the coast. The nuclei are functionally homogeneous in that they are initially used as contact bases with the tribal inhabitants of their hinterlands. They are also almost equal in size. Stage two of the model illustrates the establishment of major lines of penetration into the hinterland that minimize the total transportation costs as they link the coastal centres ( $P_1$  and  $P_2$  in figure 11-1) with the inland centres of colonial trade ( $I_1$  and  $I_2$ ). The coastal centres that are linked with the hinterland urban places by transportation network realize agglomeration economies; and grow faster than other coastal towns that may even have been founded at the same time. At this stage, also, feeder roads begin to develop; criss-crossing the hinterlands of the coastal towns, and focussing on the ports of the origin of this road network that are now becoming major coastal towns - ports. These major

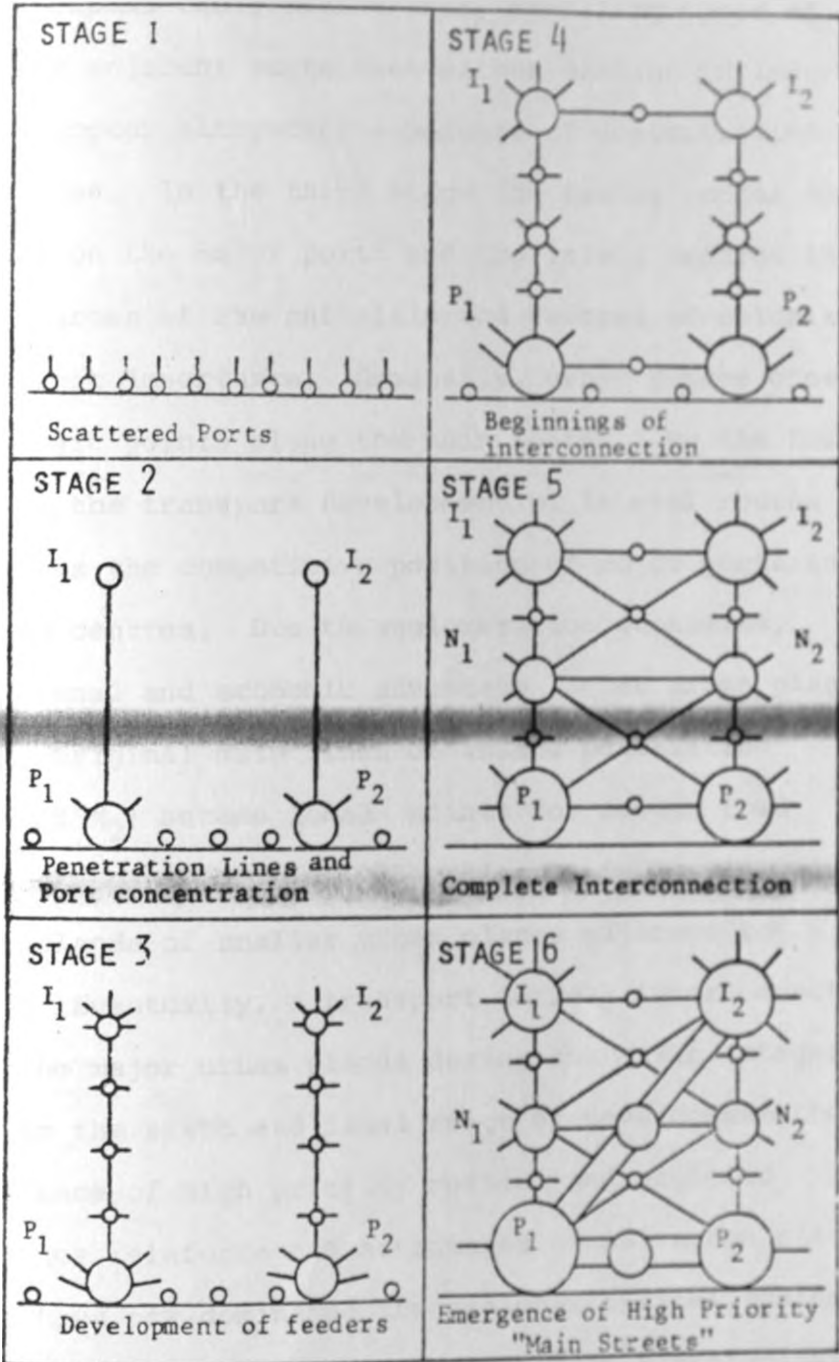


FIGURE 11-1. A model of the development of Colonial Spatial and Transportation Systems in the less developed countries (SOURCE: E.J. Taafe, R.L., Morrill, and P.R. Gould, "Transport Expansion in Underdeveloped Countries: A Comparative Analysis", 1963.)

ports expand their hinterlands, engulfing those of smaller adjacent ports that either decline in importance or disappear altogether - because of agglomeration economies. In the third stage the feeder routes focus mainly on the major ports and the inland centres that are sources of raw materials and centres of colonial strategic importance. Gradually, urban places grow at strategic points along the main routes. By the fourth stage, the transport development of lateral routes enhances the competitive position of major ports and inland centres. Due to agglomeration economies, locational and economic advantage a few urban places along original main lines of inland penetration ( $N_1$  and  $N_2$ ) became focal points for feeder road networks of their own. They also begin to capture the hinterlands of smaller urban places adjacent to them. Eventually, a transport network interconnects all the major urban places during the fifth stage; and in the sixth and final stage of development the existence of high priority spatial and economic linkages reinforce the advantages of all urban places that have now dominated the regional spatial system, making them to retain their respective hierarchical order in the colonial space economy.<sup>6</sup>

Authorities in Regional Science are almost unanimous that this is the typical trend of the evolution of spatial systems under colonialism.<sup>7</sup> The pattern is typical over the African continent; where,



on the onset of colonialism in the early nineteenth century the pre-colonial indigenous regional trading network was truncated and disrupted by the arbitrary super-imposition of colonial boundaries and transport network. The creation of these colonial territories and spatial systems had no relation with indigenous social organizations and space economy. The carving of colonial political entities - referred to as balkanization, or atonization of space<sup>8</sup> - usually preceded the organization of the colonial space economy. The resulting spatial system was highly dissimilar to the one hypothesized by Losch-Christaller and other neo-classical location theorists. Consequently, when considering the spatial arrangement of central places (urban places, growth centres, etc) in East Africa the Losch-Christaller model and all its subsequent modifications does not carry much weight. The Taafe-Morril-Gould model of spatial systems developments in colonized countries and all the concepts associated with it are more relevant. It is in this context that we shall now examine the organization of space within each of the three East African countries.

#### Evolution of the Kenyan Spatial System

The evolution of the Kenyan spatial system followed very closely the typical pattern hypothesized by Taafe, Morrill and Gould. Before the coming of the

British there was a rudimentary spatial system of periodic markets scattered all over the settled areas of Kenya, and interconnected by caravan routes. The markets were used for the distribution and marketing of surplus agricultural and livestock produce through barter trade. They may have assumed commercial, as well as administrative functions - "such that each place could have combined the barter market functions and those of a meeting place of the councils of elders and other social organizations that maintained law and order along with other societal functions within the traditional communities!"<sup>9</sup>

The trading routes linking these trading centres were used by foot and ladden animal caravans which carried the goods of trade and other items. An analysis of the Kikuyu local markets during these times has revealed this rudimentary spatial system that possessed qualities of considerable degree of organization. Exchange points existed between the three ecological zones on the eastern slopes of the Aberdare mountains and the south-eastern slopes of Mount Kenya, which is the traditional abode of the Kikuyu. At least three rank orders appear to have emerged - small markets dealing with trade within an individual ecological zone; larger markets dealing with exchange between two ecological zones (High Kikuyu, Middle Kikuyu and Low Kikuyu); and the largest

of all the markets, that dealt with exchange between all the three zones - and possibly between the tribal inhabitants and members from adjacent tribes. These high order market places seem to have been located along the centre line of the whole belt occupied by the tribe - in the centre of middle Kikuyu.<sup>10</sup>

D.R.F. Taylor observes that usually the markets had no permanent structures. They were open spaces on flat, well drained grassy plains. Despite this lack of any construction, these places were central in as much as they performed centrality functions. They were nodal points of some significance as far as the local people were concerned and had social, as well as economic functions. Often, the market place would be used for games and dances. The market day itself was certainly not viewed by the people as simply an economic event; but was a social gathering of considerable significance.<sup>11</sup> This spatial pattern has been found to have been typical of many parts of Kenya; among the sedentary, as well as among the nomadic peoples.<sup>12</sup>

The first towns in Kenya were those that were established along the coast by Arab traders. A fair amount of history exists about these urban places - like Malindi, Lamu, Mombasa, etc. - but relatively little is known about their interconnection with their hinterlands. However, the existence of these towns during the pre-colonial times is said to have

given some impetus to considerable spatial organization within their hinterlands. The urban places have been found to have been connected to inland market places by caravan routes along which a considerable volume of trade flowed. The spatial system required to effect these trading links has been found to have been of two complementary types: the internal tribal organization, and the long distance caravans. The former was the basis of the spatial system within an area occupied by individual tribe, and among all the ecological units spanned by any individual tribe. The latter interconnected the tribal spatial systems; and had ultimate links with the coastal towns.<sup>13</sup>

Before 1900 the size of the coastal towns was considerably enhanced by this spatial system in both the socio-economic and the physical dimensions. The spatial system was suddenly disrupted by the carving of the colonial boundaries during the late nineteenth century. Colonial penetration never followed the traditional trade routes, but took place by means of a trunk railway line - the Uganda Railway built between 1895-1901 to connect the coast with the area around Lake Victoria for political and strategic reasons. Later, after the railway had been constructed with these initial strategic aims the British found that this line would mainly be idle

with very little to transport because the process of colonial exploitation was still rudimentary in the hinterland of Mombasa - the coastal port of origin. An agricultural area was established on the cool Kenya highlands on both flanks of the railway line.<sup>14</sup>

Thus, the present spatial system in Kenya emerged as European settlement, railways and railway stations along the trunk line. Towns like Nairobi, Nakuru, Kitale, Eldoret, Molo, Nyeri, Nanyuki and others are examples of these hinterland urban places or nodes that were established by the European settler on the Kenya highlands.

It is significant that along the Nyika region that lay between Nairobi and Mombasa very few towns developed to the comparable size of the urban places in the highlands. This is partly because there was little agricultural or mineral extraction activities in this area. The fact that it was occupied by considerably large populations of Nyika people like Kamba, Taita and others was irrelevant in urban place nucleation; except for the establishment of administrative posts used for exerting colonial power over these natives in the strategic interest of keeping the railway line open. These administrative centres had very slow rates of growth despite their fairly well populated hinterland because the local African population was not encouraged to live

in towns.... (only the)..... Swahili and Somali porters and Sudanese ex-soldiers were allowed to settle .....<sup>15</sup>

By contrast, towns like Nairobi, Eldoret, Nakuru, etc. had a very fast rate of growth, because they were market centres for the produce of the colonial agricultural economy situated on the highlands. Before 1920, Mombasa was still the biggest town in Kenya; but thereafter it was overtaken by Nairobi in both size and rate of growth. Also, the beginning of the trunk railway line in Mombasa caused the other coastal towns like Malindi and Lamu to decline relatively in importance as trading centres - whereas in pre-colonial times they were roughly of the same size, and kept alternating in importance as trading centres depending on the military power of the ruler of any of these places at any one time.

The colonial economic and power structure maintained the resulting spatial system ruthlessly, and consistently; and in the 1950s even disrupted the traditional spatial system within the Kikuyu, Embu and Meru tribal areas as a result of the struggle of these tribes against colonial domination that culminated with the declaration and continuation of the Mau-Mau state of emergency by the British between 1952 and 1960.<sup>16</sup> The urban place hierarchy,

and the spatial system that was inherited by independent Kenya after 1963. (Figure 11-2) was therefore not induced by economic factors like in the neo-classical Losch-Christaller space economies; but a colonial spatial structure that reflected colonial strategy, the spatial distribution of colonial plantation agriculture, and the pattern of the colonial extraction transport network in the form of railways, tarmac and murram roads.

#### Designing a Post-Colonial System

Inspired by the then prevailing regional development theories of Francois Perroux and others - that appeared during the 1950s - the Kenya Government of the post-independence times, through its Town Planning Department, organized a study of the spatial system that was aimed at aiding in the design of regional growth implementation strategy.<sup>17</sup> The development plan of the period 1965-1970 outlined a method of achieving "an integrated planning system by which the ministries concerned with economic, social and physical planning came together in the planning process in such a way as to produce a comprehensive plan."<sup>18</sup> The regional planning section was organized within the Town Planning Department, and given the task of producing regional development plans for all the provinces in Kenya. The section attempted to recommend provincial hierarchies of urban places, and spatial systems that would aim

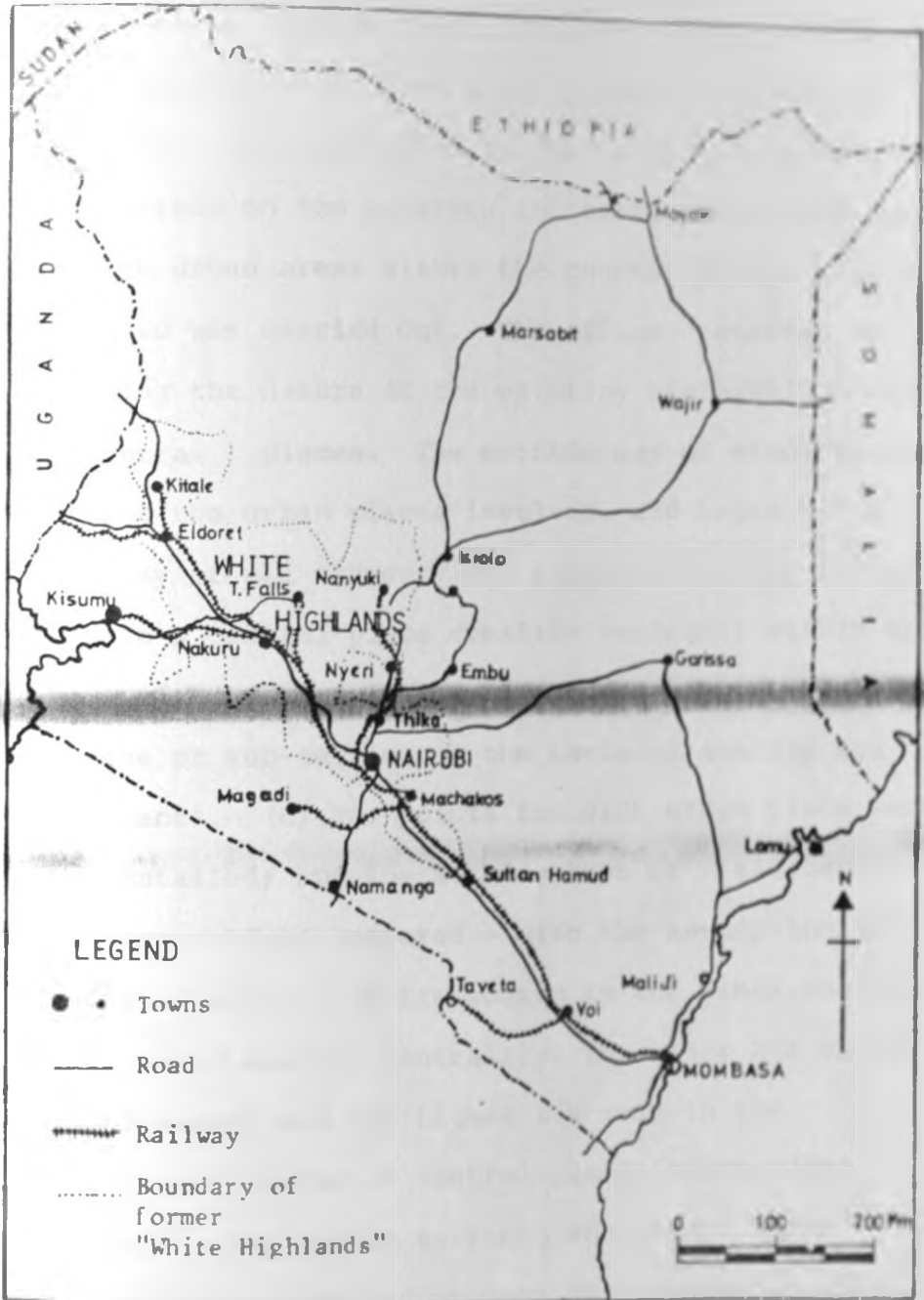


FIGURE 11-2. Kenya's Colonial Spatial System. Note the boundary of the Colonial commercial agricultural settlement the "White Highlands", and the relatively greater intensity of the transportation network within this Zone. (SOURCE: George K. King'oriah; "Economic Development and Industrial Location in Kenya". *Ardhi: Journal of Land Development* Vol. 1, No. 1; (April 1981: Pp.2-12).



at achieving maximum rates of growth within each province, and within the whole country in general.

The task was not easy, due to lack of accurate information on the existing infrastructural development in most urban areas within the country at the time the exercise was carried out. The office started by studying the nature of the existing hierarchical order of central places. The methodology of study involved ranking the urban places involved, and began by (a) a survey of all the services and sub-services (judged to have a central place creation tendency) within all towns of Kenya. (b) Then points were designed to each service or sub-service on the basis of quality and importance. (c) The points for each urban place were then totalled; and the total scores of all urban centres could be compared - with the assumption that the more points a centre scored in the final analysis, the greater was its centrality; the wider its sphere of influence; and the higher its rank in the hierarchical order of central place in any given region.<sup>19</sup> The main services enumerated were:<sup>20</sup>

- (a) administration and protection - including civil servants, police, legal facilities, fire protection, and ambulance services;
- (b) Social services - including health, education, social centres;

- (c) Communications and transportation - including postal and telephone service, petrol station, bus, rail and air transport;
- (d) Commerce - including shop, barter markets, banks, hotel and catering establishments; and
- (e) industry and power - including manufacturing, extractive and agricultural activities, electricity, water supply and sanitation network.

Out of these, the levels at which any group of services is offered in each town was determined. For example, within each major service (like in (b), Social Services) one may consider a sub-service such as health. The highest order at which this sub-service may be available in an urban place is a district hospital. This would be given three points. The second order would be a health centre, which would be capable of scoring two points; and the lowest order would be a dispensary - capable of scoring one point. In the same fashion; a sixth form secondary school would score three points; fourth form secondary school - two points; and a primary school one point. The total score of points earned by each urban place would therefore depend on the number, and the rank of the sub-services of all types that it housed - or it offered to its hinterland.

From the numerical scores attained by all the central places the research team was able to group all urban places in Kenya into four major categories:-

- (a) Local centres - that scored up to 12 points and were therefore the smallest order of central places within the country's urban place hierarchy (also the most numerous);
- (b) market centres - 12 to 18 points;
- (c) rural centres - 18 to 35 points; and
- (d) urban centres - 35 points and above.

Using this classification, and coordinating it with demographic and other socio-economic statistics then available the team was able to map the spatial distribution of all the urban places of different hierarchical orders. This way they were able to identify those areas of the country that were deficient in infrastructural and services' investment. Consequently they made recommendations of possible directions of government spending in infrastructure to fill the gaps that seemed unserved according to their analysis. This way, it was hoped that regional inequality would be lessened through creation and re-location of central place services.<sup>21</sup> As a result of locating additional services in urban places,

or adjusting the existing services, the hinterlands of the subject urban places were expected to benefit, along with the population of the urban place itself.<sup>22</sup> The basic assumption here was that services located in these central places would "trickle down" to the hinterlands. The economic growth that would result in the hinterland would then justify the calling of these urban places "growth centres" of the areas they serve.

In other words, the post-colonial spatial system was to be built on the foundations of the existing colonial system, with very little modifications except those that enhanced its effects; and those that completed its network, extending it to the areas where it had not reached by independence. The neo-classical paradigms of regional development and growth were used to defend the maintenance of the spatial system. Very little was done to recommend its re-orientation from its colonial foundations whose basis was designed to benefit the settler plantations in the highlands. It can therefore be argued that the machinery for penetration and colonial extraction was left intact by the exercise.

However, the failure to effect these recommendations was not by design, but occurred mainly out of the financial constraints that faced

the regional planners at the time. The colonial spatial system had significant sunk cost value that could not be abandoned by a stroke of a pen. For example existing railways: though uneconomical like the Nairobi-Nanyuki line, or the Naivasha-Nyahururu line and others were to be left in place. Former settler towns like Nyanyuki, Ruiru, Kitale and others that no longer commanded the business of their hinterlands as a result of emmigration of settlers were still left in the central place hierarchy that was recommended by the planning department.

Consequently, improvements on the existing system seemed the only viable means of achieving regional equality. This had an added advantage, because those areas that were found deficient in infrastructural facilities turned out to be largely the former "African Reserves" which were deprived of any significant development by the settler dominated colonial government. The recommendations to fill in the left out areas with infrastructure and sub-regional spatial hierarchies of urban areas was at least a welcome step in the right direction. What was necessary therefore was coordination between planning agencies at the socio-economic and physical dimensions. The policy required consistent coordinating and its effects required close monitoring so that revisions can be made on the failing components as

need arises.

The massive development of additional tarmac roads by the post-independent government in the formerly neglected areas was another step in the right direction. Links were provided where they did not exist; and this has tended to alleviate the adverse effects of the colonial system. Again, coordination between road building and the recommended urban hierarchy was necessary. New roads, like the Mukuyu-Sagana road, Embu-Meru road, seem to have the effect of defeating the recommended spatial structure in Central Province, for example; although the roads had the welcome effects of increasing accessibility within the province.

This policy of growth pole planning has been going on for more than a decade now; (1985) and there seems to be a half-hearted will on the part of the implementing authorities to carry it through. Inherent weaknesses have surfaced with time that could lead to its being abandoned as a failure if no appropriate steps are taken in time. These weaknesses were caused by the fact that the selection of growth centres was not rigorous enough. They were also due to several other reasons:

- (a) there were not enough regional scientists in the government departments and at the district level that were technically conversant with local socio-economic

- conditions;
- (b) politicians tended to influence the decision of regional analysts; wanting their constituent central places to be ranked higher than those of other places - hence the numerous promotions of urban areas to municipalities and town councils since independence;
  - (c) personal element among the analysts led to the superimposition of subjective hierarchies over the most viable spatial systems in some less developed regions of the country - especially those that the analysts were least conversant with;
  - (d) the country, the economy and the government lacked the resources for the implementation of the growth centre strategy - leading to delays in locating and re-locating services and sub-services in accordance with the needs of the development strategy; (i.e. no effective power of implementation);
  - (e) lack of the coordination expected amongst the government planning agencies and those that finance the implementation - leading to contradictory regional development objectives of these agencies; and to delays in regional development plan implementation;
- and

(f) the fact that the economy was left externally oriented. The infrastructural investments sometimes carried heavy import components that caused leakages in income multipliers to outside countries; instead of maintaining such expenditure in the country; and better still, in individual regions.

As a result, the central places development, and the development of the spatial system favours a contribution of the Taafe-Morril-Gould system.

~~The process of colonial extraction seems to be~~ perpetuated by the forces of neo-colonialism. The dualism prevalent in the economy has given rise to the urban primacy of Nairobi, because most new investments seem to be largely attracted to the city due to its superior infrastructural endowment. Accompanying this is significant rural-urban migration, with all its concomitant adverse effects on the urban space of Nairobi and the country's spatial system generally.

A policy of de-centralizing industrial activity was envisaged in the growth centre strategy. It required the spreading of private sector investment into every feasible urban centre, while discouraging and monitoring closely the location of new industry in established cities like Nairobi and Mombasa. Thus, urban primacy would be reduced and rural-urban



migration would be slowed down - if not reversed altogether. However this aim is also "in trouble" because most large-scale investment in industries is external in origin. The investors have therefore a heavy influence in the choice of industrial location - tending to locate in areas where infrastructure is already well developed, namely Nairobi and Mombasa.

The de-centralization of industry enforcement mechanism therefore seems to be lacking in one of the most vital ingredients of spatial policy enforcement: effective power.<sup>23</sup> This power lies elsewhere: in multinational corporations, in the World Bank and its affiliates; and in the countries that are the sources of foreign aid to Kenya. This phenomenon is not peculiar to Kenya only, but it is prevalent over the economies of most third world countries. As a result, the colonially induced spatial system is likely to undergo only a slow transformation to the mode that will be suitable to the Kenyan developmental conditions.

#### The Evolution of the Ugandan Spatial System

Bakwesegha observes that Uganda's pre-colonial era was "..... characterised by a score of ethnically circumscribed inward-looking groups comfortably set in the framework of fluid boundaries....."<sup>24</sup> The spatial system that existed then was punctuated by trading headquarters of ethnic rulers and connected to traditional market places in a manner not very

much dissimilar to the Kenyan spatial system. It was also connected to the coastal trade through definite caravan routes that had developed around Lake Victoria through Tanganyika (mainland Tanzania) from the coastal towns of Tanga, Bagamoyo, Kilwa and others. Undoubtedly, the headquarters of the rulers played central roles in the administration of those ethnic groups; and had also a substantial commercial role. At times, they were cardinal trading centres within the regional space occupied by each ethnic group. The structure of the spatial system attached to these centres has not yet been well understood, but it probably resembled the pre-colonial Kenyan spatial structure.

The nodality of rulers' settlements was not definite in the northern areas of the country because these areas were inhabited by non-sedentary pastoralists. In that case, the spatial system could have been largely non-existent. However, in Buganda, Toro, Ankole, Bunyoro and other places in central, southern and south-western Uganda there tended to be this "ruler town" dominated hierarchy of central place system.<sup>25</sup> Obviously in pre-colonial times the spatial structure within these tribal Kingdoms was bound to change from time to time after tribal confrontations that took place often during these times. Another point worth noting is that during

the later eighteenth and during the entire nineteenth centuries the coastal trade intensified. The nodal central places and trading areas now became definitely the chiefs' or the kings' centres. This dominance owed its origin from the availability of guns from the coastal trade; the concentration of power on tribal potentates due to the pre-colonial socio-economic organization within Uganda at the time; and the tribal cohesion caused by power consolidation of the dominant tribes like Buganda, Toro and Ankole.<sup>26</sup>

#### Colonial Impact on the Spatial Structure

Colonial penetration had similar impact on the Ugandan spatial system to that experienced in all the other colonized countries - and to Kenya in particular. The "... urban nodes took roots in forts (established by colonizers); mission sites, and administrative headquarters that spread in quick succession across the country as Uganda passed from localized native rule to Protectorate (1894) and dependency in 1902. The transfer of administrative control from the Foreign Office to the Colonial Office in 1905 hastened the imposition of development strategies that reinforced an economic and political system in urban nodes."<sup>27</sup> The population within the modern boundaries of Uganda was polarized by the colonially imposed socio-economic system between the organized tribal

kingdoms in central and Southern Uganda on the one hand, and the pastoralist tribes of Northern Uganda on the other; because the latter group did not possess any machinery for self rule similar to those of centralized chiefdoms at the time of colonial penetration.

As a result, the central and southern Uganda experienced the greatest socio-economic development by the early 1960s when independence came.

(Figure 11-3) Urban areas in these parts like Jinja, Kampala, Tororo, Masaka, Fort Portal, etc., experienced the greatest developmental impact. Traditional trade routes were replaced by roads and railways built to facilitate administration during the colonial times; to extract the few minerals that existed - like copper from Kilembe copper mines; and to assist in the exportation of African-grown commodities and cash-crops. The infrastructure was developed on the lines of the colonial policy; and like in Kenya, tended to be enhance this colonial developmental policy. It enforced the imposed colonial spatial system, and created some degree of urban primacy on Kampala; imbalances between rural and urban development within southern Uganda; and between the general development pattern in Uganda.<sup>28</sup> It created differentials in development between Northern and Southern Uganda.

The weakness of this colonially imposed spatial

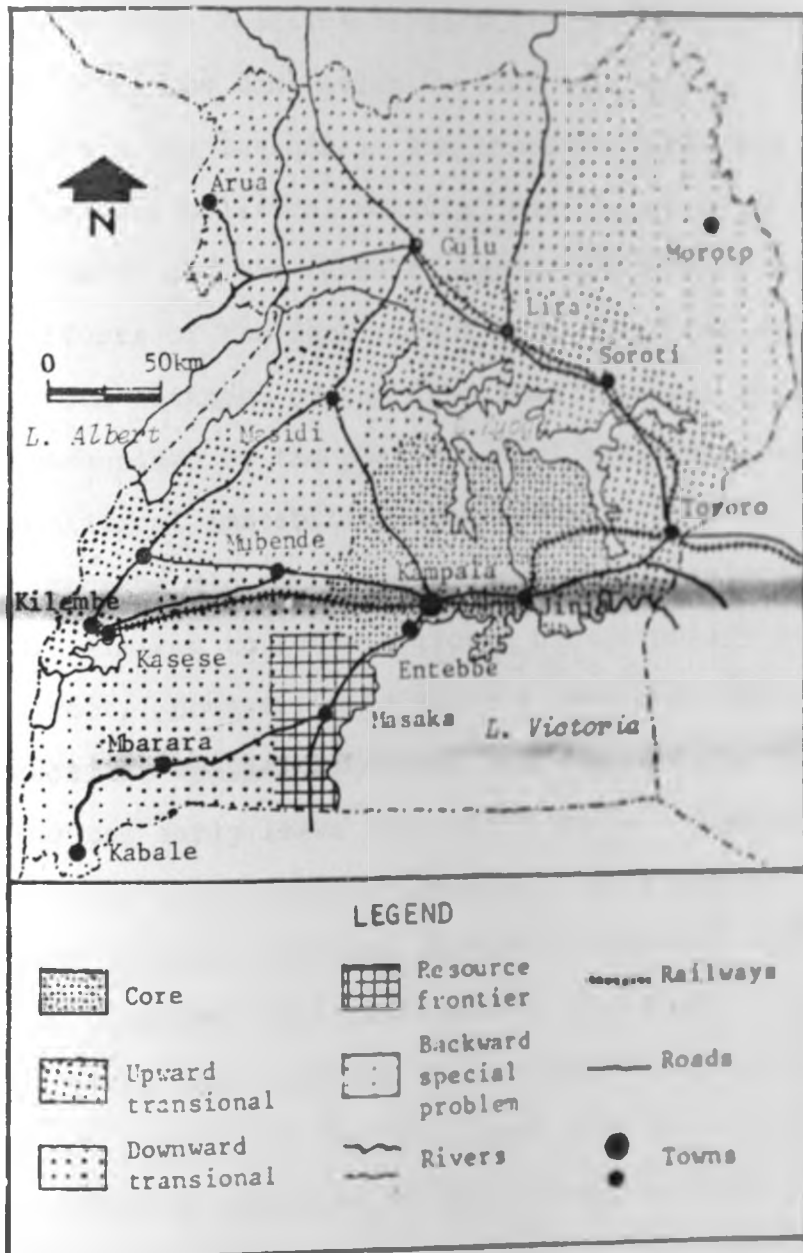


FIGURE 11-3. Uganda's Colonial Spatial System; and levels of Economic Development during the early 1960s. (SOURCE: el Shakhs et al; Eds, *Urbanization, National Development and Planning in Africa*; Page 58).

system and the concomitant socio-economic structure formed the basis for political debate just prior to independence - Politicians in Northern Uganda wanted to minimize the domination by Southern Uganda (especially by Baganda). The immediate pre- and post-independence political activity was dominated by this theme; and the theme filtered down even into the efforts of the development of the spatial system.

The weakness of the inherited spatial system was recognized by the post-colonial administration. The political instability that ensued after independence did not allow any definite regional policy similar to Kenya's growth centre policy to take root. However, mild efforts have been made to correct the spatial imbalance through a study made during the early 1970s that aimed at "...curbing the rapid, ugly haphazard nature of development that was and is still a common feature in many of the rapidly growing urban centres."<sup>29</sup> The study methodology took the form of spatial analysis by planners similar to that of Kenya, but with a slight difference in the means by which study data was collected.

The study was aimed more at the understanding of the existing the hierarchy of urban areas and the individual structures of the urban centres within Uganda, than at regional development as in the Kenyan

case. Provincial administration staff were the main sources of information; and were used for data collection. Using the data so collected, the Town Planning Department selected and ranked 72 urban places. The criteria for selection and ranking included the level of development in each urban place, the rate of growth in the immediate past decade, and the population of the hinterlands of the urban places.<sup>30</sup>

"Owing to limited finance and manpower the... selected centres were .... categorized into two, those that were in need of urgent attention, and those that could only be guided slowly in their growth. The former.... were called high ranking centres .... (t)he latter were (classified as low priority development centres whose development could wait), but administrators (were) supposed to direct and control growth.... (in them)."<sup>31</sup> The exercise was carried on during the last years of the period of social strife under Idi Amin. Currently, only the development plans of the individual towns that were selected have been finished; (1985) and no definite regional policy seems to have evolved out of the exercise. Since the scheme has hardly gotten off the ground the impact of the exercise on the Ugandan spatial system is yet to be seen.

In effect, the colonial spatial system still persists as at the dawn of independence.

### Evolution of the Tanzanian Spatial System

Tanzania comprises the Mainland (formerly Tanganyika) and the Islands that used to be known as Zanzibar in pre-independent times. After the revolution in 1974 the two formerly different and autonomous states united to form the United Republic of Tanzania; with semi-autonomous governments on both the mainland and on the islands of Zanzibar; but under one president, and with the same system of political economy and government. The spatial system of Zanzibar will be ignored for the sake of this introductory work. All that can be said is that it comprises an urban hierarchy centred on Zanzibar town and interconnected with roads and a small railway length. The organization of the spatial system of the islands is complicated by spatial restrictions of the limited land area. Adequate study has not been given on such spatial systems. Consequently attention will be given only to the spatial organization of Tanzania Mainland.

### The Spatial System of Tanzania Mainland

The coast of Tanzania mainland was the starting area for trading caravans into the interior of East Africa since the early centuries of the Christian Era. This was largely due to more humane climate



between the coast and the great lakes that afforded water and food for footman based caravans - as compared to the relatively more arid hinterland of the Kenya coast. During the eighteenth and nineteenth centuries, the time when caravan trade into the interior reached its peak, trade into Kenya from the coastal parts was also occasionally interrupted by the then powerful and warlike Galla and Masai tribes. This led to the caravan routes on the Tanzania mainland being used more often; and acquiring greater significance in the East African trade than those on the ~~Kenyan coast~~. (Figure 11-4). The history of trade in this area with Zanzibar acting as the main base and entrepot is well documented in history books on East African history, and in recent spatial system studies.<sup>32</sup>

A spatial system similar to that of Kenya and Uganda therefore developed on the mainland Tanzania during the pre-colonial times. However the Tanzanian system had better developed urban hierarchy and a more pronounced spatial system than in the other two countries; due to the preponderance of the caravan routes. Trading centres and market places were better developed along the caravan routes than in either Kenya or Uganda; although, as yet no definite rank in urban place hierarchy has yet been placed by them. The spatial system was also more permanent because of

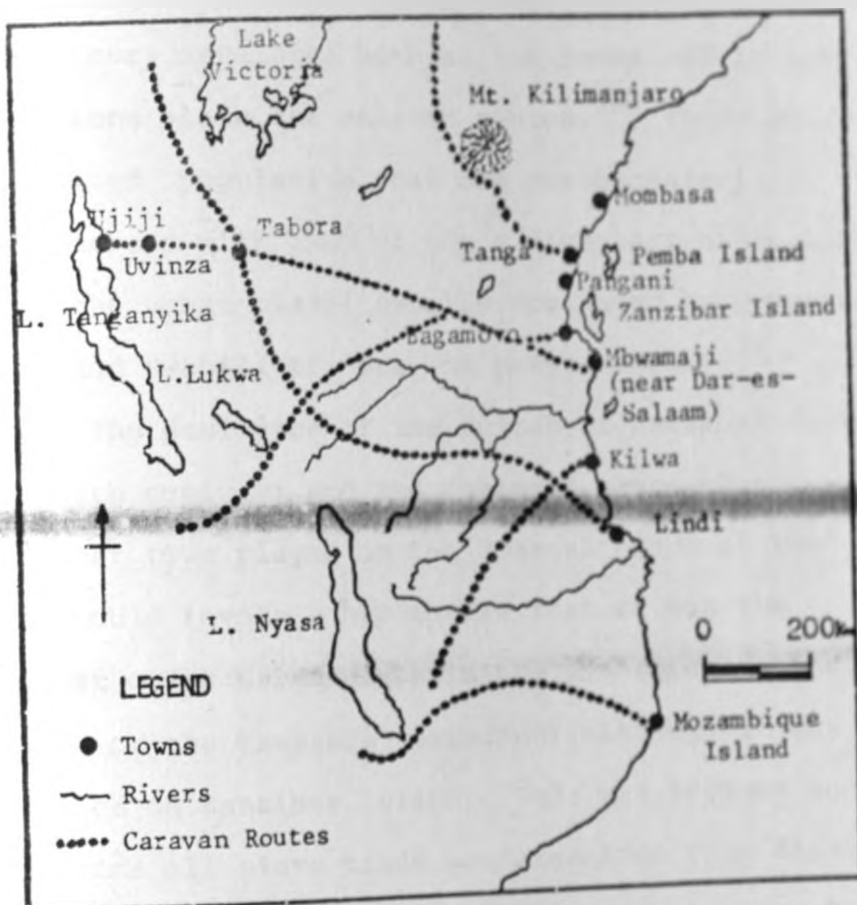


FIGURE 11-4. Pre-Colonial Trading Routes on the East African Mainland; mainly originating from the Coastline of Modern Tanzania. (SOURCE: David Slater, "Underdevelopment and Spatial Inequality", 1975; p. 148).

the effective power of the Arab and Swahili trader that was felt along the trading routes manifested in their money economy and trade in guns. Urban places like Tabora, Uvinza, Ujiji, Tanga, Bagamoyo, Kilwa and others developed both at the coast and in specific locations along the caravan routes.<sup>33</sup> These had urbanized population that was not necessarily homogeneous with that of the rudimentary hinterlands of these urban place; usually dominated by powerful Arab and Swahili traders and power classes.<sup>34</sup>

The dominance of the Sultan of Zanzibar during the 19th century; and the dominant place that Zanzibar town played on the coastal trade at the time could invoke a hypothesis that it was the highest order urban place in the pre-colonial spatial system of the Tanzania mainland; although it was situated on Zanzibar island. This was because during this time all slave trade was organized from Zanzibar; all ivory trade that was complementary to slave trade was also organized and financed from Zanzibar. This trade resulted in the re-activation of urban life on the coastal settlements opposite Zanzibar. These coastal towns acted as entrepots into the mainland.<sup>35</sup> Each was a terminus for a specific caravan route into the interior; and as such, each housed a population whose economic base was trade with the hinterland and with S.W. Asia through Zanzibar, or

directly. In terms of urban place hierarchy these could have occupied places very near Zanzibar in rank - second highest rank, third, fourth, but not very much lower than that.

The organization of the space economy was very close to that hypothesized in the Taafe-Morril-Gould model at stage One. This was because the South West Asian trade was in many ways similar to this Stage One. (Compare figure 11-4 and stages One and Two in figure 11-1).

Unlike Kenya and Uganda, Tanzania was first colonized by the Germans. However, the effect of German colonization was theoretically in no way different from the hypothesized effects of colonial penetration outlined above. The Germans also imposed a colonial spatial system onto Tanzania through their rapid railway development - both for extraction through trade, agriculture, and for strategic purposes. One significant impact of the railway line was to create an effect similar to that postulated in Stage 3 of the Taafe-Morril-Gould model. The completion of the central line from Dar es Salaam to Kigoma had the effect of increasing the nodal importance of the relatively newly founded urban place of Dar es Salaam. (It was founded in the 1860s by the agents of the Sultan of Zanzibar, as compared to other coastal towns which date from 1st century A.D.) The town grew

faster than the ancient coastal towns nearby-like Kilwa, Tanga, Bagamoyo, Pangani, etc. Tanga, especially, (which had hitherto experienced some growth because the railway line to Moshi that had been built earlier than the central line to serve the Kilimanjaro colonial agricultural settlement started there), was overtaken in terms of rate of growth; because the central railway line, which was longer than the Tanga-Moshi line, gave Dar es Salaam a greater hinterland than Tanga.

As we have noted several times before the Germans superimposed a spatial system on the pre-colonial system which had no regard to the existing socio-economic set up. They founded new towns as administrative centres and fortresses; and linked them with the rail and road transportation system they had rapidly constructed. The degree to which the Germans (like the British in the neighbouring countries) consciously and systematically directed the growth of these urban places was small. Their basic concern was to ensure their efficient functioning as centres for siphoning off the rural surplus of Tanganyika; and for ensuring efficient and effective administration to facilitate easy collection of taxes. The transportation system linking urban places therefore went only to the areas of colonial significance; and the other areas were

left relatively undeveloped.

Consequently, during the German period, and during much of the British period of colonialism the urban places in colonial Tanganyika acted principally as centres for the collection and transshipment of rural produce; centres of military and civil control; centres for the distribution of imported commodities; and as residential enclaves for the colonial administrators and their locally appointed rulers. The British administration that took over after 1918 only amplified this trend. Their notorious ground-nut scheme in Southern Tanzania that was started in the 1950s was a typical example of colonial extraction. It led to the development of another railway line from Mtwara on the coast of to Nachingwea area. When the scheme could not pay, (and thus could not satisfy its colonial initiators) it collapsed; and the railway line was lifted in 1962. Similarly, the Mpanda line which was constructed in 1950, and linked to the central line just west of Tabora primarily functioned as a means of exporting the lead that had been discovered around Mpanda. However, the size of the deposits turned out to be smaller than expected; and the railway line was subsequently terminated on the grounds of not being able "to pay its way."<sup>36</sup>

Independent Tanzania inherited this colonial spatial system that had left the bulk of its hinterland undeveloped out of the neglect by both colonial powers (Figure 11-5). Seven years after independence the country declared its intention to adhere to the socialist political economy; and to programme its development in accordance with the socialist ideology blue-print - Arush Declaration of 1967. In the 1969-1974 Development Plan the Government decided to adapt an essentially growth pole spatial system that de-emphasized the importance of the coastal cities by eventually making Dodoma the Capital of the country. The urban primacy of Dar es Salaam in comparison with the rest of the urban places in the country was an item of particular concern in the Plan; and a policy of de-centralization of industry from the capital was advocated.<sup>37</sup>

The spatial system that was expected was to be in direct conformity to the socialist Ujamaa policy. Main urban nodes like Dar es Salaam, Tanga, Dodoma, Arusha, Mwanza, Tabora, Morogoro, and Mbeya were designated to act as major growth centres in the "growth pole" strategy that was adopted. Subordinate to these was to be a spatial system that would fulfil the marketing, administration, transportation, and social needs of the Ujamaa Village system that was meant to be the basis of rural development in the

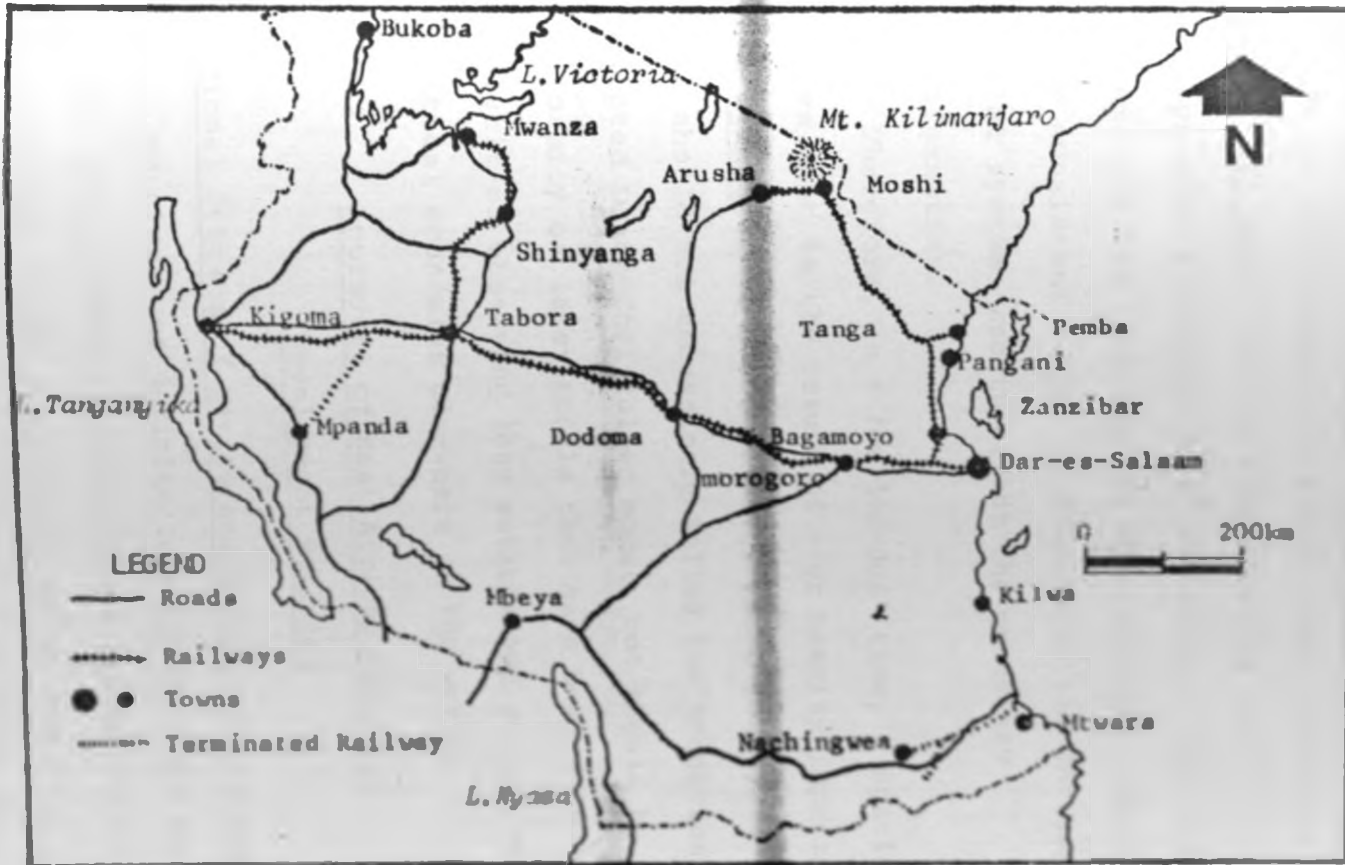


FIGURE 11-5. Tanzania's Colonial Spatial System. Note the vast areas unserved by railways, or good roads. Also note the position of terminated railways. (SOURCE: David Slater "Underdevelopment and Spatial Inequality", 1975).



country; and that was initiated with immediate effect. The result of this policy on the spatial system has yet to be seen. Currently, the immediate pre-colonial system is the dominant one in Mainland Tanzania. The Ujamaa Village, and the complementary spatial system - perhaps even transforming it altogether. The political system, and the direction of the political economy seems to be consistent enough to complement the envisaged spatial system; and to effect the necessary transformation.

Therefore, in a few decades' time, a spatial system that is the result of - or heavily impacted by the Ujamaa socio-economic development policy is expected. This should not necessarily follow the traditionally accepted Losch-Christaller model, but should be in close conformity of later models that have been developed as a result of observing long established socialist political economies elsewhere in the world.

#### Appraisal of East African Regional Development Policies

#### Regional Systems of Cities and Spatial Structures

No clear and definite rule can be laid down to govern the optimal distribution of growth centres in East Africa; or in any other country, whether developing, or developed. This is because the

spatial distribution of human activities is a socio-economic phenomenon that is dynamic in nature; and that is difficult to define or quantify in exact terms. This partly explains why the success of any attempt by the three East African countries to order the spatial distribution of growth centres and their rank sizes cannot be appraised with accuracy. The measure of such success must be seen in the context of the functioning of the spatial system in the direction of bringing the greatest socio-economic benefits to the inhabitants of any country. Theories are applied to regional development through the establishment of spatial systems that incorporates urban hierarchies and efficient transportation network. Modern regional development planning has largely been based on growth centre strategy since the publication of the work of Francois Perroux in 1950<sup>38</sup> It has been narrated in Chapter Ten how this kind of planning has been adopted with varying measures of success in developed economies.<sup>39</sup> Regional scientists like Richardson, Friedman, and others in the neo-classical tradition seem to be agreed on the necessity for a spatial system of some kind in regional development that would possibly be encouraged by government socio-economic direction. Their differences arise only in how such a spatial system should be effected and how

its functioning should be implemented.

Richardson observes that "(a) hierarchy of cities is an efficient system for promoting national growth and for promoting and distributing goods and services to society." He adds that it would therefore be foolish to attempt to equalize the size of cities, "... but it does not help us to decide whether one hierarchical structure is superior to another." Despite the imprecise nature of a system of cities, he supports the existence of some form of it in a regional economy because "... variety in urban form, structure and environment both in regard to differentials in city size and within a specific size class is probably a good thing .... it offers variety to individual households and forms a wider choice. Given heterogeneous tastes, wider choice implies greater welfare."<sup>40</sup> He sees the greatest order of growth centres (the largest metropolis) as a seed bed for innovation, managerial expertise and growth, and a port of entry for new ideas into a region; and that if this is the case, every region "should contain a large city (relative to the size of the region)." In that case, a national hierarchy of regional cities will farther devolve into sets of central place systems. The efficiency of this system of cities, according to him, "depends as much on the quality of the transport and communications networks linking

the major cities as on the balance between agglomeration economies within (each of these major cities)." He then goes on to support in principle a promotion of growth centres in lagging regions (as is implicit in the policies of the three East African countries); because he feels that a growth centre strategy involves an attempt to maximize regional growth potential via spatial concentration of development; and an attempt to obtain cost-effectiveness in urban infrastructural spending throughout any country in question.<sup>41</sup>

The only snag Richardson sees in a system of urban hierarchy occurs within the largest cities of such urban hierarchies due to the considerable social costs generated by these large metropolises. He argues that the fact that these social costs are difficult or impossible to measure cannot deny the existence and the importance of these intra-metropolitan social costs. However, if an urban hierarchy can lead to higher production within the country generally, (hence within regions in particular) and therefore lead to higher social benefits, some of these benefits may offset the intra-metropolis social costs; leading to higher overall social welfare. This is true, although the resulting social costs and benefits are difficult to quantify. Therefore, in order to understand the effects of the urban

hierarchy policy, and to ensure its desired effect takes place, the only remedy would be monitoring and controlling the rates of expansion of large cities; and not merely to attempt to reduce their sizes.<sup>42</sup>

In the African context, el Shaks and other scholars are not opposed to the spatial system per se; but in the application of this system based on western paradigms on the African socio-economic environment indiscriminately, without trying to visualize the effect of such application on the African environment.<sup>43</sup> More radical writers like David Slater,<sup>44</sup> Galina Sdasuk<sup>45</sup> and others advocate the setting of the African spatial system (and that of all developing countries) in such a way as to ensure its functioning in the direction of re-orienting the economies of the countries concerned; and of detaching these economies from the strings connecting them with international capitalism. This re-orientation implies re-planning of internal communications and infrastructure so that there is greater interregional linkages within individual countries. This infrastructural re-building and re-orientation would replace current systems or networks that tend to merely connect the coastal towns (ports) to the hinterland in the ideal extraction style; and to have very little

interconnection. The road and railway network in East Africa has this adverse a characteristic and requires re-examination and re-orientation.<sup>46</sup>

Re-orientation also implies comprehensive utilization of regional resources to the fullest benefit of the regional societies concerned in an attempt to build the "territorial societal base". Secondly, economic disparities between regions should be evened out by means of "a widespread spatial distribution of adequate welfare facilities..". Thirdly, the system should be supported by a directed ~~industrial location policy aiming at "....a fairly~~ widespread distribution of industrial activity so as to avoid some of urban concentration problems that emerged in China.... during the 1950s." Fourthly, "re-division of labour has to be steadily engineered. In societies where agricultural labour force, with very low productivity, constitutes a large share of the total labour force it is particularly important to bring about a new division of labour." Fifthly, rural-urban dualism should be eliminated by de-centralization of key economic activities from major urban areas to smaller urban places or rural areas. Lastly, a balance between production and consumption "should be worked out at the regional level as well as at the centre; and harmonized with the production possibilities of the countries and

the regions concerned.<sup>47</sup>

This comprehensive socio-economic overhaul is only possible in centrally planned economies; and is usually backed by the distribution of socio-economic and regional planning power. David Slater observes:

Finally, and rather crucially, the questions of centre-regional relationships in the field of economic management and planning. How much power should be granted to the centre and how are relationships governing all the differing facets of decision-making to be formulated so as to prevent bureaucratic centralism on the one hand, and autonomous dispersal on the other?

Also, here, what steps may be taken to escape the danger as was experienced in the Chinese case of the formulation of strong regional elites and the sharpening of contradictions between decision makers at varying levels in the administrative structure of the masses? <sup>48</sup>

He is of the opinion that answers to these questions, as well as to the viabilities of the other economic revolution proposals "can only be sought and evaluated within the general framework of a substantive analysis of the class structure and the role of the state in the society under scrutiny:

That is, the entire problem of disengagement from international capitalist system and realization of socialist transformation in an underdeveloped country cannot be understood in isolation from the nature of class forces and struggle. In the struggle to transform the organization of an underdeveloped space economy the theoretical and practical significance of essential changes that take place can only be grasped in the context of the unfolding relationships and conflicts between social classes. <sup>49</sup>

From a neo-classical viewpoint, Friedman recognizes the need for regional development in all its implications, including planning of the spatial structure. Whatever the nature of regional development is envisaged, he feels that for it to succeed, (a) it must be joined by effective power for its implementation; (b) there must be political commitment to a course of action that will ensure the sustaining of the regional development policy; and the consistency among the various policy components; (c) the use of regional development instruments must be concerted; and (d) a national balance of interregional development must be sustained.<sup>50</sup>

Since physical planning in the so called "Market Economies" implies government intervention of some kind with the laissez faire situation; and government direction of the activities affected by planning; his views, though less radically spelled than those of Slater, have no significant difference in content. This is because any government intervention leans towards central planning of social and economic systems. The extreme form of this intervention is obviously the centrally planned socialist economies.

Friedman feels that these implementation requirements are applicable in such policies like physical control of land use, directed migration,



direct public investment, and financial location of incentives. He cites several instances worldwide where these criteria have succeeded; as long as they are consistently observed for long periods of time.<sup>51</sup> In another work, he lays emphasis on the spatial distribution of power; and points at it as one of the causal developments of the spatial structure in any economy. He feels that neo-classical economists tend to lay undue emphasis on economic factors as the main causes of the development of spatial structures; while, in fact, it is the distribution of the effective power that determines the direction of resource allocation, distribution of investments, innovations, and consequently, the development of urban hierarchies.<sup>52</sup> Like David Slater, he feels that for any regional policy to work power has to be distributed in harmony with the direction of the policy; otherwise the success of such a policy will be doomed. "The initial distribution of governmental power within a country will therefore guide the subsequent evolution of the space economy" he says, in this seemingly conclusive remark.<sup>53</sup> By effective power he means the situation where "planning is done by the very agencies that are in charge of making programmed investments;"<sup>54</sup> where policy making, planning and investment programming are closely linked.<sup>55</sup>

How Successful are the East African Spatial  
Systems?

In view of the above authoritative views, therefore, we can conclude that it is perhaps too early to judge any of the spatial systems of the three countries. It takes several decades for a regional policy to take shape and for its fruits to be seen. "In order to accomplish its objective, the government would have to sustain its commitment to this policy for a period of several decades."<sup>56</sup>

None of the policies of any of the three governments have lasted more than two decades and no wonder the manifestations of colonial spatial structures are still in evidence. This means that whatever policy has been adapted by any of the three countries should be sustained rigorously, and for a long time; so that the results of the policies can be seen as a result of the policies having been given time to take effect. What is evident in the policies is, at present, not a lack of good intentions on the part of any of the three governments in their formulation, but lack of coordination in the various components of the individual policies that deals substantial blows to governmental efforts in their implementation. Luigi Laurenti quotes a case in the Kenyan context where "(e)fforts of local

authorities to identify the most urgent problems caused by urban growth, and to plan projects and obtain the necessary resources to carry them out have been almost completely frustrated by the Treasury" where "(f) financial officers have shown little understanding of even simpler requirements for adequate administration of physical facilities and have slashed budget requests year after year."<sup>57</sup>

In the context, he is complaining about planning of small urban areas - the planners lack effective power, and are coordinated through such effective power vested in Treasury officers who may differ with local authority officers in the direction of planning any local authority. As long as these Treasury coordinators have the effective power, the system that is not of their liking fails - however well intentional it might be. "The moral of this story" is to emphasize coordination in planning at all levels, both physical and socio-economic. The resulting spatial system from this coordinated action after decades of its consistent implementation is likely to be the planned spatial structure. This way, its weaknesses and strengths can be appraised; and the direction of growth re-oriented, or re-planned.

In summary, I am urging a re-appraisal of the spatial systems of the three countries; and subsequent coordinated planning, coupled with political commitment to sustain the direction of overall

growth. Of the three countries, only Tanzania seems to be going in this direction. The Kenyan and Ugandan systems are currently haphazard in both design and objectives; and require thorough overhaul so that they can be coordinated to conform with the political-economic directions of each state.

In all cases, planning policy should have the following facets harmonized: Economic Policy, Activity Location Policy; Urban Hierarchy and Growth Centre Policy; Industrial Location Policy; "back to the land" Policy; Environmental Planning Policy; and others that affect or are concerned with the space economy. The growth of urban centres should be closely monitored; and as much as possible, the economic systems in each of the three economies should be re-oriented from absolute dependence on international capitalism as orchestrated by multinational corporations from the North. This is the very gist of the Brandt Report's call to re-design the new North-South economic order.<sup>58</sup>

FOOTNOTES

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7. David Slater, "Underdevelopment," pp. 137-162.

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- 20 George Cassidy and Frank Renssen, op cit.
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## CHAPTER TWELVE

### LAND USE IN EAST AFRICA

#### Introduction

Land use in any part of the world - and in East Africa particularly - is of great concern to geographers, planners, economists and men of related disciplines. A brief examination of land use in East Africa has therefore been necessary as a case study of the area that this author has some familiarity. East Africa is an area where most of the readers of this text will be spending most of their working time. However, this should be no handicap to other readers in most parts of world because similar theoretical principles that may be assumed to govern land use in East Africa may apply elsewhere in the world; especially in countries with similar socio-economic backgrounds of colonialism and current economic attachment to western economic systems.

This chapter is meant to serve as an illustration of some of the difficulties involved in attempting to use theoretical paradigms to predict the nature and the pattern of land use in any part of the world. Along with Chapter Eleven it is a warning to the student that theoretical principles in any social science are mere generalizations and simplifications of reality. As we mentioned earlier, these paradigms need not apply or

appear in their neat form as they are cast in textbooks of a general nature like this one. Whereas it is good and proper to learn these principles, to apply them in real life becomes problematic. It is all the more difficult to orientate these theoretical paradigms to the benefit of mankind an eternal challenge to all scholars and policy makers all over the world.

Like in earlier chapters, it is conceded here by the way of apology that the subject of land use in East Africa and in any part of the world is very wide. It requires separate treatment of its own, usually in the form of a full textbook, or in the form of readings that cover its multi-dimensional aspects. Already, authoritative works exist in Geography, economics, history, and sociology dealing with various aspects of land use in East Africa.<sup>1</sup> Even these earlier works are not complete by themselves. Likewise, this chapter does not pretend to offer anything more complete; or more than the barest outline of the subject. The chapter will attempt to provide brief physical and socio-economic outline answers to the phenomena of spatial distribution of land uses in urban and rural areas with respect to the theories and factual information contained in earlier chapters.

### Rural Land Use

In chapter four we analyzed the Von Thunen model of agricultural land use. We found that within the domain of the assumptions that he made, agricultural land uses tend to form annular patterns around market centres. We even found that practical and empirical examination of this model in the United States revealed a statistically significant and similar pattern around the main market centre on the north American continent - the megalopolis on the eastern seaboard of the United States. The cause of this pattern was explained by the economic fact that all land users are rational men. They behave in such a way as to maximize profits, while at the same time they are minimizing the costs of production. In particular, we found that most regional scientists have identified transportation costs as the major cost that most land users attempt to cut. Therefore, most land users locate their land-using activities in such a way as to minimize transportation costs. In minimizing these costs, they compete for land that is nearest the main centre where their produce is consumed - the market. Under the assumptions of the major theories, there is consequent competition for this land; and the use of this land by the land user who expects to derive the greatest economic benefit from - and therefore who can afford to pay the highest rent for - the land. This economic settlement, or allocation of land use among rational calculators is the main cause of annular

pattern of land uses around market centres. The rationality of the main models has even been empirically examined in next-door Ethiopia, confirming the belief that it is a fairly accurate representation of real life phenomena in both developed and developing countries and that it is only because of complexities occurring over the real life space that we do not get the same pattern of land use arrangement as postulated by Von Thunen and other major theorists. These complexities could occur because of the scale at which the empiricist chooses the land which is the subject of his study. At the small scale level - within one Von Thunen ring - we found that a different model from the Von Thunen one may apply. Here, the problem is not the distance; because one such zone is presumed to be "one constant distance" from the market. The issue determining land use within the context of this work was found in chapters three and four to be mainly fertility. So that a different model was found to apply to this situation - the Ricardian model - in which fertility of land varies over space, and the most fertile land is used first while the least fertile land takes the least priority in the economic choice of the land user. At this micro-(and possibly meso-) level the Von Thunen pattern is expected to be blurred for reasons of the deviation of land uses around most centres. Only when a wide enough view of land around urban areas and market centres is examined does one expect to find some conformity to Von Thunen.

The next cause of land use complexity is not theoretical but real. It takes the form of the geographical and socio-economic variables; and their pattern of spatial distribution within the subject environment. It is these complexities that disturb the land use pattern in any part of the world - and East Africa is no exception to this rule.

Agricultural and rural land use pattern in East Africa depends on both economic and environmental variables. In the Von Thunen analysis only the economic variables were considered while the ecological - environmental variables were held constant. The land use activities were supposed to be located over a uni-tropic space; a plain with equal access in all directions, having equal distribution of fertile soils and natural resources and a uniform distribution of rational men of equal tastes, wealth, and preferences. Obviously, this is not the case in any part of the world. Neither are all decision makers homogeneous in their thinking with respect to profit maximization and cost minimization. Under these circumstances, it is better to analyze these deviations from the expected pattern from two viewpoints - (a) the policy and socio-economic perspective and (b) the geographical and ecological perspective. These viewpoints are embodied in the following discussion.

### Socio-Economic Causes of Rural Land Use Pattern

While human society attempts to utilize land and natural resources for their physical and economic satisfaction they have designed the "rules of the game" by which resources are allocated and by which they participate in economic activity. It has been found that leaving only the economic variables to determine the pattern of human activity may sometimes interfere with individual and societal conscience - or societal norms. The nature of these societal norms is codified by most societies through their customs and systems of government. Different societies in different parts of the world and in different environments have their unique systems of government and societal organization. Through these systems laws and regulations that govern daily social and economic activities are codified. The pattern of economic and social behaviour will therefore be strongly influenced by these legal, customary and policy parameters prevailing in any society. Consequently, in any society the pattern of land use will strongly be influenced by these societal norms in addition to the raw factors of supply and demand.

East Africa has had a complete history of interaction of many ethnic groups of indigenous peoples; and later it has been subject to the colonization of these peoples by the European powers - notably Germany and the United Kingdom. Initially, the land use pattern varied in accordance with the socio-economic nature of

each ethnic or tribal group among the indigenous peoples. As we saw in chapter three land was plentiful and was used for subsistence purposes. The land use pattern therefore reflected the subsistence nature of the habits of each tribal group. As we are about to see, the pastoral, semi-pastoral, sedentary and non sedentary societies had different ways of utilizing the resource land and its fruits. Colonizing powers came, overcame these indigenous peoples and disturbed this pattern. They introduced in some parts of East Africa their systems of land use; and in other parts they influenced the indigenous land use patterns through coercive-administrative and economic measures. The movements of the Masai on the East African highlands from their traditional grazing areas in the Laikipia between 1904 and 1911, and the drifting of the peasantry (bataka) after the Uganda Agreement of 1900 are notable examples of systematic coercion. The white man also introduced the monetary economy and the concept of profit. This had the tendency of influencing the land use in East Africa through making the indigenous peoples try to conform to western profit maximization rules with respect to land use. The bulk of the theory discussed in this text would not be relevant in absence of a monetary economy. In fact, the great diversity of land use in this region is partly caused by how far the monetary economic system has impacted the original pre-colonial economic systems and their respective concomitant land use patterns.

### Pre-Colonial Land Use

Pre-colonial land use in East Africa depended chiefly on the nature of the environment over most of this area, and the carrying capacity of the land. The carrying capacity implies the magnitude of the biomass, and the human activities that each of the varied environments (ecological zones) could support. The indigenous peoples tended to settle in each ecological zone and to adapt the land use habits that would be suitable to each zone. Those who settled in the forested highlands, for example, became agriculturalists and hunters; while those who settled in the arid and semi-arid areas adapted nomadic and semi-nomadic modes of life.

East Africa has many varied ecological zones which can be generalized into five broad categories as follows:-

- (a) The Coastal Tropical Rain Forest lands.
- (b) The Nyika Region - bushland and Thicket,
- (c) The Highland Savanna - wooded grassland region;
- (d) The arid and semi-arid region, and
- (e) The highland forest region.

In each of these regions traditional land use was in accordance to what was humanly possible in view of the primitive technology of land utilization that indigenous peoples possessed before the coming of the Europeans. Transportation was largely on foot and laden animals, and the society was not urbanized enough to require large marketing centres. Production therefore was largely for subsistence, and there was only occasional inter-tribal



trade as described in the last chapter. The tools used in production - especially in traditional agriculture were simple. They comprised the machette (panga), axes and hoes (jembes) made from local iron. This was smelted by local blacksmiths and hammered into the necessary shapes; and distributed according to demand through the primitive inter-tribal trade.<sup>2</sup>

The Coastal area has been the area of contact between the peoples of East Africa and outsiders - especially from the Asian continent - for centuries. As a result of these contacts there developed a sedentary coastal tribe - the Waswabili. They utilized the coastal tropical rain forest and the neighbouring savannas largely for subsistence agriculture, and grew coconuts, mangoes, cassava, maize, bananas, sugar cane, rice and other crops suitable to this climate. Although this community was fairly urbanized as evidenced by the ancient settlements rich in architecture, it would be far fetched to try and impute the Von Thunen theory for two main reasons. Firstly, the pattern cannot be traced throughout history because of the rise and fall of the influences of urban areas over time. For example one sultan would be powerful in one period, and would cause his capital town to dominate all the others - and then he would be conquered, and the influence of this urban/market centre would often be obliterated. Secondly the area is very thin; about 20km in width. So land use around these market centres

would be distorted accordingly. Lack of adequate transportation - except by seasonal dhows and unreliable canoes - tended to make agriculture more of a subsistence nature over most of this coastal strip. Due to lack of comparative advantage between different parts of this region it was not economical to transport - say mangoes - from one part of the coast to another. This subsistence farming tended to result in patchy land use of orchard groves interspaced by crop-land for domestic consumption. It must be mentioned that although exact Von Thunen patterns could not be discerned because of the above reasons a considerable amount of trade between the coast and South East Asia has been recorded. Organized trade in agricultural produce between rural lands and coastal urban centres during this time was minimal; and the records about this kind of activity are minimal.

The Nyika region of bushland and thicket was occupied by hunter tribes like the Wakamba, and semi-nomadic Wamasaai, the Galla, etc. Some areas of Tanzania and Southern Kenya both occupied by semi-pastoralists and agricultural tribes. The crops suited to the low precipitation over this region like millet, cassava, sweet potatoes, etc. were possible. Due to the harsh climate of this area human occupancy was sparse. The animals kept were goats and boran Zebu humped cattle. Land had not acquired any economic value because of the sparse population. As we saw in chapter three, no rent could be theoretically feasible because there was plenty

of fallow unoccupied land all over this area relative to the population. Neither the Ricardian nor the Von Thunen theories could be imputed to traditional land use because of these reasons. The pattern of land use comprised patchy open areas left fallow through shifting cultivation or isolated villages that were the then current settlements of these peoples. In between these patches there would be large expanses of the natural Nyika vegetation of bushy thickets and grasslands.

The highland savanna of bushland and thicket was more fertile than the Nyika. It was occupied by agricultural peoples like the Chagga, the Sukuma, the Meru, the Bena, the Turu and others.<sup>3</sup> The farming and land use techniques were more primitive than those used at the Coast due to lack of contact with external peoples - except, perhaps, occasional coastal traders. Some tribes - like the Meru of Kenya - used wooden implements, the "muro", to break the earth, and for weeding the crops. However, steel axes, swords, spears and other implements were not unknown. Renting of the land was not developed in the western sense of the word, although some tribes like the Luos, the Teso, the Nandi, the Pare, Nyakyusa, Meru and others developed fairly sophisticated systems of land tenure and land use systems.<sup>4</sup> There was no monetary economy among these communities, and consequently these communities were not urbanized and "rational" to the degree assumed in Von Thunen and allied theories.

Therefore the land use pattern was patchy and reflected very little economic thinking. Shifting cultivation and multiple ownership of small plots scattered over the plains; some lying fallow, and others under cultivation. Use of fires for bush clearance was prevalent all over the Savanna. This had profound effect in modifying this ecological zone by killing most tall trees, and leaving only stumps and the fire-resistant types like the Acacia and Combretum. Patterns of settlement on the hillsides was more the rule, while agriculture and grazing was practised on the neighbouring plains. Occasionally tribal warfare tended to disrupt the permanence of settlement and to retard any urbanization. This, along with lack of monetary economy, makes it far fetched to try and impute the land use theories cast in more sophisticated societies of the western civilization over these highland savanna areas in pre-colonial times.

Kenya is the only East African country with extensive arid and semi-arid areas. Cultivation in these areas was impossible due to sparse rainfalls - under 250mm per annum. The inhabitants of these areas adapted themselves to nomadic pastoralism. They kept sheep, camels, goats and Boran cattle, making use of the grazing land according to the season.<sup>5</sup> In some areas the occasional rains would make the pastures luscious, and the tribes would move to take the advantage of the sprouting vegetation, leaving the dry areas behind.

Human occupation in these areas therefore depended on the availability of green pastures; and the people's mode of life was purely nomadic. Movement across the deserts was by camel. The Boran, Redille and the Somali occupied these areas. The pastoral nomadism is a more primitive mode of life than the sedentary agricultural mode of life. Because of the harshness of the environment any definite agricultural land use pattern could not be possible; and therefore the theoretical paradigms can be dismissed completely for the sake of simplicity.

The highland forest region was occupied by sedentary agricultural - hunter tribes like the Kikuyu, the Ganda, the Dorobo, Wanyankole, the Bagisu, the Toro, Chagga, the Bena and others. These peoples were mostly farmers and grew an assortment of crops that were suitable for this area. The forest area is the most fertile in East Africa; and traditional agriculture thrived reaching very high levels. Land tenure was often the most sophisticated among the East African peoples. It ranged from individualized clan ownership of the Wakikuyu<sup>6</sup> through various stages in the land tenure "spectrum" to the feudal land ownership system of the Waganda. Hunting of the game abundant in the forests and the neighbouring plains situated on inter-mountane plateaux was also practised by some tribes like the Wandorobo. Again, lack of the monetary economic system,

elaborate transportation systems, and the sparseness of population caused the sedentary nature of the economic dealings with land as a commodity. The land rent was rudimentary, and sometimes non-existent.<sup>7</sup> Shifting cultivation was prevalent, causing the situation described in Chapter 3 where rent is often not payable for the use of land. The pattern of land use within the settled area was patchy. Different crops were often grown at different elevations, and at different slopes on the river valleys that characterize the topography of these forested mountainous areas. For example, sweet potatoes and sugar cane were grown on the river bottoms, while on the valley slopes were grown the cassava, bananas and yams; and on the ridges were grown beans, peas, and millet by the Wakikuyu.<sup>8</sup> The communities occupying the flat wet areas like the Baganda, Basoga the pattern was less definite; and involved the plantation of banana plots interspaced by maize, cassava, bananas, and sugar cane. Because of the largely humid climate of Uganda these tribes specialized more in tree crops than the tribes of central Kenya and Tanzania. Thus, the banana plantations were the commonest land use among the Baganda especially. The Miombo woodlands of Tanganyika were the only exception to this rule because these forests grew on poor soils and in an environment favouring their infestation by the disease-carrying tse-tse fly. This rendered almost the whole of the south-western half of Tanzania largely unoccupied in pre-colonial times.<sup>9</sup>

Again the different socio-economic and physical environment from the one postulated by Von Thunen makes the theoretical paradigms based on the rational "economic man" irrelevant in the determination of the land use patterns over East Africa in pre-colonial times. Land use in this zone - like in most other zones of East Africa - was regulated more by tribal customs and the nature of the physical environment than by the economic forces. The tribal customs in turn were regulated by emotional attachment between members of the community rather than purely economic considerations. Man's relationship to land was more spiritual than economic.

#### Colonization and Rural Land Use

The impact of colonial penetration on land use in the three East African countries varied according to the colonial status of each country. Uganda was a "protectorate", while Kenya was a "colony" and Tanganyika (mainland Republic of Tanzania) was a mandated territory. A "colony" was a territory dependent entirely on the British Crown. It was acquired by the British crown through settlement by British Subjects, through conquest, through annexation, or through cession from colonial dependencies of a foreign power by that foreign power to the British crown. The soil of the colony was considered British, and the inhabitants of the colony were British subjects. A "protected territory" might be a semi-independent state whose government is supervised by the British Crown - such as a "protectorate"; or it might

be a "mandated trust territory". Acquisition of a protectorate was mainly by treaty, usage or sufferance; and so was acquisition of a mandated territory. The later was usually held by the British crown on behalf of the league of Nations after the 1914-1918 war with a mandate on the British crown to supervise the development of the state until the inhabitants are "mature to govern themselves". The soils of both the Protectorate and the Mandated trust territories were foreign, and the inhabitants were only British protected. Originally, British jurisdiction was limited in kind by the nature of the agreement with a local ruler. The crown was also supposed to govern any British subjects and those of other countries resident in the trust territories, and also the subjects of the protected territories as the local rulers (if any) may consent. However, in both types of protected territories this changed in the latter part of the Twentieth century and these limitations were largely abandoned. British domination over the Protectorates and the Mandate trust territories became more or less as extensive as in colonies; and the style of government became almost identical.<sup>10</sup>

With respect to land use, what actually mattered initially was the status of colonization of each territory. Land within the colonies was manipulated by the Crown however "it" pleased because it was British soil. On the other hand the "foreign soil" in



protected territories was supposed to be reserved for exclusive use of the indigenous inhabitants of the territory. This meant that Europeans of British origin could settle in a colony like Kenya, but such settlement was, in theory, strictly limited in Tanganyika and Uganda - because they were "protected territories". European settlement was legally safeguarded by legal institutions in a colony, so that in Kenya a European could not assign his interest over land to a non-European. In Tanganyika and Uganda it is the interests of the Africans which were theoretically safeguarded by legal institutions; and it was supposed to be illegal for an African to transfer his interest over land to a European, or a non-African.<sup>11</sup> This means that the first thing that the British did immediately they acquired any of the three territories - no matter what its colonial status - was to define land tenure, so that the administrators can be able to have clear guidelines with respect to dealings over land and real property.

#### Definition of Land Tenure in Uganda.

The first country to come under the British rule in East Africa was Uganda.<sup>12</sup> A British protectorate was declared over Uganda in 1894. After several vassilating decrees and orders in council regarding land tenure and the general administration of the territory the British Government appointed Sir Harry Johnston as special commissioner over Uganda as one of the basic

measures of achieving his objectives. British rule - according to him - was to be made self-sufficient and firmly entrenched by strengthening the hand of the ruling oligarchy and "so bring stability to the protectorate." The culture of the Baganda was such that the amount of land ownership defined the extent of political and economic power over all the tenants and sub-tenants working in that land. So, Johnston set out to make sure that the "oligarchy" was well rewarded with land (at the expense of the common man - the Mukopi - by the terms of the Uganda Agreement which he signed on behalf of the British Crown with the Kabaka of Uganda in a great hurry - "after (only) three months' residence in Buganda, and without any .... consultation with the Foreign Office ....." on the 10th of March 1900.<sup>13</sup>

The second objective of making the land settlement and probably Johnston's main interest was in gaining control over and utilizing the unoccupied land. He hoped that this land would be used to support the protectorate financially - thus entrenching the colonial rule over Uganda. Therefore he concentrated on identifying the unoccupied land and left the Kabaka and his feudal vassals to adjudicate over the problems of the most populated areas of Buganda, very often at the expense of, and causing great hardships to the common man. West observes that this primary concern of Johnston prevented him from worrying himself "..... unduly over the problems of the occupied land; so long as he obtained the chiefs' agreement."<sup>14</sup>

The chiefs and other feudal potentates could not fail to give their consent to the agreement since they were the beneficiaries of the whole arrangement. The Uganda Agreement fathered a land settlement and land tenure scheme called the Mailo System of Buganda from whose operation the chiefs were the main beneficiaries. The word "Mailo" is derived from the English word "mile", that is, a square mile; and has come to be used in Luganda as an "estate" or an "area".<sup>15</sup> By article 15 of the Agreement the total area of Buganda was taken to be 19,600 square miles. Johnson made sure that this was divided between the Buganda ruler (the Kabaka) and other notables on the one hand; and the Protectorate government on the other. Thus, the Kabaka, and the members of the royal family - the regents, county chiefs, and certain other leaders - received either private or official estates totalling 958 square miles. The other chiefs, about 1000 in number were allocated 8000 square miles at the rate of 8 square miles each. A total of 92 square miles were given to christian missionary societies, and 50 square miles were set aside for existing government stations; while 1,500 square miles were set aside for forest reserves. The remaining area - in which Harry Johnstone was primarily interested - amounted to about 9000 square miles ".... of waste and uncultivated land (and) was to be vested in Her Majesty's Government."<sup>16</sup>

All this sub-division of Buganda called for an already established and well-staffed survey department to demonstrate individual claims. However, little was done due to lack of interest to adjudicate these claims by both the foreign office and the Protectorate Government as soon as the Agreement was signed. This led to inconsistent vassilation in both policy and government interference with the land tenure system throughout the early part of the 20th century. The "new" land tenure was immediately out of step with the pre-Agreement traditional land tenure system and caused untold difficulties to the common man (the "Mukapi"- pl. "Bakopi") who was largely ignored in the system. When the whole situation stabilized it amounted to a poor cousing of the British feudal system. Several items of legislation were passed to ameliorate the difficulties created by the hasty Agreement; to very little avail; until 1950s - when a freehold land tenure with a landowning middle-class emerged from the confusion.<sup>17</sup> This land ownership system was later extended to Toro, Eunyoro and Ankole. Thus the land tenure in Uganda is still evolving under the impact of the Mailo System.<sup>18</sup> The Northern Ugandan districts have been left out because at the time of British penetration they were not as closely settled as the southern districts. Most land in these areas was crown land, where the "natives" had only the interest. In any case, a large part of it was scrub-land;

and therefore of little interest to the colonialist.

The resulting land tenure in Uganda

caused a subsistence - small holder - cashcrop economy where large plantations were largely the exception rather than the rule. The land use pattern that resulted was a patchy mixture of seasonal crops, cash crop (coffee, tobacco, cotton, etc.), and banana plantations.<sup>19</sup> Each tenant and sub-tenant within the mailo system would grow food crops and cash crops of all kinds on his small-holding that he has either purchased or rented from the Mailo owner. The overall pattern was therefore a patchy intermixture of small plantations all over most of the southern districts. Most of the northern tribes led a semi-sedentary semi pastoral life; and "land adjudication" has not taken place in these areas as it has in the south.

The Crown never came to utilize the remaining land in accordance with the Johnston design because of the ambivalent nature of land ownership within Uganda in view of its "protectorate" colonial status. Vassilation of colonial policy over land ownership, and the growing suspicion of the Baganda of the British administration and white settlers (after what they could see happening next-door in Kenya) led to legislation that was meant to outlaw the transfer of mailo land to non-Ugandans by 1916.<sup>20</sup> Thus, despite the pre-existing land tenure before colonialism that responded more to the environmental factors, the present land tenure in Uganda has been heavily

impacted by the system of colonialism - which was arbitrarily superimposed over the customary socio-economic system of the Baganda and the other Ugandan tribes. Land use patterns and practices have therefore responded to this socio-economic climate in a different way from the western - based land use models. The discernible difference between the pre-colonial land use practices on the one hand and the colonial land use practices - even post-colonial practices - on the other is therefore the result of this ethnic interaction that was caused by colonialism and colonial interference with traditional societies in Uganda.

#### Definition of Land Tenure in Kenya

Kenya was the second country to come under the British colonial domination. When the British Protectorate was declared over Uganda in 1894 it became necessary to build a railway line to link Uganda and the Coast. In the process of providing this transportation link to the territory with the strategic fame of containing the source of the Nile - and therefore determining the colonial destiny of Egypt and the Suez Canal - it was necessary to annex the land through which this railway line was to pass. According to the then known geographical facts, the present territory known as Kenya was deemed to be largely vacant; and seemed to have unpromising economic future because of the prevalent barren country that offered no significant promise to agricultural activity. However, for strategic and other

reasons, the present Kenya (then called the East Africa Protectorate) could not be left alone independent of British control. After a brief spell of administration by a trading company called Imperial British East Africa Company (I.B.E.A.) the British Crown took over the administration of the territory in 1895 by officially declaring it an "East Africa Protectorate". In the same year, the Uganda Railway was started at Mombasa.

Before the railway could be laid down it became necessary for the railway engineers to seek clarification with respect to land ownership colonial office - London. Thus the British had to define the status of the Protectorate land in relation to the British Crown before anybody could deal with that land. Through a system of arbitrarily made Orders in Council, rules and regulations and statutes - made in quick succession between 1896 and 1902 it became clear that the British Crown claimed all the unoccupied land in the East Africa Protectorate.<sup>21</sup> In the meantime, as the railway building proceeded inland to Kisumu (then considered by colonialists as being in Uganda - as their boundaries of "Uganda" began at the higher edge of the Eastern Rift Valley Escarpment near Limuru, Kenya) land was supposed to be acquired for railway use in accordance with the Land Acquisition Act of India, (1894).<sup>22</sup>

In 1902 the colonial governor Charles Elliot began his "White Highlands" policy whereby land on the cool Kenya Highlands was to be "reserved" for colonial plantation agriculture by the British colonists. Large tracts of land were carved from the seemingly vacant and partly African occupied land on the highland. The land tenure and land allocation process was defined in accordance with arbitrary legislation and regulations that were prepared between 1902 and 1915. Finally, the African "native" was reduced to a tenant at will over all Kenya land with no interest over this land, except usufruct - or mere use of the fruit of the land.<sup>23</sup>

The area of the Highlands was enlarged by extending the Protectorate boundary to the present position - annexation of the "Naivasha" and "Kisumu" Province in 1902. Consequently, most of the arable land in Kenya was brought under the white settler dominated colonial plantation agriculture. Africans were pushed to poor land by a systematic arbitrary succession of rules, regulations - and lastly - legislation. The Native Trust Land Ordinance of 1938 established the "Trust Lands" wherein Africans could conduct their agricultural activities "without interference" by the Kenya (now Colony) government and white settlers.<sup>24</sup>



Land use pattern and practices that resulted from this dichotomous land tenure system was typical of large mechanized farms, with European "scientific" type of farming; and overcrowded land use systems of traditional agriculture that was heavily impacted by the overcrowding conditions; forced labour, excessive taxation and colonial exploitation. At present, large farms occupy the former "White Highlands" while small-holdings (about 8 hectare on average) occupy the former "Native Reserves" under the Trust Land Ordinance. The latter have a characteristic balknized and patchy appearance with mini-plantations (one hectare on average) of each crop interspaced with others of staple foods like maize, millet, beans, etc. In some areas the indigenous peoples were indoctrinated that cash crops like coffee would bring better economic benefit. This caused cash-crop monocultural predominance at the expense of staple crops. In the later half of the twentieth century when prices in the world market - especially that of coffee - were dropping it has caused serious hardships and food shortages. The Chogoria area of South Meru District in Kenya is an example. In other areas like Kiambu and Murang'a - the small-holdings have been seriously fragmented due to inheritance and succession; so that now the resulting strips of land are no longer economically viable for any form of agriculture. This has had the ultimate result of causing a class of landless people; with the concomitant adverse socio-

economic side effects like rural-urban migration into Nairobi and other urban centres of Kenya. The land consolidation and reform of land tenure that was implemented by the colonial and now the Republic governments have not provided sufficient solution of to landlessness. Neither have the settlement schemes that came after the White Settlers abandoned their farms with Uhuru. Land use patterns and practices in future will depend on what measures the Republican government will take to administer the long leasehold large farms on the highlands; and on the general ~~socio-economic direction of the country.~~ Of late, some members of Parliament have been calling for maxima in the areas of land ownership that an individual should be allowed to own. This issue is a big political debate in view of the fact that section 75 of the Kenya Constitution guarantees the sanctity of private ownership - and therefore militates against any massive nationalization of any land that may fall in excess of whatever maximum quantity of land ownership may be fixed.

From an economic viewpoint adopted in this text no good example can be obtained to match the Von Thunen model of spatial arrangement of rural land use in Kenya. The socio-economic interaction with the colonizing peoples, changes (improvements) in transportation and other technology between early Eighteenth Century when Von Thunen was writing and the second half of the Twentieth Century, and other factors discussed in Chapter four,

have impacted the economic landscape so seriously that Von Thunen is virtually invisible over the Kenya highlands. In addition to this, the areas that were not heavily influenced by the settler population and western "civilization" have hardly changed from their traditional pattern discussed above. This pattern is obviously not in keeping with the assumptions of Von Thunen and related models.

#### Definition of Land Tenure in Tanzania

Western influence came to Tanzania initially through colonization by the Germans from about 1885 to 1918 - as we have discussed in Chapter Twelve. The Germans also wanted to exploit the agricultural potential of their East African dependency; and they initiated a settlement scheme by the Europeans at a smaller scale than the British. German settlers occupied most of the fertile land on this vast territory - especially in the Kilimanjaro area. This caused a railway line to be built between Tanga and the Kilimanjaro area during the last decade of the Nineteenth Century. In their own way, but not very much unlike the British, they first defined an arbitrary procedure of appropriating their newly annexed land within their new colony. After that they defined the land tenure to be applicable in accordance with the practices of the "mother" country - Germany. Krishan Maini observes that the concept of granting indefeasible titles

to land "was first accepted by the German colonial administration of Tanzania. This administration permitted the creation of freehold titles. Two methods were adopted: (1) It recognized the rights of certain occupants to parcels of land as estates in fee simple, ..... (2) the administration alienated parcels of land, by grant, either in fee simple or for a leasehold term. The grantees of leasehold estates were given the option, provided they complied with the development conditions contained in a lease, to convert the leasehold estates into fee-simple estates." These rights were put on record in some form of registers stored in the main administrative areas.<sup>25</sup> No compensation is recorded as having been paid to the tribal owners of these fertile lands.

After the first World War, Tanzania was ceded to the British as a League of Nations' Mandate Trust territory. It therefore assumed the status of a "protected territory" as discussed above. In accordance with the Trusteeship Agreement for Tanganyika the "natives" were supposed to be governed by the British on behalf of the League of Nations. Consequently, the British Government and the British Tanganyika administration were in theory not as free to deal with the land in Tanganyika as they were in Kenya. Article Six of the Mandate reads as follows:

In framing of laws relating to the holding or transfer of land, the Mandatory shall take into consideration native laws and customs and shall respect the rights and safeguard the interests of the native population. No native land may be transferred, except between natives, without previous consent of the public authorities, and no real rights over native land in favour of non-natives may be created except with the same consent.<sup>26</sup>

Consequent to these and similar provisions European settlement by the British took place in Tanzania in a restrained comouflaged manner, unlike the outright annexation and settlement that was practised in Kenya. The British Trustee administration did not alienate any land on freehold, but granted land to settlers on leaseholds that did not exceed 99 years.<sup>27</sup>

Consequently, settlement in Tanzania was not as attractive as it was in Kenya for British Colonists; especially in view of the loopholes in the regulations governing settlement in Kenya, and the post First World War "Soldier Settlement Scheme" in Kenya which was inaugurated in 1919 to reward the war veterans. In addition, Kenya had larger areas of highland region that had already been declared "white highlands". Tanzania agriculture and land use after the British colonization therefore was supposed to be controlled largely by indigenous peoples. This in general perpetuated pre-colonial land use patterns throughout the period of British Trusteeship; and into independence. Only relatively small areas as compared to Kenya had some formalized European type of land tenure, and the

rest of Tanzania - about 90% was under customary land ownership as at independence in 1961. This is because in any case the 90% of the land was not as fertile as Kenya highlands. The land use pattern - as observed above - remained largely out of the influence of the major land use models, because the assumptions that form the basis of these models did not hold in Tanzania. Most of the land was savanna type and was also unsuitable for settlement because of the tse-tse fly menace. Added to the lack of homogeneity in natural resource distribution, lack of effective money economy, lack of adequate and efficient transportation, and other factors, it would be too much to expect any order in accordance with Von Thunen. Only land that was suitable for cultivation was farmed first - and like in all the traditional economies, including Kenya and Uganda - unsuitable land has been left, and has been reclaimed only when population pressure has made it economical to farm such land. We see here, that the Ricardian model is more applicable to areas where traditional economies are dominant than the Von Thunen model.

After independence the government of Tanzania took advantage of the fact that land use and land tenure has not been as heavily impacted by colonial penetration as it was in Kenya and Uganda. In 1962 the government passed legislation that abolished freehold titles in favour of leasehold titles - in the interest of

acquiring more control over land and natural resources; and therefore making land use and land yields more beneficial to the common man.<sup>18</sup> This made it easy later for the government to implement a bold socialistic rural re-settlement schemes in the form of Ujamaa Villages. This farther makes it difficult for theories cast in the western socio-economic background to apply to land use in Tanzania; because the Ujamaa model is a socialistic one - more akin to the Soviet and Chinese models than to any of the socio-economic models of the Western world.

#### General Pattern of Rural Land Use in East Africa.

In summary it can be said that neither the Von Thunen nor the Ricardian theoretical frameworks are sufficiently applicable to rural land use in East Africa. This is because of an entirely different socio-economic climate from that found in Western Europe and the United States. In East Africa the economy has been largely traditional and of a subsistence nature, with underdeveloped cash economy habits. Any rationality in land use decision-making is interrupted by these factors. A traditional farmer, for example is not expected to reason systematically in a manner that maximizes profit. He is expected to behave in a manner that maximizes his utility within the constraints of his tribal customs; and other socio-economic functions arising from his

unique environment. In addition to the lack of homogeneity of spatial variables the socio-economic one is a major disturbing factor to the pure Ricardo-Von Thunen models. Matters are made more complex by the fact that land use and land tenure have been manipulated by the colonizing powers to suit their extractive purposes in the three territories. The forces of supply and demand therefore are seriously distorted; and will continue like that in the foreseeable future.

#### Land Use in Urban Areas.

In Chapter Nine we explored the theoretical economic principles that govern the spatial distribution of land uses in the neo-classical economic urban space. A generalized view of what could be expected in most urban areas in most of the Western world was given, and it was explained that the dominant factor in determining the spatial distribution of urban land uses is accessibility. Economic competition of various goods and services for parts of the city where they can reach most customers, and therefore attract most buyers to the service they offer - thus maximizing profit - is supposed to cause automatic allocation of land uses among different economic activities. We also found that for some time, many urban geographers, economists, sociologists, and scholars of related subjects have been interested in what causes the structure of urban areas. They have developed many descriptive and causal theories of city structure, the most famous of which is the concentric zone theory, the Radial



Sector Theory, the multiple-nuclei theory and various forms of the application of the gravity model. In addition, factors determining the location of retail, residential, industrial, transportation and other land uses have been given consideration in the foregoing chapters. All the time, the dominant land use allocation factor was the profit maximization motive of the land user, and the "invisible hand" of the forces of the market.<sup>29</sup> By this motive, the land users are supposed to benefit the community at large while they benefit themselves through profit maximization; and through choice of optimal location.

Regional scientists in all parts of the western world - especially of the neo-classical economic tradition - are of the opinion that the three main models of city structure and the sister theories of urban land use allocation explain the nature of urban land use; and are complementary rather than in contradiction with one another. They help to deepen the insight into the nature of city structure<sup>30</sup> and to explain the nature of urban economies in general. Empirical testing of these models has tended to validate the fact that economic factors as assumed in these models influence the spatial distribution of land uses in urban areas of the western world; and that as a consequence, most urban areas tend to develop similar structures to one another. However, it has been found out that city

structures may also be influenced by other factors that are not necessarily economic.<sup>31</sup>

In real life, most of the assumptions underlying the economic principles that govern the nature of city structures are relaxed or do not exist. Empirical evidence in East Africa<sup>32</sup> suggests that urban areas can have varied shapes and land use patterns due to complex physical and socio-economic variables that interact within urban regions and their tributary areas over time. This means that each urban area has its own unique shape and land use pattern, although these patterns may generally conform with the elements of the main city structure theories (See chapter Nine). This is true, also despite the fact that in most cities the rational "economic man" operates to allocate land uses to their highest and best uses in urban areas.<sup>33</sup>

Since most of African countries have the western socio-economic environments it might easily be concluded that the structure of most cities therein conform to the general stipulations of these models; especially in view of supporting research and findings on the African continent that has taken place since the city structure models were formulated.<sup>34</sup> This is because the profit motive behind land use allocation in urban areas is a powerful one - despite some disturbing side-vectors on the physical and the socio-economic dimensions of the urban space. These conclusions have been drawn with respect to Nairobi by various scholars; but at the same

time, important deviations have also been detected that make the land use pattern in Nairobi different from any other city.<sup>35</sup>

These deviations are observable in most East African cities; so that each one of them has its own unique physical characteristic. The most obvious cause of these departures is differing physical environments of different cities. For example, the area whereon each city is located is obviously different for the simple reason that no two parts on the face of the earth are exactly identical. Some cities are situated on hilltops and mountain sides like Murang'a and Meru. Others lie on the plains - half way on the hillsides, and halfway on the plain like Nairobi. Some cities lie on the coastal plain like Dar es Salaam, Tanga; and so on. Topography has the effect of disturbing the land use pattern because of its impact on accessibility - hence on demand for land. It is easier, for example, to travel across a plain than across a succession of river valleys. Under these circumstances cities tend to develop along the direction of cheapest accessibility; because land is acquired in this direction earlier. Intensive use of land results in the ridge whereon the city was founded; and tends to sprout in the longitudinal direction of the ridge before any significant growth can take place across river valleys - on adjacent ridges.

Other types of physical handicaps may exist in or around urbanized areas. These may divert the direction of land acquisition and urban development in the direction where these handicaps are least, or where they do not exist. The expected pattern of city structure may then be modified accordingly. These, and many distortions on the city structure may be the result of the physical environment as it influences the land users' choice on where to locate his land using activity.

Climatic factors may also affect the development of land use patterns in a city. In towns that lie on the sea-side the influence of land and sea breezes (on the East African Coast) cools the land plots nearest the sea best, while other land within the urban space may experience the climatic discomfort associated with tropical coastlands. Together with the pleasant recreational value of the beaches, this climatic factor causes the land immediately next to the seaside to be demanded and valued highly for residential use. The highest and best use for this land is something like low density high income residential land, recreation facilities, hotels, etc. Expensive villas are found on the beach areas of Mombasa, Dar es Salaam, Maputo (Mozambique) and other coastal cities due to this real local climatic reason.<sup>36</sup> Within Nairobi, the Athi plains towards Jomo Kenyatta Airport are hotter than the highlands on the Kikuyu Escarpment towards Limuru and Kiambu. Although policy factors - especially

the political clout of European settlers - may have been dominant in the determination of land uses over the city, the climatic variation influenced the classes in power during the formative years of the city's structure; and made them adapt a systematic method of residential land use allocation. Consequently, land was allocated in such a way as to yield the present pattern of land use whereby expensive houses of the high income are found on the cool escarpment, while the hotter plains are occupied by low income housing and industries.<sup>37</sup>

Therefore in most East African cities the micro - and meso-climatic factors in the regions occupied by cities have had the effect of influencing past decision makers with respect to where housing of various socio-economic groups (and other urban activities) would be located. On the highlands the locational dichotomy is between the breezy, panoramic hillsides and the hotter valleys or plains adjacent. On the coastal areas it is between the land farther inland and the breezy panoramic beaches. The process of residential land use allocation is supposed to be mainly through the price mechanism. By this, the high income select for themselves choice areas - with climate and landscape determining the highest prices of residential land; while accessibility determines the highest priced commercial land. Climate therefore (and in this way) has a very strong influence in causing the distortion of the land use pattern from the expected dictates of pure models

with all their neo-classical simplifying assumptions.

Cities are creations of man, arising from the necessity for suitable location of people; and suitable location for their activities. It is therefore difficult to imagine a city whose land use has been automatically shaped without the influence of man. In fact, the highest and best land user mechanism of neo-classical economics results from social interaction. Business activity through exchange and cash economy ultimately determines the order and the nature of the community's activities. This order is influenced by the community's need for goods and services and the spatial distribution of these goods and services. We can therefore conclude that the land use pattern that is economically determined has also a social dimension. This has been the theme of this work. The social dimension in East Africa has to do with ethnic interaction and consequent land annexation and exploitation that resulted from colonialism and the accompanying urbanization of its peoples.

#### Colonial Policy and Urban Land Use

In Kenya, urban land policy developed in response to white settlement and the "White Highlands" policy - the racial discrimination that resulted from this exercise as the plundering colonist adventures enforced their position on the Kenyan socio-economic arena. Nairobi was the town where most of the settlers initially formed an urban settlement in which they comprised a

substantial fraction of the population. Since the three East African countries were under British domination for a long time it is little surprising that urban land use practices in East Africa developed mainly in response to the activities taking place in Nairobi.

The only exception to this rule is the land use and land tenure that prevailed over ancient coastal towns like Kilwa, Lamu, Mombasa, etc; that pre-dated the colonial penetration times. The growth of these towns is largely organic; and the city structure is not as defined as that of later cities. The structures of Mombasa has been constrained by its having nucleated on an island - the spatial restrictions that have developed as the urban area grew. In addition, Mombasa old town is typical of the ancient cities which had the organic type of growth. Its characteristic zig-zag, irregular and narrow streets are not unlike those of many ancient cities where Islamic culture has been predominant. The old city is comparable to ancient Al Kahira (Cairo, Egypt), Istanbul, Damascus, etc. This pattern is also prevalent in other ancient East African cities that have been heavily impacted by Islamic culture.

Kampala (Uganda) developed as a result of opposing religious factors that were introduced during early colonial penetration times. The religious wars that resulted, and the hilly topography around the city's regional space, caused functional differentiation over this space that reflected power (or defensive)

and political nuclei. The Kabaka and his vassals occupied and controlled Mengo Hill, the Catholics occupied Rubaga hill, the Protestants occupied Namirembe Hill, and the Moslems occupied Kibuli. The city's central business district developed on the basin in between these hills. Makerere hill - occupied by the famous Makerere University - used to be a high school that grew to be a University College during the 1920s, and later into a University during the 1970s.

The missionaries (including moslem missionaries) arrived before the coming of the colonial administration, and began vying for influence over the Kabaka - who was already established in the area. Mengo used to be

the headquarters of the Kabaka's Buganda Kingdom.

Thus, Kampala developed a city structure that reflects more a multiple - nuclei appearance than that of the other two structural models. The organic nature of the city was amplified by the Mailo system of land tenure whereby land ownership in the city was individually owned, and development thereon was largely individually organized. Therefore the growth forces operating over the regional space of Kampala had a slightly different result (with respect to the city's structure) from that experienced in other East African towns that were founded as a consequence of colonial penetration. Apart from these exceptions the rest of East African towns developed more or less in response to the urban policy being formulated over Nairobi.



East Africa was a strange territory to the white man. He encountered strange diseases like Malaria, sleeping sickness, etc., for some of which he did not yet have effective cures. Malaria particularly was a notorious killer at the turn of century. Medical theory of the time and popular belief associated it with bad air found around swamps - hence its name "Malaria," meaning "bad-air". The railway encampment around which Nairobi nucleated was situated at the edge of one of these swamps; and during the early days a considerable number of early settlers died from the disease. In addition, a sudden concentration of **people with inadequate public health facilities** brought about plagues and gastric disease epidemics that claimed a considerable number of lives - especially in the slum areas that suddenly mushroomed as residential areas of Asians and other immigrants. In 1902, the first plague broke out and killed fifty people. Settlers and the colonial authorities were deeply concerned. Consequently, there was talk that the city would be moved to some healthier location up the Kikuyu escarpment that lies to the west of the city.<sup>38</sup>

In 1906, the Protectorate government in association with the Colonial Office, London, appointed a commission to investigate on the question of Nairobi's re-location. This commission was led by a qualified sanitary engineer, and an authority in the

field, by the name of Bransby-Williams. The commission found out that the town was located in a flat plain that was impossible to drain efficiently. However, the sunk costs involved in abandoning that site; and the costs that were to be incurred in re-location were considerable. Therefore he recommended that the town should stay where it nucleated initially, and that extensive works should be carried out to drain the swampy landscape. This move, and the general geography of the site may have enforced the tendency for the various races to segregate. The fact that the town site was found to be inferior provided grounds for racialist settlers to allocate to themselves the best residential land.

Accordingly, the settlers assumed that the "inferior races" were the ones whose sanitation habits spawned disease. Consequently, even before any legal measure was taken to effect any segregation the Indian residential area was located apart from that of the Europeans. The Indians lived within the overcrowded Bazaar. In addition, the broader land tenure and land use policy favoured only the "White Highlands" where only the Europeans were allowed to own land; and assumed that the Indians and other races would favour owning land in lower and warmer areas.

### Land Policies of the Later Colonial Period.

After the Simpson Commission report of 1913 the Asian community, (who were the most numerous urban dwellers and the second in terms of economic power) kept on agitating for equal treatment in land allocation in both the urban and the rural areas of Kenya - especially on the "white Highlands". In addition, around 1920 Africans were becoming conscious of the process of arbitrary land appropriation by the Europeans that was going on with colonial penetration. Various petitions and complaints were sent to London by both the disadvantaged racial groups. World opinion had also witnessed the difficulties caused on the Africans as a result of the White Highland policy in Kenya. Therefore, in granting the Mandate of Tanganyika to the British, measures were taken to prevent a repeat of the Kenyan case; and the rights of the "natives" were carefully defined as we have seen above. Evolution of land tenure in Uganda was also influenced by developments in Kenya. Africans in Uganda - as we have seen above - did not want a repeat of the Kenya Highlands' experience on their territory.

All these matters weighed very heavily on the supreme decision-makers in London. In addition, the influence of the Indian government on the colonial office had grown as a result of the concessions - both constitutional and administrative - that were granted to India after the part India played during the first

world war and after the bitter struggle for independence punctuated by several "mutinies" beforehand. In some cases, the Indian government, which by now had a large measure of autonomy from the British Crown, used to intercede on behalf of the East African Indians - and the then Union of South Africa interceded for the East African White settlers. The result of this international and intra-imperial pressure was that the British administration became kind of sensitive about the practices of East African administrations - especially Kenya - with respect to general public administration, and land allocation in particular. The Devonshire White Paper of 1923 (Kenya) outlined the colonial policy with respect to races and declared that Kenya was "predominantly an African country" where the rights of African peoples were to prevail if they ever came into conflict with those of other races.

No similar declarations were necessary in Uganda and Tanzania where the situation of African paramountcy of interests was clear from the colonial status of these territories.

As a consequence of the "White Papers" racial segregation was relaxed in Kenyan towns somewhat, and the Feetham Commission that was appointed between 1926 and 1927 to study local governments in Kenya in view of the "white paper" recommended that discrimination in land allocation in towns all over Kenya was unacceptable. However it specified that nothing

This means that most towns of East Africa that were founded at this time - and the majority were - took a segregated sectoral appearance on racial lines. Later, residential areal differentiation came to be on income lines when the racial philosophy changed with independence during the later half of the Twentieth Century. Thus, although in some parts of Uganda - like in Buganda - land use and tenure around small towns was largely under the control of indigenous peoples, in large towns where Europeans and Asians were expected to settle there were racial residential enclaves in which Africans were subtly discouraged from settling through administrative methods. Terms like European Bazaar, Indian Bazaar, African Bazaar, African Location, etc. are common in cadastral maps of East African towns during the period starting from the end of the first World War to the end of colonialism early in 1960s.

Commercial segregation within Nairobi proved difficult because already land allocation had taken place to different races in the same areas before the racial policies evolved. In addition, the Europeans knew that if business areas were totally segregated the white businessmen would lose the bulk of business to Asians and Africans because the whites would only be serving white customers - who were a minority. The Asian and African businessmen - especially the former - would have a monopoly of a wider and more populous market from their racial kinsmen. Therefore in the interest of keeping the European business running while the segregation

continued in residential areas, the colonial administration and political opinion turned a blind eye on the question of total segregation in commercial areas. However, mild separation of shopping areas was subtly organized through administrative means.<sup>43</sup>

Thus, from the earliest days of nucleation East African towns (excluding mainland Tanzania) inherited the policies taking shape in Nairobi. This way, they acquired the characteristic sectoral appearance. Land was set aside for future development on these lines; and was allocated to different racial groups through the land administrative machinery. People who acquired large land parcels in these sectoral units - especially the Europeans within the European sector - even went to the extent of laying down restrictive covenants on the land titles of the parcels they occupied. These covenants prevented non-European races from occupying residential land in European areas. This practice was prevalent in Kenya and was legalized by the Government Lands Ordinance of 1915. According to the Ordinance, these conditions were to be implemented through rules made under the ordinance empowering the Governor to veto any land transfer contrary to the provisions of the Act.<sup>44</sup>

Consequent budgeoning and jawboning from the white population of the city had its main thrust toward having land within the city divided on these lines as well. The pro-white population colony's administration began enforcing this principle informally through selective land allocation, discriminative land sales, and administrative regulations. 39

Those Europeans who went up-country and elsewhere on administrative missions started their headquarters (the "Bomas") on similar lines. These Officers were Europeans who had to conform to what the colony's racist administration was doing in the capital of the Protectorate. Land acquisition within the Bomas was supposed to be in accordance with the Land Acquisition Act of India (1894) if it was occupied. Native land tenure in most areas of Kenya and Uganda was such that the concept of "unoccupied and occupied land" was vague to define. Consequently, the administrators used their discretion to acquire arbitrarily as much land as they needed (around railway stations, townships etc.) from the native peoples without any compensation. Their superior military power, and the persuasive powers of their missionaries, added to the "ignorance" of the native peoples, made land acquisition and appropriation a very easy process. A study of primary documents written during this time reveals that no compensation was paid

for land that was acquired for official use during this time. In addition, a series of rules and regulations made in Kenya at this time - culminating in the Crown Lands Ordinance of 1915 completed the process of making the Africans tenants at will of the British Crown over the land that the Africans had occupied and used for centuries.<sup>40</sup>

In Uganda, the Uganda Agreement was a massive land grabbing scheme within Buganda that was done even before the British Crown had effectively began "protecting" the territory. Land for official use was set aside - as mentioned earlier - according to the terms of the agreement. There was therefore no need for officials to pay for any compensation on the Mailo land that had been allocated to the British Crown through the agreement. The concept of "protectorate" did not imply total equality between the citizens of various kingdoms in Uganda and the British officials, residents, traders, missionaries, etc. Therefore secluded residential neighbourhoods - roughly modelled on what is happening in Nairobi - were the result in most urban areas. During these early times there was considerable comparison between administrative and socio-economic practices of Uganda and the now Kenya despite their different colonial status. This is borne out by events that took place in Nairobi after the first plague in 1902.



Another plague occurred in Nairobi in 1904, returned again in 1911 and 1913. The then colonial administration seemed incapable of handling the sanitary situation despite extensive swamp drainage. This aroused the anger of the European residents of the city and resulted in stormy meetings in both official and unofficial circles. The whites demanded total segregation, demolition of the Indian Bazaar - the hotbed of disease - and shifting it elsewhere far from the white residential area. In 1913 an eminent medical personality was appointed in the person of Professor W.J. Simpson to advise on the planning and sanitation measures that would be implemented in Nairobi and other East African towns (meaning throughout Kenya and Uganda, because the modern Tanzania mainland was still under German administration).

In his 1913 report, Dr. Simpson lamented the lack of implementation of the recommendations of the Bransby-Williams' Commission Report with respect to land allocation within the downtown area of Nairobi.<sup>40</sup> Bransby-Williams had recommended racial segregation within the city as a solution to the health problems that arose as a result of a sudden influx of population of different races within Nairobi. Simpson endorsed the recommendation of the Bransby-Williams commission and prescribed it for application in all East African towns as follows:-

In towns where nationality is the same, the town planning resolves itself into arranging for residential, commercial, and manufacturing areas, which are farther governed in character by rental and class in such a way as to secure convenience, good transit, pleasing amenities and permanent healthiness for all. Something more than this is required in towns, such as these in East Africa, where nationalities are diverse, and their customs and habits different from one another. Though the same objects have to be aimed at, it has to be recognized that the mode of life of the Asiatic, except in the highest class, do not consort with those of the European, and that on the other hand many European habits are not acceptable to the Asiatics, and that the customs of the primitive African, unfamiliar with, and not adapted to new conditions of town life, will not blend with either. In the interests of each community and the healthiness of the locality and the country **it is absolutely essential** that in every town and trade centre the town plan should provide well defined separate quarters for European, Asiatic and African with easy and good communication between them, as well as those divisions which are necessary in a town of one nationality and race.<sup>41</sup>

Simpson's township layout pattern in East Africa was accepted in principle by the colonial authorities in charge of Kenya and Uganda - because it reflected the racialist opinion and ideology prevailing among the ruling circles and among the colonial authorities at that time. For instance, the colonial office (London) recommended that the pattern be adopted for all towns in East Africa both on sanitary and social grounds. Lord Milner, the Colonial Secretary, proposed to retain this policy for general application in the colonial dependencies of East Africa.<sup>42</sup>

In Uganda, as we saw earlier, the same effect was achieved in a reverse fashion - by prohibitive regulations and legislation that forbade inter-racial land transfer. By 1916 no Ugandan was allowed to transfer any land - urban or rural - to a non Ugandan. This restrained any racial mixing, even if under the guise of "protecting" ugandan "natives". This means that European and Indian residential areas remained in the Crown Lands and in Official Mallo, and African residential areas tended to occupy land in urban areas that was not meant for European occupation.<sup>45</sup>

Tanzania mainland was under German rule in the early part of the century. ~~German occupation did not~~ take place for a significantly long time to have sufficient impact on city structure. However, historical records indicate that Germans in Tanzania adopted almost identical practices of dealing with the natives as the British. After quelling the Maji-Maji Rebellion of 1905 to 1907 the Tanganyika Governor Albretch von Rechenberg planned "to increase African prosperity by encouraging African agriculture" by German settlers. Consequently, a settler class run on similar lines as the British settler class in Nairobi and on the Kenya highlands developed. The German system was more ruthless administratively (as projected by British-written history books)<sup>46</sup> and therefore the Germans could hardly be expected to mix with Africans and other races in town. So, even before the territory was taken over by the British after the 1st World War

the rudimentary urban enclaves had developed for exclusive settlement by German Colonists. In any case, this segregation was useful for the purpose of defending the German colonists in a territory with volatile anti-colonial tempers that they had not yet tamed - as evidenced by the Maji-Maji Rebellion.

The British administration took over Tanzania after they had formulated the urban residential land patterns in accordance with the recommendations of the Simpson Report of 1913. Consequently, in Tanzania towns the sectoral - enclave arrangement of land use - pattern took place in the model of Kenya in urban centres where there was segregated land use. As we saw earlier, once the British took over the Tanganyika mandate territory they gradually came to administer it like a colony. So from 1920 onwards, the Tanganyika administration came to adapt similar land use practices to the ones prevailing over Kenya; even with respect to urban land use.

On the whole, during the early colonial times, the growth of the city structure was not influenced by the economic calculus of the "reasonable man" or the "invisible hand" but by a racially biased land allocation mechanism - which was often laid down long before there was sufficient demand for such land. Often land for various uses was set aside, and was filled up later when these uses came into existence. This explains why commercial areas of most cities in East Africa like Nairobi, Dar es Salaam, Kampala, etc. have central

business districts with many vacant plots. These sites are currently being filled up by multi-storey structures as the demand for office accommodation increases. Similarly, most residential areas, industrial areas, and areas designated for public amenities are vacant. They are currently being developed in accordance with demand for such land. The sectoral (or enclave) land use pattern of other land uses around the central business districts of East African towns is, however, not economic. It is a result the deliberate colonial and racialist foundations of land use allocation and land tenure laid down mainly by the British administration in the early part of the Twentieth Century.

Economic forces of supply and demand have operated only within this rigid framework of land allocation machinery. Highest and best use has only manifested itself within these racially pre-determined enclaves.<sup>47</sup> The result of this is that as at independence there was lack of uniformity in cities. Development was usually fastest in areas set aside for the high income class - whether commercial, industrial or residential - and slowest in areas set aside for people or racial groups of the low income brackets.

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dwellers and the second in terms of economic power) kept on agitating for equal treatment in land allocation in both the urban and the rural areas of Kenya - especially on the "White Highlands". In addition, around 1920 Africans were becoming conscious of the process of arbitrary land appropriation by the Europeans that was going on with colonial penetration. Various petitions and complaints were sent to London by both the disadvantaged racial groups. World opinion had also witnessed the difficulties caused on the Africans as a result of the White Highland policy in Kenya. Therefore, in granting the Mandate to Tanganyika by the British, measures were taken to prevent a repeat of the Kenyan case; and the rights of the "natives" were carefully defined as we have seen above. Evolution of land tenure in Uganda was also influenced by developments in Kenya. Africans in Uganda - as we have seen above - did not want a repeat of the Kenya Highlands' experience on their territory.

All these matters weighed very heavily on the supreme decision-makers in London. In addition, the influence of the Indian government on the colonial office had grown as a result of the concessions - both constitutional and administrative - that were granted to India after the part India played during the First World War and after the bitter struggle for independence punctuated by several "mutinies" beforehand. In some cases, the Indian government, which by now had a large

measure of autonomy from the British Crown, used to intercede on behalf of the East African Indians - and the then Union of South Africa interceded for the East African White settlers. The result of this international and intrainperial pressure was that the British administration became kind of sensitive about the practices of East African administrations - especially Kenya - with respect to general public administration, and land allocation in particular. The Devonshire White Paper of 1923 (Kenya) outlined the colonial policy with respect to races and declared that Kenya was "predominantly an African country" where the rights of African peoples were to prevail if they ever came into conflict with those of other races.

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As a consequence of the "White Paper" racial segregation was relaxed in Kenyan towns somewhat, and the Feetham Commission that was appointed between 1926 and 1927 to study local governments in Kenya in view of the "White Paper" recommended that discrimination in land allocation in towns all over Kenya was unacceptable. However it specified that nothing

should be done to interfere with private treaties and results of the implementation of earlier government policies.<sup>48</sup> The commission therefore did not change anything with respect to land allocation and land tenure because it never removed the unfair inter-racial land transfer restrictive covenants. Since it was set for Kenya only, it had no effect on other territories. The pattern of land use in towns therefore remained unhampered, until independence of the three countries came during the early 1960s.

Post Colonial Urban Land Use

In the three countries physical planning and organized land administration has come to be accepted since the formative years of the land tenure. Nevertheless, despite independence, Kenya has retained the sectoral appearance of towns intact. Instead of racial segregation the residential areas are now described in accordance with the dominant income group that stays therein. Commercial areas have fused in most towns from the pre-independence African Bazaar, Asian Bazaar dichotomy in smaller urban centres; (and from the African, Asian and European Bazaar trichotomy within Nairobi) into single composite central business districts with nuclei reflecting the areas patronized by different income groups. The low income shopping areas are in places that used to be African and Asian Bazaar; while the high income group shopping



areas are those that were formerly high class Asian Bazaars and European Bazaars.

Tanzania's abolition of fee-simple interests and the consequent Ujamaa policies have tended to abolish the sectoral and enclave land use pattern legacy left-over by the British. The policy-like any other policy regarding land use will take long before a significant impact is noticeable over the city structures of Tanzania. New physical plans of cities and townships are made to reflect the aspirations of Ujamaa; and it is expected that the "market economy" founded city structure will be eliminated in due course. The social strife that has characterized the Ugandan post-independence political arena has made long-term planning of urban areas difficult. So the urban structure "picture" in Ugandan cities is largely unchanged. From current indications, Uganda is likely to follow the Kenyan path, and the city structure is likely to remain unchanged.<sup>49</sup>

Thus, we have land use patterns and city structures of East African cities determined by the visible hand of the policy maker rather than the invisible hand of the market forces - the highest and best user mechanism. In this case, apart from the influence of natural forces (like the geography of urban areas) the policy maker - rather than the investor - has been

the major architect of land use in urban areas. The investor has merely danced to the tune of the policy maker.

### Policy and Land Use in East Africa

In conclusion we can say that the rural land use in East Africa are more the result of the East African physical and socio-economic environment rather than the mere economic variables hypothesized in the major rural and regional land use models. The same can be said about models of city structure in relation to land use in the East African cities today. In addition to the complex physical environment of East Africa, the process of colonialism, and the complex human interaction that accompanied it have combined to make the East African "Economic Landscape"<sup>50</sup> very complicated indeed. The land use models in both rural and urban areas apply only by the way of analogy; and nothing in their neat form can be visible on the East African economic landscape. Despite this, the models are useful by the way of providing initial understanding of the economic forces governing the pattern of land use. The primary lesson here is that they should not be applied for any practical purpose in their raw form without extensive examination of other vectors operating over the socio-economic space in these countries.

## FOOTNOTES

1 W.T.W. Morgan, (Ed.), East Africa, Its Peoples and Its Resources. (Nairobi, Oxford University Press, 1969). The whole work deals with various aspects of land use in East Africa.

2 African metallurgy was substantially advanced. On the advent of colonialism it became a matter of policy to discourage metallurgical trades so that imports from the west into Africa can have markets. See Walter Rodney, How Europe Underdeveloped Africa (Dar es Salaam, Tanzania Publishing House, 1976), Whole Work.

3 W.T.W. Morgan, East Africa, Its Peoples and Its Resources, pp.20-34. See especially the map on p.34.

4 Krishan Maini, Land Law in East Africa (Nairobi, Oxford University Press, 1967), pp.1-17. See also George K. King'oriah, "Policy Impacts on Urban Land Use Patterns in Nairobi, Kenya 1899-1979," chapter II. Apart from the sedentary occupants of the high grasslands, the Masai used to wander about most of the East African Plateau. In times of drought they used to come in conflict with agricultural tribes settled in the bushlands and thickets.

5 W.T.W. Morgan, East Africa, p.299.

6 Krishan Maini, Land Law in East Africa, chapter 1.

7 Ibid.

8 George K. King'oriah, "Policy Impacts," chapter II.

9 H.W. West, Mailo System in Uganda, (Entebbe, Government Printer, 1964). See the entire work and note how the colonialist coined a pseudo-feudal land tenure system for Buganda and Uganda in general - to his advantage.

10 Anthony Allot, "The Development of the East African Legal Systems During the Colonial Period."; in V. Harlow, E.M. Chiver, and A. Smith (Eds.) History of East Africa, vol.2 (Nairobi, Oxford University Press, 1965), p.349. See also the footnote on p.348.

11 Krishan Maini, Land Law in East Africa, p.8. Note that any colonial theory that purported to protect the African was purported to support colonial penetration and exploitation. Even civics books during colonial times were written with a view of brainwashing the new African educated elites on the benefits and the benevolence of the colonial system of government to the "native". This is why I have deliberately stated that "Africans were 'theoretically' safeguarded by legal institutions....."; because what happened in practice was quite different from the colonial propaganda. See Y. Chernyak, Advocates of Colonialism, (Moscow, Progress Publishers, 1968). The whole work is an excellent exposé on the tactics of colonial historiographic techniques used to brainwash the educated elites during the colonial and neo-colonial historical epochs.

12 Uganda was annexed in 1894. Zanzibar was semi-annexed later, but is out of the scope of this text.

13 H.W. West, Mailo System, chapter VII, pp.109-30.

14 Ibid., p.24 (footnote).

15 K. Maini, Land Law in East Africa, p.53.

16 H.W. West, Mailo System, pp.9-10.

17 Readers are requested to read all works: Mailo System to appreciate all this.

18 Brian Hurst, History of East Africa, (London, Collins, 1979), pp.300-314.

19 H.W. West, Mailo System, See land use maps appended at the jacket on the back cover.

20 Ibid., p.17.

21. George K. King'orish, "Policy Impacts," chapter 2.

22 Ibid.

23 Ibid., chapter 3.

24 Ibid.

25 Krishan Maini, Land Law in East Africa, p.83.

26 Ibid.

27 Ibid., p.111.

28 Ibid., p.82-127.

29 The concept of "Invisible hand" propounded by Adam Smith in his famous work The Wealth of Nations first published in 1776; (New York, Modern Library, 1937), p.14 and p.241; is well known. His famous quotation asserts that "It is not from the benevolence of the butcher, the brewer, or the baker, that we should expect our dinner, but from their regard to their own interest." See page 421.

30 Harry W. Richardson, Regional Economics. (New York, Praeger Publishers, 1969), p.155. Edgar M. Hoover, An Introduction to Regional Economics, (New York, Alfred A Knopf, 1975), p.122.

31 George K. King'oriah, "Policy Impacts," **chapter 1.**

32 Ibid.

33 Ibid.

34 Ibid.

35 Harm J. de Blij, Mombasa: An African City, (Evanston, Illinois; The North Western Press, 1968); J.G. Sutton (Ed.) Dar es Salaam, City Port and Region: (Dar es Salaam, the Tanzania Society, 1970); Harm J. de Blij. Dar es Salaam, A Study in Urban Geography, (Evanston, Ill., The North Western Press, 1968.)

36 George K. King'oriah, "Policy Impacts."

37 L.W. Thornton-White, et al.; Nairobi: Master Plan for A Colonial Capital (London: H.M.S.O., 1948); pp.11-13.

38 Mary Parker Political and Social Aspects of Development of Municipal Government in Kenya. (London, Colonial Office, 1948), pp.56-68.

- 39 Robert L. Tignor, The Colonial Transformation of Kenya: 1900-1917 (Princeton, N.J., Princeton University Press, 1976); whole work, especially chapters 1, 2, and 3. George K. King'oriah, "Policy Impacts," chapter 3.
- 40 L.W. Thornton-White, Master Plan, p.15; James Smart, Nairobi: A Jubilee History (Nairobi, The East African Standard, 1950), p.32; Andrew Haake, African Metropolis (New York, St. Martins Press, 1977), pp.38-39.
- 41 L.W. Thornton-White, Master Plan, pp.11-13.
- 42 Ibid.
- 43 George K. King'oriah, "Policy Impacts," pp.154-170.
- 44 Ibid., 176-180.
- 45 ~~entire work.~~ West, Mailo System
- 46 Brian Hurst, History of East Africa, pp.300-303.
- 47 George K. King'oriah, "Policy Impacts," pp.iii-v.
- 48 Ibid., pp.194-202.
- 49 Y.Z. Memeri, Potential Urban Centres in Uganda, (Kampala, Department of Town and Regional Planning and Ministry of Provincial Administration, 1977); p.4.
- 50 I owe the term "Economic Landscape" to the title of J.B. Foust and Anthony R. de Souza, The Economic Landscape: A Theoretical Introduction. (London, Charles E. Merrill Publishing Company, 1978).

CHAPTER THIRTEEN  
LAND ECONOMICS,  
LAND VALUES AND LAND USE

GENERAL REAL ESTATE APPRAISAL

Legal Definition of Real Property

In this text we have not had a chance to explore what it is that land economists and valuers are often called to deal with from a real world and legal viewpoint. We have largely concentrated on the economic aspects of land. In most cases, land has been taken as being homogeneous in its physical characteristics; and its heterogeneous nature has not been considered in any great depth. The heterogeneous nature of the commodity land, apart from being a function of the physical characteristics of land, is also subject to the legal factors that affect land at any one moment - as we saw in chapter two. In real estate valuation or appraisal practice a valuer or an appraiser does not deal merely with a homogeneous commodity that can easily satisfy the Marshallian demand and supply situations. He deals with land and real property as defined by the law of the land.

In the legal systems derived from English Common Law two types of property have been identified in legal terms: (a) Real Property and (b) Personal

property. The reason why there should be such a distinction is deeply entrenched in these legal systems as a result of their evolution from ancient English customs, through feudalism, colonialism; and finally through being adapted by several sovereign governments after gaining autonomy from dependence on the British Empire. Glashire defines Real Property as any property where a real action is necessary to claim it back.<sup>1</sup> This implies that in case one owns an asset classified as real property, and he was dispossessed of it by somebody else, a legal action would be filed in the civil courts for the return of the real thing that was unlawfully taken. This is contrasted with any other kind of civil action; where the courts are likely to order that the dispossessed person be compensated for the lost property by means of money. The remedy for a real action that may be prescribed by the civil courts has no alternative, but to order the offending party to return the real thing being claimed.

Personal property is the complement of the real property. It is any asset where a personal action is necessary to claim it back, if it is taken unlawfully from its owners. In the personal action monetary value of the property in question can be regarded by the courts as the equivalent of full and complete settlement of the claim.



Land and anything "appartenant thereto" or attached to it like houses, trees, perennial crops, etc. are regarded as real property, while any other types of property, such as cars, clothing, watches, etc. are legally classified as personal property. The reason why land falls easily into the legal category of real property is that it is regarded to be more important than any other type of property. The nature of land (and all things attached to it) is such that if one is dispossessed of it nothing else can give him the exact alternative or equivalent satisfaction; except when the real piece of land under dispute is taken back. Other types of property are less important than land in the sense that exact or even better qualities of such property can be easily reproduced. In so doing, money payments are involved as sufficient settlement to the claimant of personal property. The necessity for such legal classification arises especially during succession and the administration of the property of the deceased. The debts of the deceased person are first settled out of personal property, and then, if they are not entirely satisfied, out of real property. This means that the legal system attaches great importance to land and its amenities than to personal property. It is considered more important that the heirs and successors should inherit land, or interest in land, rather than

mere personal property.<sup>2</sup>

We have seen in chapter two that no piece of land is physically the same as the other one due to the nature of the earth's surface on which land is situated. In addition, no land amenities like trees, houses, etc. are the same - because each piece of land has a unique way in which it can be enjoyed; in view of its unique physical characteristics. Moreover, the past owners of the subject land may have developed such land in various ways that need not necessarily be similar. The legal factors affecting land and making it heterogeneous have been outlined in chapter two. We saw that all these factors, when taken into account, make land a heterogeneous commodity. This means that instead of considering the supply and demand of one commodity, we are dealing with numerous "markets" for numerous sub-categories of the commodity, land. This is the nature of the commodity that the real estate appraiser, or valuer sets to assess its value; and to market. It also explains why in the text we have been taking in terms of land, landed property and real property; almost interchangeably.

### Market Value of Land

The amount of money that can be used to purchase any piece of land, whether developed or not is the price of that piece of land. That price is usually called the market value of land, and is often ascertained by study of current selling or renting transactions over similar (but not exactly the same) pieces of land in the neighbourhood of the plot in question. This price is the exchange value of land. This means that the land is capable of being bought or sold at that price; and that such a price has been determined by the interaction of the demand and supply of the subject land and its near substitutes in the market. It means that such value is the price that two parties, the willing buyers and the willing seller have agreed upon in view of the prevailing economic circumstances surrounding the subject land. This value is what the real estate appraisers or valuers endeavour to identify with a view to advising their clients; who may want to know what such market value is for several reasons.

We saw earlier that the reason why people should buy land is so that they can use it for some way or another. Land is used for situating productive economic activities such as growing crops, building commercial or industrial buildings. Without land or space, earthbound human activities would not be

possible. This is why from the earliest times in the history of economic thought land has always been regarded as one of the factors of production. Therefore, because of the necessity of space - and hence land - in daily economic activities land valuers are often called on to assess the value of this space before it changes hands between various owners. The legal system, as we saw in earlier chapters, has evolved in such a way that the land owners are not necessarily the land users. Sub-leasing land for a term of years; and other legal interests are likely to co-exist on land for various reasons that evolve through the process of land-using the subject tract of land.

This means that when land valuers are valuing land in the economic and legal systems where such valuation is possible<sup>3</sup> they have to take into account all the factors that would influence the nature of the piece of land that is subject to their attention. This is because the valuers have theoretically no alternative than to regard land as some kind of investment during their assessment. Land is therefore regarded as an asset that is capable of generating a stream of cash flow over the period of time. Alternatively, land is capable of generating use satisfaction that is quantifiable in monetary terms by considering the fact that the occupier may have to

rent alternative accommodation to obtain similar use satisfaction were he not in possession of the land area he is occupying. We saw in chapter three that land may not have any rental value when it is used at its extensive margin of cultivation. Despite this, it has such form of utility that the current land user or occupier is unwilling to part with it immediately, because of the on-going activities. Under these circumstances the valuers may have difficulty in assessing the value of cash-flow, since there is no cash being earned from land. However, because a theoretical situation similar to that in chapter three is rare nowadays due to population increase, some form of rent could accrue to most land in the populated parts of the world. This makes it easier for the valuer to assess the duration of the cash-flow; and to discount such cash flow in present value terms, reducing it to the present value of land. This is usually identical to its market value.

THE PROCESS OF VALUATION

Problem Identification

Valuers act as consultants to clients of various types, who request them to undertake an appraisal of their property for various purposes. The first thing that a valuer does when he is approached by a client is to define or to have the client define the problem

that requires his professional expertise for solution. He investigates what his clients' real requirements are, and why his client wants a valuation of the piece of land that he claims to be the owner. This information gives the valuer clues on many things, such as the statutory requirements of the valuation that the client is seeking, the date of valuation, and even the economic aspects of that property, when considered from the viewpoint of the type of valuation required. The client will no doubt be having legal documents relating to his interest in the land he claims to own. The valuer will therefore require to positively identify the site or the plot that requires a valuation.

Positive identification of the subject piece of land defines the geophoric location or geostatis of the site. Accurate locational identification is a pre-requisite to any definition of a site, and helps distinguish this site from any other site.

"Locational identification begets unique sites. Indeed, the site is location before it can be anything else." Locational identification has been classified by Speedy as being one part of "what Ricardo called 'the original and indistructible powers of the soil.'<sup>4</sup> Speedy defines a site or a plot as:

..... an identifiable land surface area whose horizontal dimensions are geographically identifiable, and below ground level for usable distance..... Theoretically, [a] .... site extends from the centre of the earth to the surface and beyond to infinity, but physical and statutory restrictions limit this theoretical concept to one of practical, usable dimensions. <sup>5</sup>

The horizontal dimensions of a site are geographically identifiable by means of boundaries - which are imaginary lines providing the lines of division between any two contiguous sites. Boundary demarcation is the starting point of any landed property transaction or operation, and valuation is one of these operations. "The early Egyptians found it necessary to use mathematically based survey techniques to re-identify fields on the flood plains after the Nile had receded. William I's (of England) Domesday Survey required the correct identification of each estate, which is an essential to any land tenure system."<sup>6</sup> Various tribes and communities in the world have started their transactions with accurate site definitions. Speedy narrates how "Māori tribal lands (in New Zealand) were clearly identifiable, often by using natural features as boundaries, but where necessary large stones or even

carved posts were used."<sup>7</sup> The Kikuyu and the Kuru of Kenya used the traditional "gitoka" and "kirru" respectively, and any other useful easily grown plants to identify individual land boundaries.<sup>8</sup> Current land registration in Australia, New Zealand, Kenya and other former British dependencies - based on the Torrens system - aims at providing the legal and statutory basis for positive identification of sites through accurate boundary demarcation. This employs the techniques of land surveyors, who demarcate the boundaries of each plot using a coordinate and direction system that is mathematically connected with the global grid of latitudes and longitudes.

Therefore, a valuer has to understand the land survey and statutory land registration system used in demarcating the boundary of the site he is being commissioned to value. This way he can tell whether such a site actually exists, what its size is, and its exact location on the surface of the earth. Once he has accepted the instructions of his client to value the site, the first thing he does is to search the title of his client on the subject piece of land. This will confirm the statutory definition of the boundaries of the site, and provide information on the legal rights of his client over the site - or the legal interest that his client is commissioning



him to value. Once this is done, the valuers will be knowing the exact location of the site he is being requested to appraise; and the duration of the legal interest of his client. The latter gives an idea of how long his client expects ~~some~~ cash-flow from the site; and how his legal commitments influence each amount of cash-flow receivable from investment on this site.

#### Valuation data gathering and Analysis

This involves the examination of all those physical, legal, social and economic factors that affect the cash flow accruing to the client from the subject site. Land tenure or legal interest defines the time and the extent to which the client enjoys the use of the site. This is easily quantified in monetary terms by examining how much he could pay to acquire or rent a similar legal interest elsewhere. Legal instruments like restrictive covenants and zoning restrictions limit the extent to which the client can use the site for the economic purposes of generating cash flow. Rational people, presumably, put their sites to the highest and best use, as we saw in chapter two. The legal definition of the extent to which the site could be used implies that the subject client could use the site as intensively as possible; but that he cannot achieve the highest and best use because of these restrictions. The

stream of cash flow which the valuer sets out to find present value is "truncated" by the legal obligations. A site without these obligations is more profitable than one having them, because it can be utilized more intensively. Theoretically, a site without any legal obligation is capable of earning the highest income under the prevailing economic circumstances - of being put to the highest and best economic use. Such a site is defined legally as a freehold in absolute possession.

If a valuer sets out to value a freehold he has to investigate whether there are any leases or sub-leases, restrictive covenants, easements, life interests, mortgages, legal and zoning restrictions. In short, he checks whether the freehold use of land is not subject to any subordinate interest before quantifying the magnitude of cash-flow. In case he is valuing any of the subordinate interests he checks whether these are also not encumbered by other subordinate interests before quantifying the periodic magnitudes of cash flow accruing from these interests. Leases, sub-leases, easements, life interests are some of the main subordinate interests that he may be commissioned to value.

The valuer will then go on to inspect the property, measure the site and buildings and related factors. He will examine such factors as site

elevation and topography; the infrastructural services on the site; the age and design of buildings and other improvements; suitability of site for present use; adaptability of such site to future uses; accessibility to and from the market, to amenities, labour, etc.<sup>9</sup>

In addition to all these details the valuer requires a background of the general economic situation of the country, the region and the local area in which the site is situated. Such knowledge as has been outlined in the earlier chapters of this text is vital as an ancillary to his valuation analysis tool-kit. Most valuers live in the regions they operate, and the state of the economy of these regions is a part of their professional data stored in their sub-conscious mind. These facts include the regional and local population structure; regional and local disposable income (average wages); the level and types of regional employment or unemployment; the state of the local industry; growth prospects of the region and its industries; the nature of regional and local infrastructural amenities; current planning proposals and the trend of development; and the nature of the region in which the plot is situated - position of the town in regional hierarchy. In short, this amounts to detailed urban-regional analysis in the sub-conscious mind of the valuer (chapters eight to thirteen).

Some types of valuation - like Rating valuation - require formal urban - regional analysis before they can be undertaken; as we shall see in the next section.

In addition to the broad regional data, the valuer will need to understand or to enquire on the local property "market" of similar land, plots or development property he is dealing with. It has been stated earlier that quantification of the exact economic market parameters of any good is impossible or very difficult; and the state of equilibrium is difficult to identify. However, the valuer will use the crude surrogates available to him to analyze the local scene. He must be aware of the total stock of similar plots or properties in the town or locality in which the subject land of his investigation is situated. He must also be aware of the temporal rate of change in this stock; the imminent change due to perhaps some expected developments, sub-division schemes or urban expansion; and whether or not the existing stock is fully utilized - the vacancy rates. This data will give him the supply side of the picture.

Regional analysis and the general socio-economic "climate" will indicate the demand side of the market. From regional population change one can understand how demand for residential accommodation is likely to change over any given period. An

upsurge in regional economic activity would generate the demand for space and accommodation of all kinds, as seen in earlier chapters. The valuer must be in a position to know whether the plot he has been commissioned to value is affected by any of these economic variables. In addition he must gather the rental data for comparable properties, and the rating information. The latter is a rough indicator of the rental, and sometimes the capital value of the property; especially when the rating valuation in the local authority has been completed in a period that is relatively recent as compared to the time of the required valuation. The recent rental and sales data will give evidence on how fast similar properties can be sold or rented. This - along with all the above mentioned data - will give a fairly accurate demand side of the market. Sales values are surrogates used frequently by valuers and the judicial system as indicators of the "market price" of comparable land or property.

At the end of all this analysis the valuer will have the following vital information:-

- (a) How much of the potential cash flow from the subject site his client can lawfully enjoy throughout the period of his ownership of that land.
- (b) How long his client can enjoy that cash

flow; and what the effects of the passage of time, legal obligations and market conditions are on the amount he can enjoy.

(c) What rate of return he can expect on any investment on similar property given the bank rate and other considerations discussed in detail within chapter six. In short, what <sup>is</sup> the effect of the economic environment is on the subject plot and similar property; and how much return on this investment on the subject plot he can expect to earn in view of the inherent risks on the investment on such sites that is imposed by socio-economic circumstances or environment in which the plot is situated. This risk rate will be a percentage of return determined by his "expectations" on the property as an investment. One could say that it is based on the valuer's "gut feeling" about the property in view of its economic environment. The valuer, in determining this rate, places himself in the shoes of an entrepreneur investing in the subject land. The rate is therefore entirely subjective.

These three facts will enable the valuer to find the present value of the expected cash-flow from the plot

or property he has been commissioned to value.

### Factors affecting Valuation decision making

Valuation is both a science and an art that requires a separate textbook for satisfactory treatment; and not merely a section of a chapter. This text does not pretend to say all there is in connection with the valuer's methodology; and readers are directed to relevant text books on various aspects of the subject.<sup>10</sup> Broadly there are three main types of valuation (a) market value valuations (b) statutory valuations; and (c) replacement cost valuations.

Market value valuations involve the determination of how much a plot or property subject to a valuer's investigation can be sold in the open market. The open market implies a willing buyer and a willing seller within the socio-economic environment of the sale transaction. The socio-economic environment includes all the factors discussed in the last section. This type of valuation involves the identification of the magnitudes of cash-flows and the time frames in which such cash flow can be expected. The capitalization of such cash-flow (or the finding of its present value) gives the value of the subject property. Alternatively, one can begin with such capital value and then one can set out to find the rental value of the subject property. The

rental value is the periodic cash flow. Whatever the approach or the intention of the client the economic factors discussed throughout this text will be considered by the valuer in addition to the legal factors outlined in this chapter. The method of capitalization is left for a more comprehensive text on the subject.<sup>11</sup> The types of valuation requiring a market value approach are;

- Sale Valuations
- Rental Valuations
- Mortgage Valuations and
- going concern valuations.

Once the capital value of the cash-flow has been obtained it can be compared to those of similar properties as a check. The replacement cost of the property can also be compared to the capital value as a cross-check. Rental values, once calculated are compared to those of similar property. It is an obvious fact to a trained valuer that given capital values rental values can easily be calculated, and vice versa.

Statutory valuations are those that are governed by acts of parliament for reasons that are largely beneficial to the state; a local authority; or the affected individuals - whose ownership rights are protected by the constitution. These are:



- (a) Rent Restriction rental assessments
- (b) Estate duty valuations (probate valuations)
- (c) Compulsory acquisition valuations  
(or eminent domain valuations)
- (d) Rating valuations (i) Annual value rating  
(ii) Improvement rating  
(iii) Unimproved site  
value.

These valuations involve the understanding of the property market like the ordinary market valuations. In addition, the market value is usually adjusted according to the requirements of the act of parliament that governs each type of valuation.

In each type, elaborate methods of valuation have been prescribed by the governing acts. Sometimes these methods or assumptions can render the prevailing economic conditions irrelevant. For example, in carrying out the estate duty valuations of any property within the Republic of Kenya, the Old Estate Duty Act (the now repealed Cap.483 of the Laws of Kenya) provided that the market value of the property of the deceased person be assessed as at the date of death. This meant that valuers were sometimes forced to remember what the "market" or the socio-economic factors that affected the cash-flow of the subject property used to be at the date of death. This author when he was working with Kenya's Ministry of Lands and

Settlement was commissioned several times by the Government to value property for estate duty under the peculiar circumstances where the owner of the property died five or even ten years before the date of valuation. In each case the author had to do rental and capital value analysis as at the time of death; and to try to visualize how the investment climate was at the time. The task was usually not a very easy one. It called for all the economic knowledge the author could muster, a historic view, and a thorough understanding of the law governing such valuations. In most cases, the values calculated were rough estimates of market value at the time of death; and, in absence of better data, the legal system usually accepted such estimates for the purposes of the governing act.

#### Rating Valuation

As discussed in the foregoing section, this is one kind of statutory valuations. It is considered in greater detail here because of the magnitude or the universality of the application of the values arrived at through the valuer's methodology in carrying out this type of valuation. Often, valuers are requested to prepare complete schedules of property values for entire towns. These schedules are usually used by the rating authorities as bases for levying rates or revenues. The work of a rating

valuer is therefore monumental; and he needs to be specially prepared before he starts the onerous task of preparing this schedule or valuation roll. Another source of concern arises from the fact that whereas in general valuation practice valuers are often required to value properties in their town of residence, the rating valuer may be called upon to prepare a valuation roll for an entirely strange town. Once he has prepared this roll he is often required to defend it through an appeals system (prescribed by rating statutes) which judges the fairness of his valuation methods. ~~This means that a rating~~ rating valuer is required to do thorough initial research before he begins the process of appraising every plot in the town. The emphasis on thorough research is necessary for all valuation, but it is absolutely important in Rating Valuation.

Some valuers in practice today are not well equipped with research methodological techniques for the analysis of specific rating areas.<sup>14</sup> Often, for lack of evidence on whether the economy of a town has improved, gone down or remained constant, valuers in Kenya (and perhaps in other parts of the world) have been applying the legal machinery for renewing the dates of valuation roll schedules; and using these for levying taxes on the towns subject to their investigations. One case the author is familiar with

involves a local authority in Kenya that was situated in an area of economic decline following the departure of European settlers in the immediate post-independence period. The valuation (improved site value) roll for this town was made in 1957 when the town was in its economic apogee. Consequently a decline in effective demand occurred as the European settlers were leaving the town. According to the law, a valuation roll in Kenya is renewable every five years; and in any case when the Rating Valuer appointed for the town has cause to believe that land values have either ~~declined or appreciated due to some physical~~ economic phenomenon. In this case the roll was due for revision immediately a decline in effective demand occurred; or at least in 1962; after the expiry of the next five years.

What actually happened is that the valuers had no methodological tools to inform the local authority on the matter of the town's declining economy. Valuers with the knowledge of economics, regional analysis and research methodology were in serious short supply within the former Kenya Colony at the time. So whereas it was obviously noticeable that demand had declined, this decline could not be proved methodologically by the then practicing valuers. A political element was also responsible for this state of affairs.

If the decline was reflected in the next roll it would have meant that the local authority would loose a lot of revenue as a result. This would have been politically unacceptable in the local area because the county councillors would have to give concrete answers to their constituents why the money for local authority services was not sufficient. This meant that if the next roll reflected a decline in site values it would have been opposed by the representatives of the local authority. Rating law in Kenya provides for machinery for objection to a part of (or to all) the rating valuation roll, if the land owners feel it is unfair. Consequently, the rating valuer for the town kept renewing the roll for "lack of enough evidence" that the values have changed as provided by the statutes. The local authority kept on receiving the revenue on the basis of the old roll for a period of 20 years; until a new roll was prepared in 1976 - long after the economy of the town had presumably made a downturn and then an up-turn.

The moral of this true story is that valuers require the equipment of research methodology tools as advocated by Stephen Kituuka.<sup>15</sup> Of late, the government of Kenya has been sending valuers for further training in overseas and local universities; and the academic calibre of the valuation profession

in Kenya is improving admirably. But to avoid a repetition of this kind of circumstances greater emphasis is required on research methodology and regional economic analysis.

#### Regional Economic Analysis in Rating Valuation

An understanding of the regional economy of any region in which a local authority levying rates is situated is vitally important. Often valuers do not have the funds and time to do a detailed economic analysis of the region occupied by a town (for example) and its immediate hinterland. However, local authorities in Kenya today need to establish valuation offices with valuers specializing in regional economic analysis as a peripheral activity to rating valuation. Such analysis would take the nature of a study done by D.A. Black<sup>16</sup> for Nairobi, and would be feasible if done in connection with a general urban study; or regional surveys and data systems compilation.

The study would usually begin with regional delimitation techniques as described in chapter eight; so that the economic study and planning region containing the local authority can be positively identified. Care would be taken to ensure accurate demarcation and delimitation of contiguous homogeneous region. Then economic and demographic statistics would be gathered and compiled. Trade data including

imports, exports, volume of economic activity in the subject region; etc, are relevant. Usually econometric approaches using Keynesian techniques as described in chapter eight have been found to be useful in most small and large regions.<sup>17</sup> Input - output techniques may be employed to simulate the impact of entry or exit of new economic activities. Other econometric methods may be employed to project the growth trends and other trends in economic activity.

If a valuer is dealing with established urban areas, regression techniques may be employed to determine the land values empirically; and to establish valuation trend lines in various directions from city centres. These techniques are useful in establishing land value gradients in various directions, and in providing near accurate indicators of land values in different areas of the city at different times.<sup>18</sup> If possible, temporal changes of these land value gradients may be studied to provide dynamic indications of land value changes, and perhaps to offer projections on the future values of the subject town.

As far as rural or homogeneous regions are concerned, trends of economic activities identified through econometric methods should be good surrogates for land and property value rates of change. This is because demand for space that is represented by

property has very close relationships with the general trend of economic activity. As explained in chapters five and six. In these chapters we saw that demand for space - land and landed property - follows very closely the trend of effective demand in the economy, and responds similarly to exogenous forces like government action, decline in exports (chapter eight) and general economic activity. The valuer must be in a position to adjust his valuation in accordance with changes in regional economic performance; using such tools as time series analysis and economic indexes. His use for such methods could be partial and subjective; but this is a minor factor, and may be counteracted by thorough research and academic honesty of the professionals.

Having completed urban-regional economic analysis the valuer acquires a very firm data base on what has been happening in real property market in recent times. This happens during the time of regional economic analysis or as an independent pre-rating exercise. Rental values of properties need to be analysed; and the derived capital values computed. Recent sales require analysis as well; and how representative of the "market" for property is being appraised. Costs of construction in the region are also of some relevance. Trends in these costs, costs of materials, etc. provide good indicators of replacement values of



buildings. The list is long; and methods of detailed valuer's methodology need to be read from a regular valuation text. However, we may mention that useful information may be obtained from newspapers advertising real estate transactions, land registries, local authority offices, real estate offices (if they are co-operative), economic planning departments, chambers of commerce, and general administrative offices. The valuer is advised to leave no stone unturned in his analysis. This is because any taxation based on the roll may have serious economic consequences on the area served by the local authority. ~~Therefore~~ the valuer is acting for in case the valuation roll is hurriedly prepared.

Using the data gathered, valuers calculate representative values for each section of the rating area and apply minor adjustments to arrive at the rating values of each plot. These minor adjustments depend on individual site factors, existence of legal and economic site disability, standard of repair and maintenance of buildings and infrastructure, position in relation to city centres, volume of trade at the site, the "corner influence", influence of plot depth, accessibility, etc.<sup>19</sup>

Urban-Regional Economic Analysis

The Market Solution

In the modern era of economic development

planning, the old state of affairs where regions were left to develop in the laissez faire manner way has largely been abandoned. The laissez faire was based on the view that increased national efficiency should be the primary objective of regional development, and that the price system in a market economy is the best available automatic regulatory mechanism for achieving this objective - through its inducing optimal spatial allocation of resources. This argument was justified by the fact that man-made regulators were thought of being only capable of taking limited account of the general interdependence of the space economy as reflected in minute spatial differences in costs, prices and incomes.<sup>20</sup> As Loach described it: "Every individual faces special geographic differences whose controlling influence is attuned to his exact location more finely than any planning could be.... if geographic price differences were to be abolished, or even merely frozen, they would soon have to be replaced by complete spatial planning which would face the enormous task of taking into account the effects of thousands of locations upon one another - something that only the play of changing prices has so far been able to do successfully for any length of time."<sup>21</sup>

A second argument for the market solution relates to uncertainty. Because of the uncertainty attached to predicting the future, it has been argued

that the inevitable gaps between anticipated and realized costs and revenues in a region could be minimized by spreading decision-making as widely as possible among individual firms, rather than having it centralized on a regional planning authority.

However, laissez faire in regional development has been found to be only feasible in conditions of plentiful resources and under-employment. Richardson feels that if the economy as a whole operates below full employment level, it is difficult on efficiency grounds alone to argue for regional policy measures. He adds that the presence of unemployment "is scarcely a good advertisement for free market solutions." In addition, strong agglomerating tendencies found in economic activity under laissez faire may be due to the herd instinct of entrepreneurs more than to independent rational calculations.<sup>22</sup> In other words, the market solution is not necessarily the best from a regional economic growth point of view. It may also not be the most optimal for regional allocation of resources. It has come to be felt more and more that although maximization of private returns to the nations' resources means reliance on the market to determine regional allocation of investment, the government has an important lubricating function. Its intervention in resource and factor allocation mechanism in a region may be necessary to reduce

resource and factor immobilities, and to provide more knowledge of the economic conditions of the region - thus facilitating more optimal investment. This "lubricating mechanism" may be allowed to operate when the government is involved in active encouragement of the free market's role in regional development.

Recent approach to regional economic development involves more active government participation in directing resource allocation. This is due to recent experiences involving frustration by the fact that left to themselves, underdeveloped regions do not actually develop, but tend to deteriorate. The so called developing countries do not seem to catch up automatically with the more advanced ones, even with continued and massive international assistance of various types. Unemployment and economic decline of urban areas - or some blighted sections of urban areas - is more visible and more unsettling for both the individual and the members of the urban society. Problems of traffic congestion and environmental degradation through pollution, etc; rural unemployment, and rural poverty; have recently stimulated a search for more rational use of space and resources - both at a regional and national level.<sup>23</sup>

In addition, it appears that there has been a significant shift in the attitude of the general

public, and of most economists, towards population growth on a local, regional, national, and world basis. In the 1920s and 1930s the expanding economies of the "new world" seemed to ridicule Malthusian predictions on world overpopulation. In recent times, however, there has been frustrations caused by seeing hard-won output gains in many developing countries and under-developed regions cancelled by mushrooming population growth. This growth has put pressure on infrastructure, amenities, government and local authority services, and has overloaded their budgets. Today, thinking and policy at both the regional and national levels are much more directed toward welfare objectives - such as fuller regional and national employment, higher per capita incomes and higher individual welfare; rather than toward misleading standards of aggregate growth under laissez faire.<sup>24</sup>

This shift in thinking has been due to the strong realization that the effectiveness of the market mechanism is open to criticism. The theoretical base for free market in regional economics lies in general equilibrium theory. But general equilibrium analysis tends to be static rather than dynamic. It rests on marginalist assumptions; whereas in the space economy locational inertia prevents instantaneous adjustments to marginal changes in costs and revenues.

Moreover, if equilibrating tendencies are strong, the path of adjustment may be difficult, and may have harmful consequences. The assumption of the perfect competition on which the efficacy of market forces depends is cancelled out by oligopoly and monopoly elements at national and regional economic levels - which are often harmful to societal welfare. In addition, the location decisions of firms may be based on irrational grounds made in the light of imperfect knowledge<sup>25</sup> as seen in chapter ten.

Finally, the laissez faire approach has been attacked on the grounds of cost-benefit analysis. If either social benefits are less than private benefits; or social costs exceed private costs so that government and local authority intervention would yield a positive net social rate of return, it pays for such intervention to take place. The philosophy of development in this case takes preference of the welfare society at large to that of an individual. In Kenya, this is reflected through government works like roads, industries, schools, hospitals, etc. When land for any of these public amenities meant for the use of the public at large is required it is acquired by the government through statutory measures based on the philosophy that the discomfort of one individual is preferable to that of the society at large. Financial compensation is offered for the

land taken in an attempt to get the person whose land has been acquired to the same status as he was before government intervention. This attempts to bring the state of affairs to the point where the public gains by obtaining land for public use, while the individual is basically left unharmed by the new arrangement. The situation could be classified as being Pareto optimal.

Pareto Optimality, named after the famous Italian mathematician and economist Vilfredo Federico Damasco Pareto (1848-1923) is an important concept in the economic theory of distribution and welfare. In simple terms the criterion for social welfare optimization is defined as follows:

Any change which harms no one and which makes some people better off (in their own estimation) must be considered to be an improvement.

Unfortunately, there are many policy proposals which cannot be judged with the aid of this criterion. The criterion does not apply to any proposal which will benefit some and harm others. For example, compensation for land acquired by the public from individuals may not be adequate, and the project may therefore turn out to be less than Pareto Optimal. The criterion has also been criticised as a method of sidestepping the income disparities in the population by its emphasis on cases where no

one is harmed only; and avoiding the issues of equality. Adequate compensation concepts are improvements on Pareto Optimality. They bring about the Kaldor Criterion where the gainer is able, potentially, to make compensation out of his gains. This criterion, named after the famous English Economist, Nicholas Kaldor (1908 - ) asserts that;

A change is an improvement if those who gain evaluate their gains at a higher figure than the value which the losers set upon their losses.<sup>26</sup>

This implies that for example a public project which involves compulsory purchase of land needs to be far much more valuable than the value of the land involved in order to be feasible and for compensation to be possible. Both criteria are used to justify governmental interference with *laissez faire*, in order to alleviate the cruel side of the forces of the market; and to ensure that social benefits are higher than social costs.

#### Need for Urban Regional Economic Analysis

If governmental interference with the action of supply and demand in regional economics is justified it does not pay to interfere with the economies in a haphazard and random manner. The government needs to be in a position to understand the functioning of the



subject regional economies thoroughly well in order to be able to detect resource constraint areas and other malfunctioning elements of the regional economic systems. A need has therefore arisen in recent years to study regional economies systematically, and to monitor the rates of change in all the economic variables closely. The effect of such changes and rates of change on the regional ecology is also studied. This is because private firms tend to pay attention only to their internal cost variables, and those external costs that affect them directly. By so doing they tend to ignore the wider effects of their operations on regional ecologies and broader environmental variables that could ultimately be expensive in national and regional fiscal terms if corrective measures are required to remedy the situation.

This close monitoring is necessary because the governments have come to appreciate that activities and interests within a region are highly interdependent. The more crowded or heavily populated a region is, the greater the interdependence of activities and interests. These interactions become particularly crucial in a high density urban region within a city or a neighbourhood. Any change in one activity produces externalities and neighbourhood effects upon a variety of other

activities which can be either positive or negative - helpful or harmful. For example, the utility of a sports complex can help merchants of an area by attracting more visitors and purchasing power; and at the same time it can spoil the surrounding residential area through the concomitant traffic congestion, sports generated noise and litter.

The methodology for the study of small regions is in no way different from that described earlier when it was said that a valuer would employ similar techniques to analyse the regional economy. The

~~difference is rather in emphasis, because the~~  
valuer could be employed to produce only a single valuation roll, and be required only to do minor modifications during the "life" of the roll, the regional economist is largely pre-occupied with the constant monitoring of the regional economy - and its impact on social, physical and environmental variables. Using the data acquired in his constant study he is in a position to advise the local authorities and the governments on the best ways of interfering with economic variables within the region, so as to ease out the adverse effects of laissez faire on the regional economy and the regional environment. In fact, if the profession of regional economists is well established, or if regional economic studies are constantly in progress by the

multi-disciplinary teams that may sometimes be necessary, the valuer need not do exhaustive regional studies himself; but would consult the regional economist for finer details that he may not be able to explore because of other preoccupations of his vocation. The valuer may, of course, be a regional economist; since ideally the two disciplines require almost identical training at undergraduate levels, with only minor differences at advanced levels. Therefore, each is in a position to understand the moves of the other one in clear terms; and to respond to them efficiently and appropriately.

Aims and Content of regional economic analysis.

The regional economist would approach a regional economy as a component of a national economy or a component of a larger region. He would analyse the trends of local employment as compared to national employment. He would study other local resources like land use, land availability, capital availability, entrepreneurial availability and the state of infrastructural amenities. He would concern himself with problems of national resource allocation and those of regional resource allocation; bearing in mind that regional resources are components of national resources. In so doing he would take into account the scarcity or availability of these factors and resources; and their market both at regional and

national levels. He would study the interdependence of resources and other variables on the regional economy and environment. In so doing he would be in a position to identify problems of resource allocation and to prescribe taxation policies and administrative policies of regulating the economic variables that are not working to his satisfaction.

In particular he would devise ways of internalizing the externalities involved in regional economic change. He may, for example be in a position to fix a fee or an industrial tax to offset the social costs incurred through the pollution of the environment by the industries in a region - to internalize adverse externalities. He may be able to recommend re-location of the offending industry or activity. In fact, the process of land use zoning in urban areas and in larger regions should ideally be made in close consultation with regional economists. If the planning group doing the work is multi-disciplinary, such zoning is done only after detailed regional economic studies have taken place. The reader should refer to chapter eight for detailed analysis of regional delimitation and the definition of a region.

With respect to nodal or urban regions such detailed study gives the regional analyst insight into the land use allocation mechanism in the region. He is in a position to understand and project land

requirements by urban activities over time as urban area grows. If he is involved in urban renewal and housing he gains knowledge of the land use succession system through which the laissez faire system allocates land in urban areas over time - Consequently he is able to prescribe how best to allocate sites for housing and other land uses. He is able to scrutinize the "free market" land use allocation mechanism, to understand its merits and de-merits and using this understanding, to decide where best to begin urban renewal, urban re-development and the construction of new housing estates. If he is a transportation analyst he discerns the interdependence of activities and their effect on traffic generation - that land use, land values and the transport network are closely interrelated. His studies enable him to locate the urban transportation network in the city for maximum social benefit, and to adjust the existing system with similar goals.

The recent times, regional analysts have been more intensively involved in the promotion of growth within the regions of their interests. Growth creates agglomeration, infrastructural and urbanization economies that tend to attract more activities in a region. This induces greater employment, higher wages and a better standard of living in a region; as seen in earlier chapters. It has been said that regional

growth is induced by local export promotion. In addition, the establishment of propulsive industries in a region would create backward linkages to other industries on which the propulsive industries for their raw materials and intermediate good inputs. These other industries may begin with an initial sole aim of supplying the "propulsive" industries with inputs. Later they may diversify, and become major exporters themselves. They may also have backward linkages and induce other industries to locate in the region - which may also become important contributors to the welfare of the regional economy. The chain, through this process, and the resulting multiplier effects could have considerable effect on regional growth. The regional analyst, after the study of his economic variables must be in a position to recommend the correct type of these propulsive industries - the type that will have maximum backward linkages, and also forward linkages. The backward linkages enhance the total regional resource employment, while the forward linkages complement other existing or prospective industries by eliminating input bottlenecks.

The regional economist would therefore be deeply involved in regional growth promotion. If he is working for a city - municipal council or any other local authority he would be interested in

making his local authority have a high rate of growth, a high rate of resource employment and maximum citizens welfare. He would have intimate knowledge of the local authority's tax base and he would use his growth promotion techniques to widen the tax base. This has the ultimate results of increasing the services provided by his local authority through the increased revenue accruing from more sources of taxes - which in turn result from higher employment and more optimal resource allocation within the area under the jurisdiction of the local authority.

#### Physical Planning and Land Use.

##### The Physical Planning discipline.

Urban and regional planning - sometimes called town and country planning is an old discipline that began since the ancient Greek civilization times. Infact, it began earlier. The settled agricultural communities of the fertile crescent and China knew how to lay their towns in the order acceptable to their socio-cultural values. Different rulers in these civilizations knew what they wanted with respect to the physical and aesthetic look of their cities. However, the intention seems to have been there, but was often not directed in a "professional" manner. In most cases, the ancient planners who were responsible for the layout of the cities now being unearthed by archaeologists died, often leaving no

documented evidence of their intentions, and of the socio-economic variables they took into consideration when laying out these monumental cities of ancient times.

The first systematic attempts at town planning occurred during the time of the Greek civilization, beginning around the 9th century B.C. under Pericles. During this time there thrived within the Hellenic civilization a desire for beauty in architecture and urban arrangement. However, emphasis was laid on the aesthetic and architectural looks of public buildings rather than private

buildings - of which we know very little about.

Consequently, monumental public buildings and temples that stand even today in various parts of Greece and Asia Minor came into being. In this tradition, Hippodamus of Miletus around 415 B.C. advocated a systematic arrangement of buildings and streets of cities. He was the first to lay down a theoretical basis for a city plan, and popularize its use. The grid city plan in which most subsequent cities have been planned is thought to have been invented by him.<sup>27</sup>

Since that time, efforts at achieving systematically organized spatial distribution of urban activities and land use have been well documented. However, the formal discipline of city and country planning did not develop until well into the twentieth



century; when, as a result of works of philosophers, architects and environmentalists, it came to be universally accepted that human intervention should occur on the laissez faire mechanism of land use allocation. This resulted from haphazard land use during the industrial revolution era, that gave Europe and America urban slums, city blight, and other adverse environmental externalities resulting from the unzoned land use - especially in closely settled urban areas.<sup>28</sup> As the necessity of ordered land use

came to be appreciated more and more, it has become

~~necessary to plan land use (physically) even over~~

the countryside - hence the term "town and country

planning" or "physical planning" that is used to

describe the new discipline of professionals that

are involved in this kind of exercise.

Physical planning can therefore be described as the art and the science of securing the best use of land in the interests of the community that lives upon it. The discipline involves a regulation of development or re-development of towns and small urban settlements with a view to giving the resident public maximum advantages in the public health, economy and aesthetic fields. This means that physical planning is done for the people, and the machinery that acts for a community is some form of a government. Planning therefore ought to operate

at national levels, and the entire country stands to benefit from an overall coordinated land use program across the country. The local authorities lack the jurisdiction for national level coordination, and therefore the role of the central government would be to provide this power to coordinate the land use allocation mechanism throughout the nation - hopefully with the above goals taking high priorities. At local authority level more detailed land use coordination is done; because the locally elected (or appointed) governments have greater knowledge of local needs - in view of unique local physical and socio-economic environments. It would therefore be ridiculous, and very expensive to expect this very detailed involvement from the central government.

Planning at both levels seeks to resolve, in terms of development plan proposals, the many competing and conflicting uses to which land can be put, in view of the inelastic nature of the supply of the factor land. The allocating and coordinating authorities are therefore entrusted by the public with the duty of land resource allocation to avoid negative externalities, land use conflicts and other diseconomies of scale that would result from a laissez faire situation at the disadvantage of the resident public. It is generally assumed that these authorities know best what to do; because, once land has been put

to some specific use, it becomes difficult to have that change. This is because of the amount of money, investment and time that eventually would be expended on a specific land use. Random changes would therefore be uneconomic waste of these "resources", which are scarce and expensive by themselves. A legal process of pegging down land use (of which physical planning is a part) has therefore developed to take care of the situation.

This implies that the physical planning authorities have not only to involve themselves in ~~the allocation of land use, but also with the~~ regulation of land use over time. "Regulation" implies that physical planning is a means of exercising control over land development with the aim of achieving certain desired social and economic goals. This negative aspect of control - the "do-not-do-that-follow-my-advice" viewpoint should be practiced with competence; and should always have that positive aspect of doing things to improve the physical and social-economic environment for which land use planning is being carried out.

#### Scope and Methodology of Physical Planning.

##### Scope of Physical Planning.

National Planning: At the highest level of physical planning is national planning; which implies national control of land use, land ownership, location

of industry, the planning of population movement, air communications, town sizes and other matters. It takes the form of attempting to coordinate all the physical planning effort at a national scale, and attempting to organize a spatial system of economic activities so as to achieve the goal of national welfare maximization and resource use optimality. Regional planning in Kenya is recent. It is only in the 1970s when the Town Planning Department of the Ministry of Lands and Settlement prepared six regional development plans for Kenya.

~~In the process, an inventory of all existing~~ places in Kenya was undertaken, and these "growth centres" were categorized into four levels: urban centers, rural centers, market centers and local centers in descending order of importance and size. The aim of such hierarchical arrangement was to achieve some sort of central place network. Using this network the central government would allocate public services with a view to promoting growth. Although this system was not satisfactory by itself,<sup>30</sup> it is now accepted by the Kenya government and the planning philosophy in general that some governmental coordination of land use and activities must take place at national level.<sup>31</sup> National planning therefore involves coordination of all the regional plans within the boundaries of the nation.

This means that good regional plans have to be prepared, to begin with. A good regional plan would do the following:<sup>32</sup>

- (a) It would identify regional goals, i.e. the goals of the people living in a region. Ideally, the citizenry would be involved in this process.
- (b) It would set the region in the context of the national socio-economic system. This means that there is no use preparing regional plans if their execution would require more resources than are available in a region. A good regional plan must identify the regional resources, and be set within the regional resources' constraints.
- (c) Regional plans should contain guidelines for various types of development in a region; the location of industry and land use in broad terms.
- (d) They must have scenarios or projections for future development; and have guidelines for modification and revision to take into account irreversibilities like infrastructural sunk costs, etc.
- (e) They must be flexible, otherwise failure of one part may cause abandonment of whole plans, or large parts of their substantive

content.

- (f) They must leave considerable room for the initiative of local people who would modify them according to local environmental and socio-economic circumstances.
- (g) Major issues should be identified first; the plan must be a broad policy document, leaving detailed planning and minor issues to be settled at the local planning level "A good regional plan does not attempt to master plan every acre of land ..... or every socio-economic activity; rather, it relies on guideline procedure...." as suggested in (c).<sup>33</sup>

Local planning: involves detailed planning of a city, town, village or a small district a few square kilometres wide. Most town plans are done at this scale, and have been considerably successful over the last decades. Despite their localized nature the details have to be done for every acre on a continuous basis by resident planners. This means that "part development plans" are required for each area of a town or a small region; which must be in conformity with the local plans. The local plans must conform to regional plans; which, taken all together in a national context must conform to the

- 441 -

spatial arrangement preference for the nation, in accordance with the national development goals.

#### Planning Methodology.

Like in earlier discussions within this chapter it is difficult to be able to deal with all there is in physical planning. Fair treatment of the subject requires more than one textbook because of its complex nature. I must point out here that the nature of the work involves a team, a multi-disciplinary team. This is the only way the respective multi-dimensional issues arising from physical planning can be solved with any degree of competence. Engineers, architects, geographers, lawyers, economists, surveyors, sociologists and economists are usually involved in physical planning at both national, regional or local levels. A land economist could be one of the members of a team to help make decisions on issues regarding the economic implications of land use decisions. Since physical planning is land use allocation per se; it falls under the umbrella of our study; and the land economist has to know its capabilities, its successes and weaknesses. Most courses in land economics therefore require some introductory town planning techniques.

Brian Macloughlin<sup>34</sup> has pointed out that the physical planning methodology is cyclic in nature. It involves:

- (i) Scanning the environment of the area to be planned; and on the basis of the values held by the people of that area identifying certain needs or wants which might be satisfied through governmental interference with the laissez faire mechanism.
- (ii) Then goals are formulated in broad terms; and perhaps at the same time certain precise objectives are identified.
- (iii) Possible courses of action that will help achieve goals and objectives are outlined.
- (iv) Evaluation of these possible courses of action must take place by reference to the means and resources available, the costs likely to be incurred in overcoming the constraints on action, the benefits likely to be derived, and the consequences of action, so far as can be seen.
- (v) Action is taken on the basis of these considerations. The action taken modifies the relationship between the individual or group and the environment. It alters the environment itself; and in time, the community's values and



perception of the environment.

(vii) After action has been taken the environment continues to be assessed; new goals and objectives may be formed from the results of the action on the previous plan. Thus the cycle is repeated and planning begins a-fresh.

In all these stages land use is the crux of the matter, and the land economist requires active participation; or the knowledge of the process of land use allocation through planning.

FOOTNOTES

1 G.C. Chesire Urban Land Use  
Property; (London, Butterworths, 1974, p. 10-11).  
See also Phillips S. James. Introduction to English  
Law; (London, Butterworths, 1974, p. 107-108) and  
E. Swinfen Green, An Outline of Land Law,  
Sweet and Maxwell, 1965, p. 9.

2 Ibid. (all works).

3 In Socio-economic systems where land  
has been nationalized it is sometimes difficult to  
arrive at capital value of land. In Tanzania, for  
example, only improvements over land can be valued;  
because land is not supposed to be commercialized  
under the Arusha Declaration of 1967.

4 Squire L. Speedy, "Economic Approach  
to Value." The Valuer, Vol. XXVI No. 5 (January  
1981), pp. 387-393.

5 Ibid.

6 Ibid.

7 Ibid.

8 George K. Kingorlah, "Policy Impacts  
of Urban Land Use Patterns in Nairobi, Kenya: 1999-  
1979," (Unpublished Ph.D. Dissertation, School of  
Graduate Studies, Indiana State University, 1980),  
pp. 85-89.

9 This is an accepted valuation practice.  
In particular, see any text on real estate or valuation.  
In particular see Arthur M. Welner, Donner Hoyt and  
George F. Bloom, Real Estate (New York, The Ronald  
Press 1972), pages 1-80.

10 Ibid. (the whole work).  
Also see Eugene L. Grant, W. Grant  
Irenson, Richard S. Leavenworth; Principles of  
Engineering Economy; (New York, The Ronald Press  
Company, 1970), whole work.

11 Ibid. (All works).

12 Arthur M. Welner, et al. Real Estate  
p. 87. "Compulsory purchase" is known as "Eminent  
Domain" in U.S.A.

13 Estate Duty Act of Kenya, Cap. 403 of  
the Laws of Kenya (now repealed).

14 Stephen E. Kituuka, "Industrial Real Estate Lending in Kenya," (unpublished M.A. Thesis, Nairobi University, Department of Land Development, 1982) chapter 1.

15 Ibid. (whole work).

16 David E. Black; An Employment and Output Projection Model for Kenya and Nairobi, (Nairobi, Nairobi University, I.D.S. publication No.52; DP. 172.)

17 Harry W. Richardson, Regional Economics, (New York, Praeger Publishers, 1969), whole work. See also Walter Isard, Methods of Regional Analysis, (Cambridge, Mass., M.I.T. Press, 1960), whole work.

18 Warren Soyfried, "The Centrality of Urban Land Values," Land Economics, vol.39 (1963), pp.275-284.

19 These are generally those factors that a valuer will look for when valuing a vacant site. See Arthur M. Weiner, et al. Real Estate.

20 Harry W. Richardson, Regional Economics, p.390.

Location, translated by W.H. Woglom, From Die räumliche Ordnung der Wirtschaft (New Haven, Conn., Yale University Press, 1940), p.333.

22 Harry W. Richardson, Regional Economics, p.390. Edgar M. Hoover, Introduction to Regional Economics, p.252. Milton Friedman, Free to Choose, (New York, Alfred A. Knopf, 1978). In this work Friedman is pioneering the reaction against "big government" in the opposite direction of the interventionist philosophy advocated by many planners and regional Economists. Friedman's monetarist economic theory asserts that government spending is the one bringing about inflation. He goes back to advocate laissez faire in economic activity. This author believes that laissez faire cannot work in land use decisions; and that government intervention as advocated by Hoover, Richardson and many other eminent economists, is the only right way to check adverse externalities caused by the so called "free enterprise" over land.

23 A.J. Harrison, Economics of Land Use Planning, (Newbury, U.K., Policy Journals, Ltd. 1981), the whole work deals with methods of influencing land use by public authorities; taking into account economic mechanism of supply and demand for space, goods and money in any economy.

24 Ibid.

25 George K. Kingorish, "Economic Development and Industrial Development in Kenya" Ardhi: Journal of Land Development, vol.1 No.1, (1981), pp.7-17. In this article I have included the process of colonization and all its evils as the chief cause of irrational location decisions in East Africa.

26 William J. Baumol, Economic Theory and Operations Analysis, (Englewood Cliffs, N.J., Prentice Hall, Inc. 1977), pp.526-531.

27 J.H. Johnson, Urban Geography: An Introductory Analysis, (Oxford, Pergamon Press, 1967).

28 Ibid., chapters 1, 2, and 3.

29 Kenya's Department of Town Planning goes to these details, although it is a central government organization. This is because local authorities in Kenya have not evolved physical planning machinery to cope with local work that involved part of development plans, etc. Therefore, the Department provides an advisory service to most local authorities in Kenya in an effort to ensure efficient planning even at the basic local level involving two plots or so.

30 D.B.F. Taylor, "The Role of the Smaller Urban Place in Development: The Case of Kenya," in Salah el Shakhs and Robert Obudho (Eds.): Urbanization, National Development and Regional Planning in Africa, (New York, Praeger Publishers, 1975), pp.143-147.

31 Republic of Kenya Land For Human Settlements A National Position paper presented to the 6th Session of the United Nations Commission on Human Settlements; Helsinki, Finland; 28th April to 6th May 1983. This author takes special pleasure in having been a co-author and editor of this paper.

32 Douglas R. Webster, "Regional Development Planning: Persistent Paradigm of New Concesus." Ekistika vol.47, No.284 (September/October 1980), pp.343-345.

33 Ibid.

34 J. Brian McLoughlin, Urban and Regional Planning: A Systems Approach (London, Faber and Faber, 1972), pp.92-104 (chapter 3).

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# I N D E X

Abiodun, Josephine Olu	377-379
Addis Ababa	152-156
Adoptive Model of Housing Market	
Africanization of Commerce (in Kenya)	215-217
African (Native Reserves)	545, 602-607
Agglomeration	478-482, 508-512
Aggregate Demand	186, 211
Aggregate Demand for Capital	179-185
Aggregate Supply	186
Alonso, William	159-161, 167, 200-201, 205, 440-446
Alternative Investment	238
Asian Exodus (East African, 1967-1968)	215-217
Average Cost	39-43
Average Factor Cost	65-66, 71-75, 189-194, 198-200
Average Product	32-39
Axial Development Hypothesis	416
Bacon, Sir Francis	5
Bank Rate	173, 226, 228-232
Banking	219-232
Basic/Non Basic Ratio (B/N)	389-394
Basic Services	389-394
Behavioral Matrix	482
Bid Price Curve	161, 167
Boom	185
Borchert, John R.	368-375



Bransby-Williams Commission	621-623
Buache, Phillippe	333
Budget Constraint	232-238
Building Cycle	282-284
Building Industry	277-284
Burgess, E.W.	415
Cash Flow	654-662
Cash Reserve	230
Capital	6, 16
Circulating,	69-70, 169
Liquid	17, 69
Real or Fixed	69
Capital Budgeting	210
Capital Formation	188
<del>Capital Gains Tax (Kenya)</del>	<del>222</del>
Cash Flow	210-215, 218-219, 222-232
Central Business District (CBD)	402-409, 437-439
Central Place Theory	338, 343-380
Central Bank	219-232
Charge (Mortgage)	244
Christaller, Walter	344-360, 476-479, 4
City Structure: Theories of	413-429
Classical Economists	16-17
Complementary Land Use	246
Complementary Region	346
Commercial Banks	219-232
Concealed Subsidies	300

Concentric Zone Theory	413-419, 426-429, 439, 612
Considerations: personal	482
Constitution: of Kenya	606
Contiguity (among Regions)	321-323, 333
Colonial Penetration	536-539, 551-552, 560-562, 595-597
Cost Structure	496, 499-508
Credit Squeeze	56, 166, 185, 230
Cross Elasticity of Demand	51-52
Dedentures	240
Delivered Services	447-453
Demand Cone	133-134
Demand Curve (Rent Control)	309-312
Demand, Elasticity	47-63
Demand for Investment	210-215, 219-232
Demand for Land	13, 89-101, 210-267
Demand: Real Property	199-200
De-Merit Good	290
Derived Demand	45-46, 8½-81, 165
Devonshire White Paper	624, 635
Differential Rent	109-111, 162, 201
Diminishing Returns	36-38
Dipreciation	254
Dipressed Region	515-516
Discounted Cash Flow	174-179, 211
Disposable Income	222
Distance Friction	455
Dualism: Rural-Urban	570
Dunn, Edgar S.	159

Economic Base	386-394
Economics	1, 4
Economic Life (of a building)	253-258
Economic Investment Returns	168-179
Effective Demand	302
Effective Power	572-574, 575
El Shakhs, Salah	569
Equilibrium	232-237
Equilibrium: Factor Market	72-75, 92, 102, 185-196
Equilibrium: Land Markets	167 259-264
Equilibrium, in Property Markets	259-264
Estate Agents	174, 250, 261
<b>Exchange Value</b>	<b>647</b>
Expectations	176, 206, 231
Extensive: Margin of Cultivation	85, 86-98
<b>External Rate of Return</b>	<b>178-198, 198</b>
Externality	246-250
Factor of Production	16, 44, 77, 78
Mobility of	56-59
Freetham Commission	624-625, 635
Filtering Down (of Houses)	286-289
Firm, Theory of	17-44
First Order Firms	478
Fiscal Policy	166, 173, 222-232
Foreign Exchange	216
French Revolution	79

Friedman, John	572-574
Functional Integration (Within Regions)	321, 322, 333
Galbraith, J.K.	224
General Theory (Keynesian)	168
Geographical Coefficient "g"	490-492
Geophoric Location	650-651
Government Spending	223
Gravity Model	453-457
Great Dipression	221
Greenhut, Melvin	479-480
Growth Pole Planning	546-549
Growth Pole Theory (See Perroux, Francois)	
Hamilton, F.E.	483-486
Harris, C.D.	415
Hartshorne, Richard	476
Highest and Best Use	56, 242-253
High Order of Goods	341, 487-488
Hippodamus of Miletus	684
Homogeneity of Regions	319, 321, 331-334
Hoover, Edgar M.	475-476, 480
Housing Finance Company of Kenya	223
Housing Management	305
Housing Market	268-314
Housing Research and Development Unit (University of Nairobi)	269
Hulman, E.L.	415
Human Capital	6
Hovarth, R.J.	152-156

Hoyt, Hommer	419-421, 439
Hypothesis	5
Income Elasticity	47, 52-56
Identification Problems	500
Indifference Curve	18, 291-294
Indivisibilities	500
Industrial Linkages	376
Inferior Good	55
Infrastructural Economies	509
Interest	115, 117, 229
Interest, Rate of	171-179, 190
Internal Rate of Return	178-196
Investment, Process of	168-174
Invisible Hand	637
Isard, Walter	159, 367-369, 480-481
Isocosts	20, 272-282, 470, 493-496,
Imperfect Competition	72
Input-Output Analysis	387-395
Intensive Margin of Cultivation	98-106
Isodapanes	466-473
Isolated State	120-125
Isoquants	18-44, 232-237, 272-282, 480, 493-496
Jones, Donald W.	162-163
K-Value	350-360
Kaldor Criterion	676
Kenyan Spatial System	533-549
Keynes, John Maynard	168-169, 212, 215

Labour	6, 16
Laissez faire	672-673, 674, 678, 681, 685, 686, 692
Land	6, 16
Demand for	58-63
Investment in	210-267
Land Economics	8-14
Land Use	242-253, 581-638, 643-695
Land Value (rent) Gradient	135-137
Land Valuation	649-676
Launhardt, Wilhem	463-464, 480
Laurenti, Luigi	574-575
Lease	243-244
<b>Leontief, Wassily W.</b>	<b>388</b>
Level of Investment	211
Liquidity of Capital	213
Local Centres	543
Location of Industry	461-521
Location: Residential	439-446
Location Triangle	464-473
Losch, August	350, 360-368, 476-479, 491
Low Order Goods	341, 487-488
Macloughlin, Brian	691-693
Mackenzie, R.D.	415
Macro-economics	210, 221
Mailo System	597-602
Marginal Cost	40-43, 71-72, 88, 92, 94, 95, 100, 188
Marginal Efficiency of Capital	181-185

Marginal Efficiency of Investment (MEI)	179-185, 191-196, 198, 200 224, 231, 232, 247
Marginal Product	36, 88, 92, 98
Marginal Revenue	44, 66-67, 71-73, 95, 96, 100, 101 105, 188
Market Centres	543
Market Value	647
Marshall, Alfred	16, 115, 186, 187, 191
Megalopolis (American)	156-158
Merit Good	290-291, 301
Micro-Economic Analysis	210
Mobility of Land Use	245-259
Monetary Illusion	224
Monetary Policy	166, 173, 222-232
Monetary Supply	225-232
Monopoly	44, 51
Monopolistic Competition	44
Mortgage	244
Muller, Peter	156-158
Multiple Nuclei Theory	415, 421-429, 613
Multiplier	211, 229-231
Napoleonic Wars	79
National Housing Corporation	223
Natural Sciences	3
Neighbourhood Shopping Centres	430-434
Nodal Region	318, 324-331
Non-basic Services	389-394
Normatic Economics	4

Open Market Operations	226-228
Operations Research	210
Opportunity Cost	100
Order: Natural	77
Orientation	469-473, 487-512, 493, 496, 528-529
Owner Occupier House Allowance	223
Palander, Tord	473-476, 480
Pareto Optimality	675
Penny Post	2
Perfect Competition	88, 96, 190
Perroux, Francois	566
<b>Personal Action (legal)</b>	<b>645</b>
Personal Property	645-646
Philbrick, A.K.	329-334
Physical Planning	683-693
Physical Sciences	3
Physical Threshold	252
Physiocrats	77
Pick Up Services	447-457
Positive Economics	4
Pred, Allen	482-483
Preference Shares	240
Premium	178, 179, 205, 213
Price: Elasticity	47, 49
Profit	115, 117
Profit Maximization	46, 71-75, 122, 180-185, 188, 232-238
Propulsive Industries	515
Psychology	3



Punctiform Market	122
Quasi-Rent	109, 114-116
Radial Sector Theory	415, 419-421, 426-429, 439, 613
Range (of a good)	338-343, 346
Rank (of a City)	399-400
Rating Valuation	662-669
Rawston, E.W.	481
Real Action (legal)	644-646
Real Estate Appraisers (Valuers)	174, 196, 197
Real Property	644-646
Recession	185
Region	11
Regional Delimitation	319-334
Regional Economic Problems	514
Regional Growth	380-394
Regional Integration	328
Regional Shopping Centres	436-437
Renner, George	476
Rent Bid Function	126-137, 200, 204, 207
Rent Control	306-312
Rent Restriction Act (Kenya)	245
Rent, Theory of	77-118, 206
Resources	6, 7, 16
Resource Allocation	6, 7
Restriction (Physical, Economic, Technical)	481
Retail Centres	429-431
Return, Rate of	172-179, 188, 205, 220
Ricardian, Theory of Rent	79-115

Ricardo, David	79-81, 119, 158-163, 165, 200-208, 480
Richardson, H.W.	565-573
Rural Centres	543
Risk, Perception of	176
Risk Rate	176
Risk Taking	170
Satisficer	482
<b>Savings</b>	<b>173, 219-232</b>
Savings Bank	173
Scale Line	25, 235
Scarcity Rent	106, 109, 185-186
<b>Science</b>	<b>2</b>
Scientific Investigation	3, 5
Sdasuk, Galina, V.,	569
<b>Security of Capital</b>	<b>213-214</b>
Security of Income	212
Shares	237-241
Simpson Commission (on Nairobi, 1913)	623, 629-631
Sinclair, Robert	155-156
Site and Service Scheme	298-300
Slater, David	569
Smith, Adam	16
Smith, David M.	483
Social Science	1
Social Welfare	301-302
Sorrenson, M.P.K.	92
Space Cost Curve	483

Spatial Monopoly	250
Spatial Systems	522-580
Specificity	51, 58-59
Standard Metropolitan Statistical Areas (SMSA)	327-328
State Economic Areas	320
Statutes	245
Stocks	213, 216, 226-232, 239-240, 241
Stock Broker	174
Stonier, Alfred (and D.C. Hague)	86-115
Strategy (Regional Development)	518-520
Subsidized Housing	286-306
Subsistence Farmers	86-98
<b>Substitute Goods</b>	50, 64
Suburban Shopping Centre	435-436
Supply Curve	186, 188, 295-297, 309-311
Supply of Factors	63-72
Supply of Labour	98-100
Supply of Land	13, 71-72, 89, 94
Supply Schedule	63, 66-69, 69-72
Taafe-Morril-Gould Model	529-533, 560
Tanzanian Spatial System	556-565
Taxation	185, 214, 222-232, 303-304
Taylor, D.R.F.	524-525, 535
Technical Services (subsidized)	300
Technology	25-32, 53, 55, 235
Tenant Purchase	297
Threshold (of a good)	338-344, 473-476

Tiebout, Charles M.	388
Time Preference	171
Total Cost	40-43
Total Revenue	42-47
Total Product Curve	28-43
Transfer Earnings	109, 111-114
Transportation Cost	121, 163, 505-508
Transportation Zone	407-409
Treasury Bonds	227-232
Trust Land	604
de Turgot, R.J.	77
<b>Uganda Agreement</b>	<b>597-602, 628</b>
Uganda Spatial System	549-556
<del>Ujamaa Policy</del>	<del>563-565, 637</del>
Underdeveloped Area	515-517
U.N.I.C.E.F.	154
United States of America	155-158
Unitropic Plain	121, 122
Urban Centres	543
Urban Place	316, 524-525
Urban Re-development	253-258
Urban-Regional Economics	8-10
Urban Sprawl	258-259, 413
Urbanization Economies	509
Urbanized Area	325
Valuation (Estate Appraisal)	197
Valuation Roll	663-665

Value, Capital	187
Variable Cost	501-504
Von Thunen, Johann Heinrich	119-163, 165, 167, 198-208, 253, 316, 335-336, 344, 400, 440, 462, 480, 583-584, 612
Wall Street Crush (1929)	221
Wealth	77
Wealth Distribution	302
Weber Alfren	464-473, 480, 491
Wages	98-101
Whitelesey D.	324
Zone of Transition	40-411