Durham University

Durham E-Theses

Recent population changes in Libya: economic relationships and geographical patterns

Robert Gordon Hartley

How to cite:

Hartley, Robert Gordon (1968) Recent population changes in Libya: economic relationships and geographical patterns. Doctoral thesis, Durham University.

Use policy

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a https://etheses.durham.ac.uk/id/eprint/1982/ is made to the metadata record in Durham E-Theses
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Please consult the full Durham E-Theses policy for further details.

Academic Support Office, The Palatine Centre, Durham University, Stockton Road, Durham, DH1 3LE
e-mail: e-theses.admin@durham.ac.uk Tel: +44 0191 334 6107
https://etheses.durham.ac.uk

RECENT POPULATION CHANGES IN LIBYA: ECONOMIC RELATIONSHIPS AND GEOGRAPHICAL PATTERNS.

BY

ROBERT GORDON HARTLEY

A Thesis Submitted for the Degree of
Doctor of Philosophy in the University of Durham,
August, 1968.

The copyright of this thesis rests with the author. No quotation from it should be published without his prior written consent and information derived from it should be acknowledged.

BEST COPY

AVAILABLE

TEXT IN ORIGINAL IS
CLOSE TO THE EDGE OF
THE PAGE

ABSTRACT

Economic benefits afforded by petroleum exploration and exploitation in Libya have recently been superimposed on an historical background of direct and pervasive influence by geographical factors. The process of economic transition is permeating the country's social, political and cultural structure, though at a faster pace than the resultant demographic changes.

The precise interrelations between the demographic and economic transitions form the crux of this study. The major research finding is the identification of an intermediate stage in the process of demographic evolution. This stage is characterized by a geographical and occupational redistribution of the population, preceding and accompanying the initiation of population growth through a decline in mortality. The cause of this increased population mobility is primarily economic although its precise form is also determined by the physical, social and cultural environments. The characteristics of this stage of transition are related to a marked dichotomy between urban and rural areas. This duality in the socio-economic characteristics of the population forms both the means by which further erosion of the traditional economic system takes place, and also an incipient stage for further demographic transition.

As the economic transition preceded, and in part initiated, the demographic transition in Libya, the economic effects on the population are studied in the first part of the thesis. By concentrating on the temporal sequence of economic change, several non-discrete phases are distinguished. Actual changes in the distribution of rural and urban populations follow. They are superceded by a study of the age and sex structures of the population.

This analysis hints at the significance of internal migration as the major demographic process operating in the incipient stages of economic growth. In the final part, the demographic effects on present and future economic growth are highlighted, particularly the problems of limited labour supply and rapid population growth. The concluding section examines the demographic-economic relations of Libya in the context of a model of transition developed for other countries experiencing rapid demographic and economic transformation.

PREFACE

My research on recent demographic and economic changes in Libya was begun in September 1965, this topic being chosen for three main reasons. Firstly, the publication of Libya's second population census relating to 1964 made possible for the first time a demographic comparison with the first census relating to 1954. Secondly, within this ten year intercensal period, Libya experienced a marked economic transformation, the consequences of which permeated the country's demographic structure. Finally, although previous research work from the Department of Geography, University of Durham, had pioneered the field of detailed regional surveys in Libya, few studies had attempted to collate and analyse the growing volume of statistics relating to the whole country.

During my period of research I made two field trips to Libya. The first visit lasted from March to June 1966. Part of the time was spent travelling in the three provinces of Tripolitania, Cyrenaica and the Fezzan collecting relevant literature, and part was spent making contacts in the various government departments. The second visit took place from April to July 1967, during which time I distributed a questionnaire survey and undertook detailed field studies in the two major urban centres of Tripoli and Benghazi. These activities were curtailed in June 1967 following the outbreak of Arab-Israeli hostilities; but fortunately the programme of field work was already substantially completed.

There are many people both in Durham and in Libya who by their help have enabled me to complete this study. Although it is impossible here to mention them all by name, I would particularly like to record my gratitude to Professor W. B. Fisher for accepting me as a research student in his department. I am greatly indebted to Dr. J. I. Clarke who supervised my work, for his interest, encouragement and helpful

criticism. Thanks are also extended to other members of staff and to post-graduate fellows of the Department of Geography, University of Durham, for their assistance and to friends who have read through the proofs of the thesis. I wish to acknowledge the co-operation and hospitality afforded me by officials of the Libyan government ministries, the staffs of the University of Libya and the British Embassy, and the employers and employees of numerous Libyan firms.

TABLE OF CONTENTS

		Page
PREFACE		(iii)
LIST OF TABLES		(vii)
LIST OF ILLUSTRATIONS		(x)
INTRODUCTION		1
CHAPTER		
I	STAGES OF GROWTH AND DUALITY IN THE LIBYAN ECONOMY	8
	1.1 Traditional Society	9
	1.2 Preconditions for Take-Off	13
	1.3 Take-Off 1963-68	26
	1.4 Conclusion	34
II	DEMOGRAPHIC REGIONS IN LIBYA: A PRINCIPAL COMPONENTS ANALYSIS OF ECONOMIC AND DEMOGRAPHIC VARIABLES	40
	2.1 The Model - Principal Components Analysis	42
	2.2 Selection of Regions	43
	2.3 Selection of Variables	43
	2.4 The Components Analysis	44
	2.5 Components and Regional Classification	48
	2.6 General Evaluation of the Factor Structure	52
	2.7 Association of Variables	54
	2.8 Summary and Conclusion	57
III	DISTRIBUTION AND DENSITY OF POPULATION 1954-66	61
	3.1 General Characteristics of Population Distribution and Density	62
	3.2 Distributional Changes	66
	3.3 Changes in Population Density 1954-64	67
	3.4 Regional Co-efficients of Distributional Evenness	69
	3.5 Population Potentials in Northern Libya	70
	3.6 Tripolitania's Rural Population Distribution	72
	3.7 Non-Physical Factors influencing Tripolitania's Rural Population Distribution.	83
	3.8 Cyrenaica's Rural Population Distribution	88
	3.9 Population Distribution in the Fezzan	94
	3.10 Summary and Conclusion	96

IV	URBANIZATION AND POPULATION DISTRIBUTION	99
	4.1 Population Clusters: the Size Continuum	101
	4.2 Size and Spacing of Settlements	105
	4.3 Determinants of Settlement Size and Spacing	108
	4.4 Conclusion	111
V	AGE AND SEX STRUCTURES	116
	5.1 Elements and Patterns of Libya's Age Structure	117
	5.2 Elements and Patterns of Libya's Sex Structure	130
	5.3 Summary and Conclusions	137
VI	MIGRATION TRENDS	140
	6.1 Historical Phases of Migration	142
	6.2 Recent Migration Patterns	148
	6.3 Rural-Urban Migrations	157
	6.4 Characteristics and Consequences of Urban Migrations	163
	6.5 Conclusions	167
VII	LIBYAN MANPOWER RESOURCES	173
	7.1 Economically Active Population	174
	7.2 Economically Inactive Population	183
	7.3 Types of Economic Activity	188
	7.4 Recent Employment Trends in the Private Sector	199
	7.5 Sample Surveys of Oil and Construction Companies	200
	7.6 Future Requirements	206
	7.7 Summary and Conclusions	208
VIII	PAST, CURRENT AND PROSPECTIVE POPULATION GROWTH	212
	8.1 Patterns of Fertility	215
	8.2 General Mortality Differentials	220
	8.3 Population Growth 1954 to 1964	233
	8.4 Population Projections	238
	CONCLUSION	244
	APPENDICES	252
	BIBLIOGRAPHY	304

LIST OF TABLES

Table		Page
1.1	Selected Measures of Population Distribution, Composition and Growth, 1936-64	17
1.2	Economic Expansion 1962-66	27
2.1	Demographic Variables	43
2.2	Economic Variables	44
2.3	Libyan Mutassarrifia Regions. Percentage of total variance explained by each component.	45
2.4	Percentage of variance (communality) of each of the forty demographic variables accounted for by all three components.	46
3.1	Provincial Changes in Population Distribution and Density, 1936-64.	63
3.2	Mudiriah Administrative Districts in Northern Tripolitania, 1954-66	63/64
3.3	Mudiriah Administrative Districts in Northern Cyrenaica, 1954-66	64/65
3.4	Mudiriah Administrative Districts in the Fezzan, 1964.	65/66
3.5	Rainfall Zones and Rural Population density in Northern Tripolitania, 1954.	75
3.6	Results of the Population-Rainfall Correlations	76
3.7	Distribution of Irrigated Land by Rainfall Zones in Northern Tripolitania, 1958.	78
3.8	Land Use Zones and Rural Population Densities in Northern Tripolitania, 1954.	84
3.9	Rainfall Zones and Rural Population Density in Northern Cyrenaica, 1954.	89
3.10	Land Use Zones and Rural Population Densities in Northern Cyrenaica, 1954.	91
4.1	Level of Urbanization in selected Middle East countries, 1960's.	100
4.2	Median Sizes of Libya's 8 Largest Settlements as a Fraction of Tripoli, 1917 to 1966.	103
4.3	Settlement Spacing by Three Size Groupings, Libya 1966	106

4.4	Economic Activities in Libyan Settlements, 1964.	109
5.1	Age Structures in Selected North African and Middle East Countries.	119
5.2	Dependency Ratios in Selected Middle Eastern Countries	125
5.3	Sex Ratios of North African Countries and Moslem West Africa	132
5.4	Sex Ratios of Citizen Population aged 15-44 years significantly above and below the national average, 1954 and 1964.	135
5.5	Correlation Co-efficients of Sex Ratios with Factors 1, 2 and 3.	137
6.1	Measurements of the Net Internal Migration by Direct and Indirect Methods in Libyan Mutassarrifia, 1964.	151
6.2	Origin of Migrants living in Tripoli and Benghazi Muqataa, 1964.	159
6.3	Place of Birth of Migrants living in Libya's Seven Largest Municipalities, 1964.	160
6.4	Ratio of Male and Female Single Persons aged 20-44 years to the Total Population aged 20-44 years, 1954-64	161
7.1	Crude Economic Activity Rates by Sex for Indigenous Populations in selected North African Countries.	175
7.2	Age Specific Male Activity Rates of Indigenous Populations in selected North African Countries	178
7.3	Unemployment Amongst Male Citizens, Six Years and over by Muqataa, 1964.	182
7.4	Attendance of citizens (aged over 6 years) in Primary, Preparatory and Secondary Schools per 100 Citizens aged 5-25 years in 1964.	186
7.5	Sectoral Proportions of Gross Product and Male Employment, 1954-64	190
7.6	Localization of Industry. Number of Libyans engaged in each economic activity, 1956 and 1964.	192
7.7	Percentage Distribution of Income Groups in Urban and Rural Areas 1962-66	193
7.8	Occupational Distribution of Economically Active Male Citizens in Libya (aged 5 years and over), 1954 and 1964.	196

7.9	Economic Status of Economically Active Male Citizens in Libya, 1954-64	198
7.10	Employment of Libyans and Expatriates by Company and Place of Work, June 1966.	204
7.11	Estimated Demand for and Supply of Personnel during 1964-69.	206
8.1	Geometric Population Growth Rates of Citizens, Alien and Total Libyan Populations, 1931-64	212
8.2	Population Size, Rate and Amount of Increase, and Rate of Births and Deaths in selected Middle East Countries, 1958-66.	213
8.3	Urban-Rural Fertility Ratios, 1954-64	218
8.4	Patterns of Urban and Rural Mortality, 1954-64	222
8.5	Measures of Infant Mortality	225
8.6	Causes of Infant Mortality	226
8.7	Natural Increase, Birth and Death Rates for Libyan Citizens 1954-64	237
8.8	Linear and Geometric Projections of Libya's Population to 1980.	239

LIST OF ILLUSTRATIONS

Figure

I Administrative Divisions in Libya.

1.1 Elements of Economic Growth 1954-62

1.2 Scatter Diagram for the Share of Agriculture and Per Capita Gross Domestic Product.

2.1 Distribution of Regions on Factors 1 and 2

2.2 Correlation of Population Variables with Factors 1 and 2

2.3 Correlation of Economic Variables with Factors 1 and 2

2.4 Factor 1 : Urban-Rural Gradient

2.5 Factor 2 : Agricultural Gradient

2.6 Correlation of Population Variables with Factors 1 and 3

2.7 Correlation of Economic Variables with Factors 1 and 3

2.8 Distribution of Regions on Factors 1 and 3

2.9 Factor 3: Accessiblity and Sex Ratio Gradient.

2.10 Changes in Selected Population Variables 1954-64

2.11 Distribution of Regions on Factors 2 and 3.

3.1 Population Changes by Mudiriah 1954-64 Northern Tripolitania

3.2 Population Changes by Mudiriah 1964-66 Northern Tripolitania

3.3 Population Changes by Mudiriah 1954-64 Northern Cyrenaica

3.4 Population Changes by Mudiriah 1964-66 Northern Cyrenaica

3.5 Distribution of Population in the Southern Region (Fezzan) 1964

3.6 Distribution and Density of Population in Northern Tripolitania 1954

3.7 Distribution and Density of Population in Northern Tripolitania 1964.

3.8 Changes in the Distribution and Density of Population in Northern Tripolitania 1954-64

3.9 Distribution and Density of Population in Northern Cyrenaica 1954

3.10 Distribution and Density of Population in Northern Cyrenaica 1964

3.11 Changes in the Distribution and Density of Population in Northern Cyrenaica 1954-64

3.12 Rural Population Concentration - Tripolitania 1958, Cyrenaica 1954.
3,13 Potentials of Population in Northern Tripolitania 1954
3.14 Potentials of Population in Northern Tripolitania 1964
3.15 Potentials of Population in Northern Cyrenaica 1954.
3.16 Potentials of Population in Northern Cyrenaica 1964
3.17 Climatic Variations in Tripolitania
3.18 Rainfall-Agricultural Zones in Tripolitania
3.19 Land-Use and Population Densities, Tripolitania, 1954.
3.20 Rural Population Density by Rainfall Zones
3.21 Rainfall Zones v Rural Population Distribution
3.22 Rainfall-Agricultural Zones in Northern Cyrenaica
3.23 Land-Use and Rural Population Density, Northern Cyrenaica, 1954
4.1 Settlement Rank-Size, England and Wales 1961 and Libya 1966.
4.2 Settlement Hierarchy in Northern Tripolitania 1954-66
4.3 Settlement Hierarchy in Northern Cyrenaica 1954-66
4.4 Size and Spacing of Settlements.
4.5 Size and Spacing of Settlements in Libya 1954-66
5.1 Age-Sex Structures in Libya 1936-64
5.2 Theoretical and Actual Age Structures
5.3 Age Structures in Libyan Regions and Provinces 1954-64
5.4 Percentage Deviations of Quinquennial Age Groups in Libyan Regions from the National Average in 1954 and 1964
5.5 Sex Ratios by Age
6.1 Net Lifetime Migration 1964 by Place of Birth and Present Residence.
6.2 Origin of Libyan Migrants from Muqataa Regions.
6.3 Destination of Libyan Migrants by Mutassarrifia
6.4 Distribution of In-Migrants in Tripoli
6.5 The Bidonvilles of Tripoli
6.6 Distribution of Migrants from the Central & Eastern Gebel

6.7 Distribution of Migrants from the Western Gebel.

6.8 Distribution of Migrants from the East Coast Zone

6.9 Distribution of Migrants from the West Coast Zone

7.1 Patterns of Employment in Libya, 1964.

7.2 Agricultural Labour Force in Libya 1964.

LIST OF APPENDICES

APPENDIX A. DEMOGRAPHIC MATERIAL AND SOURCES

APPENDIX B. SIGNIFICANT CORRELATION CO-EFFICIENTS ($\pm$ 0.45) BETWEEN:-

(i) Demographic Variables v 3 Factors and Demographic Variables

(ii) Demographic Variables v Economic Factors

(iii) Economic Variables v 3 Factors and Economic Variables.

APPENDIX C. SUPPLEMENTARY TABLES

INTRODUCTION

Up to some twenty years ago, the study of economic and demographic linkages was chiefly directed to the formulation of fixed relations between natural resources, population and production. The whole dynamic field, including social institutions, technology and cultural values, was introduced into these formulations merely as a limiting constant - " at any given stage of arts" as described by Malthus, or "within a particular population cycle" as specified by Pearl. Such static concepts as "over-population", "under-population", and "optimum population" are still commonly over-emphasized in dealing with problems of developing countries This has tended to lead to a fallacious conception of changes in population and changes in economic production as alternative means of promoting progress.

The influence of population changes on the economic growth of developing nations has attracted new attention recently, partly because of two prevalent trends. The first of these trends is the rise in aspirations, plans and programmesfor expanding national output in low-income countries seeking sustained economic growth. The second trend is the increasingly pervasive pattern of rapid decline in death rates in areas where until recently mortality risks were high. These areas have high birth rates; thus the drop in death rates means that population growth is (or is becoming) very rapid.

Research was concentrated on Libya because it had experienced these trends in an accentuated form. By studying recent demographic and economic changes it was believed that the relationship between population and economic development might be clarified by considering the problem in a specific context and in quantitative terms.

When it became independent in 1951, Libya was amongst the poorest countries in the world. Its disturbed history, small population and scantiness of resources had retarded development, and human activity remained

closely in subjection to the vagaries of the environment. Against this background of direct and pervasive influence by geographical factors, has been superimposed a veneer of economic benefits afforded by petroleum exploration and exploitation. Since oil was first exported in 1961, Libya has risen to be the seventh largest world producer of oil. Total government revenue is about £L 200 million, seventy per cent of which is destined for development projects, while per capita income has risen ten times in the last ten years. The country is experiencing a process of economic transition which is permeating its whole social, political and cultural structure, and at a pace experienced by few developing countries. Not only does the country's fast rate of change make an eloquent argument for its immediate study, but the very compression of radical changes into a short time span bring into sharp focus some of the fundamental development issues. Of particular significance is the process of transition from one economic and demographic equilibrium to another.

Evidence from other African and Middle Eastern countries suggests that despite Libya's rapid pace of economic growth, its process of economic development may be represented by some form of model. The basic feature of the model is a distinction between a traditional economic system and a modern exchange system. The effect of economic development which springs from the exchange economy is to encroach upon the traditional economy, drawing part of its productive resources into the orbit of the exchange economy. The manner in which this erosion of the traditional economy takes place varies from country to country but tends to follow certain basic patterns. It is the purpose of the models to elucidate this process of interrelationship between traditional and exchange economies. The heart of the matter is in the manner in which the productive resources of the traditional economy are drawn into the exchange economy.

One extreme model suggests that commercialization has been brought about chiefly by the transformation of parts of the traditional economy, usually by peasant agricultural producers of crops for export. In contrast,

the Libyan process of economic transition is characterized by the second extreme model, the main features of which are as follows:

(a) The exchange economy has been brought about largely by foreign capital and enterprise, mainly in petroleum exploitation, and by foreign settlement.

(b) The exchange economy depends heavily upon foreign capital, it is highly capitalized, its techniques are advanced, and it is geographically localized, mainly in urban centres.

(c) There is a relatively large outflow of workers as wage earners from the traditional economy to the exchange economy.

The theory of demographic transition provides a conceptual framework within which both the erosion of the traditional economic system and the resultant population changes can be interrelated and the deviations from the normal explained. The theory asserts that high birth and death rates, characteristic of an agrarian, low-income, traditional society, are affected by economic development. The structure of production changes with a declining importance of the family as a production unit, with the growth of impersonal systems for the allocation of jobs, and with the development of economic roles for women outside the home. These changes tend to increase the possibility of economic and geographic mobility of the population that can better be achieved with small families, and tend to decrease the economic advantages of a large family. One of the features of economic development is typically increasing urbanization, and children are usually more of a burden and less of an asset in an urban than in a rural setting. The whole process of economic change, moreover, weakens the force of both the physical environment and traditional customs and belief. In most countries that have undergone the economic transition from an agraria to an industrialized, market-orientated economy, the custom of the small family has started in the urban groups at the higher end of the socio-economic scale and has spread to smaller towns, low-income groups, and eventually to rural areas.

The events described by this theory can apparently be traced in every region where the economy has been subject to the evolution from an agrarian to a specialized market-dominated economy. However, the theory is not sufficiently quantitative and specific to indicate how far and how fast the vital rates and the population characteristics generally change. Nor does the theory emphasize that the decline in birth rates typically occurs after a substantial time lag in comparison with the decline in mortality rates. The slower response of the birth rate to the economic change is attributed to the fact that a fertility decline depends more strongly on the alteration of long-established customs and institutions. Also, there is in almost any society a general consensus in support of the reduction of suffering, illness, and death, while no such consensus supports the desirability of small families and/or attitudes required to reduce the birth rate. The historical implications of the lag between the decline in the death rate and the decline in the birth rate have meant a substantial and rapid growth in population.

The crux of this thesis is to give more precision to the inter-relationships between the demographic and economic transitions operating in one country. At the same time, the particular processes and form changes operating in Libya are placed in a wider international context. Of the many contextual settings in which Libya could be placed three comparisons have been emphasized throughout the thesis; with countries containing small absolute populations, with countries which have experienced rapid economic growth (particularly the oil-rich states), and with countries which have a similar Muslim culture (particularly in the Middle East and North Africa).

While there is a serious shortage of methodology in approaching the regional aspects of demographic and economic change, the methods and techniques of population geography have been used in this study. As a strategy in its mode of comprehending large, complex realities, the technique of population geography analysis has enabled some penetration to be made of

the major causes, characteristics and consequences of Libya's recent developments.

Three main limitations are inherent in this approach. Firstly, there has been a strong reliance upon official sources for the basic demographic and economic information. Much of this data is scrappy, scattered and uncollated. Even where there was official published material on population, the information was sometimes defective. Where possible, the accuracy of the data has been tested; details of the information used are summarized in Appendix A. Secondly, as a frame of historical perspective, the use of two population censuses in 1954 and 1964 provides only two still pictures of a rapidly changing situation. Such an excercise is justified only by the speed of economic and demographic developments in Libya, for the pre-oil phase is effectively captured by the 1954 census, while some of the post-oil consequences are reflected in the 1964 census. Questionnaire surveys and detailed field studies have provided independent checks at particular dates during the intercensal and post-1964 periods. Thirdly, the areal subdivisions for which the 1954 and 1964 population data were published refer to large, heterogeneous administrative regions. The regions characterized by the largest amount of census information are known as Mutassarrifia. These twenty-eight administrative regions have been used as the basic areal subdivision throughout the thesis. Their names and locations are described in Figure I.

In surveying relations between the two complex sets of demographic and economic changes it is natural to begin with the influence of one set on the other, and then to consider influences operating in the opposite direction. As the economic transition preceded, and in part initiated, the demographic transition in Libya, the economic effects on population are studied in the first part of the thesis. Actual changes in the distribution and composition of the population follow, and are superceded by a study of

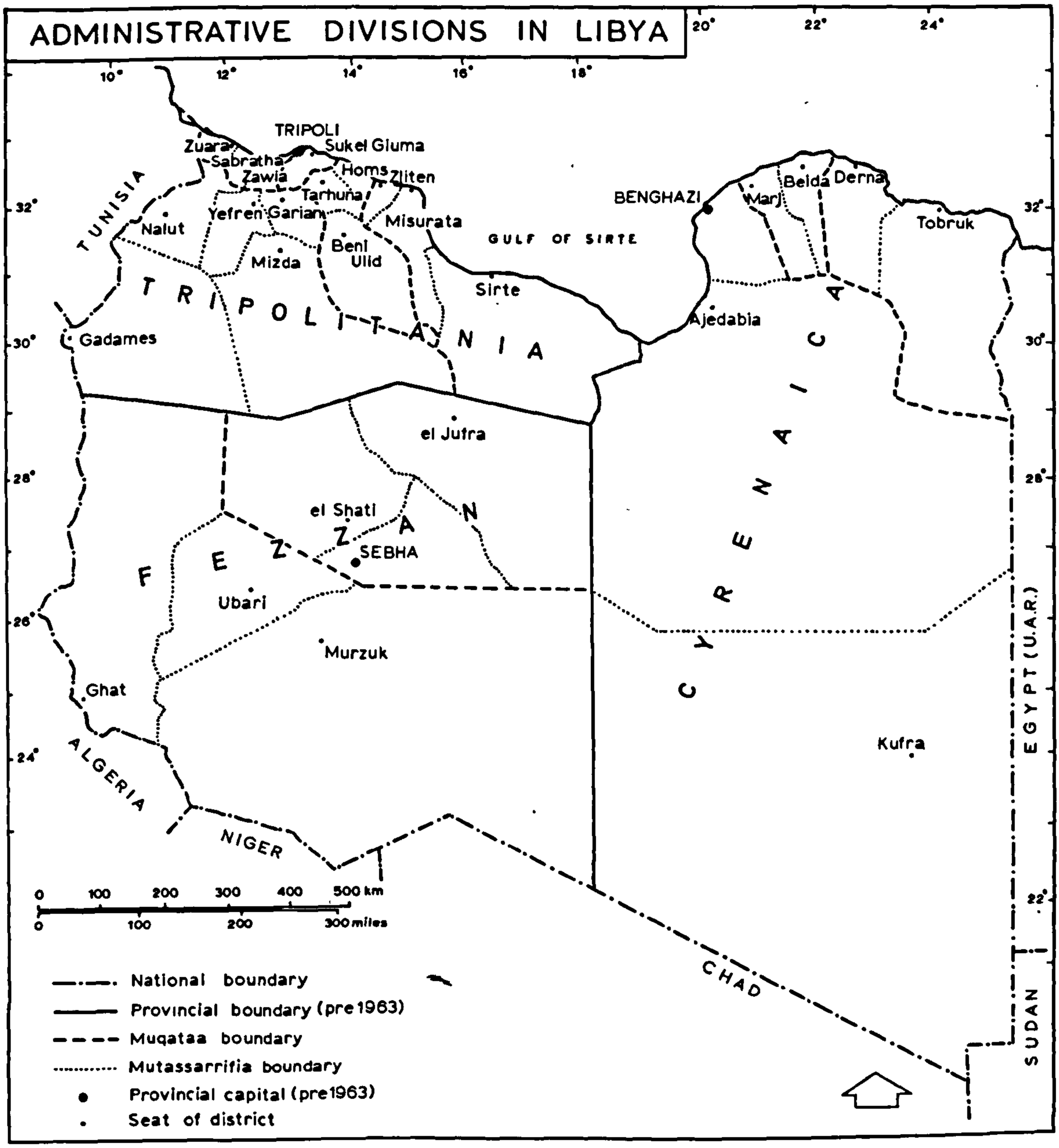

ADMINISTRATIVE DIVISIONS IN LIBYA
10°
12°
14°
16°
18°
20°
22°
24°
32°
30°
28°
26°
24°
TRIPOLI
Zuara
Sabratha
Zawia
Sukel Giuma
Homs
Zliten
Tarhuna
Yefren
Garian
Misurata
Nalut
Mizda
Beni Ulid
GULF OF SIRTE
Sirte
BENGHAZI
Marj
Beida
Derna
Tobruk
Ajedabia
TUNISIA
TRIPOLITANIA
Gadames
el Jufra
el Shati
FEZZAN
SEBHA
Ubari
Murzuk
Ghat
ALGERIA
NIGER
CHAD
CYRENAICA
Kufra
EGYPT (U.A.R.)
SUDAN
0 100 200 300 400 500 km
0 100 200 300 miles
National boundary
Provincial boundary (pre 1963)
Muqataa boundary
Mutassarrifia boundary
Provincial capital (pre 1963)
Seat of district

Figure I

the major demographic determinant of change. In the final part, the demographic effects on present and future economic growth are highlighted.

The thesis has nine major sections. Chapter One provides some historical understanding of the process of economic development. By concentrating on the temporal sequence of economic transition, several non-discrete phases are distinguished, the most recent being the economic duality identified in the model of economic change. Chapter Two objectively analyses the demographic and economic systems operating in Libya, and gives regional precision to the erosion of the traditional socio-economic system. Chapter Three elaborates the numerical changes and determinants of population distribution, particularly of the rural population during the period of rapid economic growth. Chapter Four concentrates on the process of urbanization which increasingly dominates the pattern of population distribution, and which appears to be the main line of penetration of the modern economic sector into the traditional socio-economic system. Changes in two central indices of population composition - age and sex structures - are analysed in Chapter Five. This analysis hints at the significance of internal migration as a demographic process operating in the incipient stages of economic growth. This process is identified and elaborated in Chapter Six. The last two chapters study two implications of the demographic transition in Libya. Chapter Seven identifies the country's manpower problems, noting that the actual work force is approaching the potential supply of labour, thereby setting limits to future economic growth. The final chapter, Eight, analyses the principal demographic variables of mortality, fertility and migration noting how the modernization process has influenced their precise changes, and how in turn, changes in the demographic variables will influence further

economic growth. The concluding section examines the demographic-economic relations of Libya in the context of a model of transition developed for other countries experiencing rapid demographic and economic transformation.

CHAPTER I

STAGES OF GROWTH AND DUALITY IN THE LIBYAN ECONOMY

Historical perspective is one of the best safeguards against taking a superficial view of Libya's development problems. If the variety, complexity, and pervasiveness of these problems is to be fully appreciated then historical dimension must be comprehended. This chapter therefore attempts to provide some historical understanding of the process of Libya's development.

It does so by focusing upon Professor Rostow's provocative application of a stage approach to the course of development.[1] By this method Libya's pattern of growth and the strategic factors initiating this growth can be placed in a broader context, thereby concentrating on the country's particular uniqueness and uniformity.

The following hypothesis is explored: that the process of Libyan economic growth can be regarded as centering on a relatively brief time interval of two or three decades when the economy and society of which it is a part transform themselves in such ways that an urban-rural dichotomy results from sustained economic growth. The hypothesis contains two interrelated elements, a process of rapid economic growth, and a consequent adaptation of the socio-economic system.

Professor Rostow's grand historical thesis attempted a much broader analysis by generalizing the sweep of modern economic history. Its basic theory of dynamic production, however, emphasizes the composition of investment and the growth of particular sectors in the economy which are relevant to Libya's situation.

It is believed that, at any given period of time, leading sectors are instrumental in propelling the economy forward through a series of growth stages. The most relevant of Rostow's five stages of growth for poor countries are the first three - the "traditional society", the emergence of "the preconditions for take-off", and the "take-off". The take-off is meant to be the central notion in the scheme; a decisive transformation whereby the economy attains a self-sustaining growth.

Libya has experienced at least the first two phases of the temporal sequence of transition, and with the recent economic development based on oil exploitation may be entering a sustained period of growth associated with the "take-off" phase. Precise definition of the early phases, however, is more difficult to determine. As an approximation, the period prior to the Italian colonization in the 1920's contains many of the elements of the "traditional society", while five years of actual oil exploitation mark the beginning of a period of self sustained growth. The intervening phase of Italian occupation, World War II, achievement of independence and receipt of foreign aid, provided essential preconditioning factors for more persistent economic growth.

1.1 Traditional Society

Little documentary evidence is available to permit a quantitative study of the economic and demographic conditions prevailing in pre - 1920 Libya. Nevertheless, certain geographic characteristics have remained fundamentally significant for several decades in the region's history. In essence, Libya was a zone of transition having strong connections with neighbouring areas.

The northern coastlands formed a junction between the Mediterranean north and the continental Saharan interior. Besides this, the coastlands were an east-west routeway. A few Berber-speaking areas in the west indicate a now reduced, but once important ethnic affinity with north-west Africa; and commercially, eastern Libya had traditional ties with Egypt.

While the influx of Arabs from the east permeated the country with a common culture and faith between the 6th and 13th centuries, there remained a significant degree of regional distinctiveness. North-west Libya, known as Tripolitania, was first colonized by the Phoenicians, while the north-east, known as Cyrenaica, was influenced by the Greeks. Though both areas subsequently became part of the Roman Empire during the 1st century B.C. they continued to evolve separately. In contrast to both northern zones, the southern interior, known today as the Fezzan, evolved its own cultural characteristics associated more with West Africa.

Although climatic extremes have intensified since Neolithic times, it was not a harsh physical environment which retarded sustained economic growth. In fact certain evidence suggests periods of genuine prosperity. During the era of Roman occupation, for instance, careful use of water resources together with an assured export market stimulated agricultural expansion. It is believed that the northern coastal areas supported a population of at least one million persons,[2] of which at least a fifth was concentrated in coastal towns.[3] Basically, the cycles of growth and decline were associated with the nature of foreign settlement and the use of local resources. Much of the foreign settlement was concentrated in coastal towns while the domestic resources were controlled by rebellious tribal groups in the interior.

With the influx of Arab invaders in the 11th century A.D. settled agriculture declined and the major coastal towns remained only as isolated commercial centres depending on piracy and the Saharan caravan trade, particularly slave trading. Although provincial administration was attempted from the coastal towns, it was not until the middle of the 19th century that the Turks succeeded in maintaining a semblance of order. A general improvement in the economy followed the establishment of a more stable form of government. The country seemed self-supporting in cereals, exporting in good years, though importing in bad ones. Trade was developed through the export of livestock, animal produce, citrus and dates, while a flourishing handloom industry was created in the towns.

The common characteristics which Rostow assigned to this stage probably occurred in pre-1920 Libya. The area and volume of trade fluctuated with the degree of social and political disturbance, the efficiency of capital rule and transport links. Handicraft industries developed, but because of the ceiling on production a high proportion of the country's resources were devoted to agriculture. The size of the population and the standard of living undoubtedly rose and fell not only with the sequence of harvests but with the incidence of war and plague. With high stable fertility and mortality patterns in both urban and rural areas, the main determinants of population change were excessive mortality through disease and war, and migration. But to group the variety of social and economic conditions of pre-modern Libya into one stage is an heroic oversimplification. The combination of characteristics in the "traditional society" are not unique to that stage.

What was apparent, however, was the existence of an urban-rural dichotomy throughout the varied history. Although the population of urban centres had declined from an estimated ±200,000 in the Roman era to 50,000 in Turkish times[4] their functions had remained similar. The towns continued to serve as the loci of foreign settlement, as central places for a very circumscribed hinterland, and as break-in-bulk points for trans-Saharan trade and agricultural exports. The rural areas remained essentially backward, with peasant agriculture near the coast and nomadic tribes inland; but they remained essentially free from urban dominance.

1.2 Preconditions for Take-Off

The second stage of growth embraces societies in the process of transition when the preconditions for take-off are developed. The transition, according to Rostow, has many dimensions. A predominantly agricultural society must shift to a predominance of industry, communications, trade, and services. Self-sufficient regions must be orientated more to a modern money economy. Increasing specialization must replace traditional family, class or guild systems. A redistribution of income must favour necessary long term capital investment. A decline in mortality must be paralleled by a decline in the need for unskilled farm labour. Above all there must be an increasing ability to manipulate the physical environment for the country's benefit.

The value of this section lies not so much in the identification and isolation of each necessary precondition factor, but rather in analysing the consequences of three historical phases of change: the Italian occupation, World War II and its aftermath, and independence and foreign aid.

In each case the preconditions arose, not endogenously, but from some external intrusion, hastening the breakdown of the traditional society and setting in motion new or intensified ideas and sentiments.

1.2.1 Italian Occupation 1911 - 1943

For the first time in Libyan history a foreign minority succeeded in dominating the whole country. In doing so it aroused strong hostility, particularly among the nomadic groups, and nationalistic feeling, which culminated in political independence in 1951. The Italian occupation and colonization also extended what had been urban values and objective methods into rural areas, partly by mobilizing capital investment outside the towns and partly by establishing a foreign class of peasant workers. The chain reaction of responses to these stimuli enabled the country to progress, in some respects, and to stagnate in others. Still the impacts set in motion a process necessary for later economic development.

1911 - 22 Italy attempted to occupy Libya in 1911 after declaring war on Turkey. After a one year struggle Turkey withdrew her troops and Italy proclaimed absolute sovereignty over Libya. Effective control, however, was delayed by Italy's preoccupation with World War I and by strong resistance from the Libyan tribes who were unwilling to condone permanent occupation of their territory. Thus in the first phase of occupation the tribal structure remained intact as a parochial unit of social and economic activity. The towns became the embryonic nuclei of effective Italian power, but as transport between the towns increased, so the influence of central rule advanced into rural areas.

1923 - 28 The protracted nature of the war and the acrimony which had inevitably worsened Italian-Arab relations led to a hardening of attitude towards the Libyans by the Italians. Tripolitania was the first province to be subdued. The removal of the Turkish administration heralded a relaxation of enforced taxation while the lack of cohesive tribal groups made opposition ineffective. But the strength of Cyrenaican tribes, together with the leadership of the Sanusi religious sect, combined to provide a major obstacle to Italian control. Depletion of the tribes through continued warfare and the removal of tribal leadership through insidious slaughtering of petty sheikhs weakened the tribal structure[5]. This created an uneasy peace in which development activities gathered momentum.

1929 - 43 Following the rise of fascist nationalism in Italy, Libya was regarded as a potential outlet for the Italian economy and a justification for their claim to world power status. Plans for colonizing Italian peasants were achieved through the application of great amounts of capital to the problems of development; $150 million (at pre-1940 rates of exchange) is estimated to have been spent on public works, utilities and agricultural development during the thirty years of Italian administration.[6] Most of the investment up to 1935 was directed towards the construction of railways, roads, ports and public buildings. In the latter phase of investment, between 1935-43, expenditure was concentrated on the reclamation of the steppe lands for private and "Demographic" settlement by immigrant Italians.[7] Both the necessary survey work and the infrastructure investments provided Libya with its first essential precondition elements.

Yet the Libyans paid a heavy price for their inter-war economic growth. The protracted war and acquisition of 15 per cent of the total productive land in northern Libya indirectly initiated new demographic responses. Between 1922-40 some 40,000 Libyans are estimated to have migrated to Egypt, Tunisia and the Sudan. Part of the vacuum was filled by the 140,000 Italian immigrants who entered Libya before 1940[8] This net population growth was concentrated mainly in the coastal towns of Tripoli and Benghazi. Initially, skilled labour from Italy sufficed the manpower needs and was added to the existing ethnic and religious elements in the urban areas. Turkish-Berber peoples, known as Cologhli, together with negro remnants of slaving and Jewish artisans, formed the bulk of the urban population in 1911[9] and 1931. With the growth of the Italian development schemes, Libyans were increasingly valued as a workforce. 30,000 are thought to have migrated to the urban centres between 1914-40. On the other hand, agriculture still dominated their occupational structure, accounting for three-quarters of economically active Libyans in 1936.[10]

Despite probable errors in the two population enumerations of 1931 and 1936,[11] it appears that the basic features of the 1954 pattern of population distribution, composition and growth were apparent during the Italian occupation (Table 1.1). Annual growth rates of 2.3 per cent between 1931 and 1936 were comparable with those between 1936 and 1954, but different variables accounted for the growth. High fertility and mortality levels during the 1930's indicated that migration was the major determinant of population growth. A crude fertility rate of 683 children under 5 years of age per 1000 women aged 15 - 49 years reflected higher levels than Egypt

or Algeria. Early marriage and a low proportion of single women onntributed to the high fertility among Moslem women. Despite efforts by the Italians to improve urban sanitary and medical facilities, Libyan mortality rates probably remained high. In Egypt, for instance, crude mortality rates of 35 per 1000 inhabitants were common, despite some reduction during the 1930's.[12] Assuming that Egyption rates reflected minimum conditions in Libya, a net annual increase of between 0.5 and 1.0 per centoccurred. This rate of natural increase was also suggested by a crude estimate of the replacement per generation.[13]

Demographically, therefore, the Italian phase of occupation did not initiate the radical decline in mortality rates associated with this stage of preconditions for take-off. Instead, it initiated a redistribution of the population in both geographical and occupational terms. Inevitably, this was reflected in a growing urban-rural dichotomy. Economically, too, changes initiated by the Italians had an indirect rather than direct effect on the traditional economy. The Libyans themselves were unable to mobilize their own resources to benefit. from the increasing demand for North African products. It was the investment of capital and the socio-political implications of the colonization which set in motion economic changes. Of these infrastructure investments and political awareness were the two key elements. Even at pre-1940 prices, the financial investments by the Italians were far in excess of any previous injection of capital. They were also particularly important because they were directed to some of the peculiar Libyan problems; notably, extension of the agricultural area by land reclamation, long term investments in water conservation, farm buildings and equipment, extension of communications to serve rural areas, and investments in necessary social amenities.

TABLE 1.1.

SELECTED MEASURES OF POPULATION DISTRIBUTION, COMPOSITION AND GROWTH, 1936-64

Measures of the Libyan Citizen Population		1936	1954	1964
1.	Total Libyan population	732,973	1,041,599	1,505,501
2.	Annual rate of increase 1936-64	2.3	3.7	
3.	Per cent of population resident in Tripoli and Benghazi	17.0	16.0	20.1
4.	Per cent of population classified "settled"	85.0	74.0	78.1
5.	Sex Ratio (males per 1000 females)	1075	1078	1081
6.	Age Groups: (a) per cent aged under 15 years	40.0	38.5	44.0
	(b) per cent aged 15-59 years	51.2	52.0	48.7
	(c) per cent aged over 60 years	8.8	9.5	7.3
7.	Per cent of population (aged 15 years and over) married (male and female)	71.7	63.7	74.1
8.	Per cent of population (aged 10 years and over) engaged in agriculture	73.9	68.3	40.0
9.	Per cent of population (aged 10 years and over) engaged in service activities.	12.1	23.9	
10.	Aliens as a per cent of total population	15.8	4.3	3.1
11.	Fertility ratio (children under 5 years per 1000 women aged 15-49 years)	683	678	880

Sources:
(a) Pan, C.L. "The Population of Libya" Population Studies, III, (1949), pp.100-125
(b) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959).
(c) Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966)

Measured in actual material benefits, the Libyans gained little at the time. Extension of the agricultural area was partly at the expense of tribal grazing lands,[14] while social investments in hospitals and schools catered mainly for Italians; so too did the Italian "Demographic" and "Concession" farms. Nevertheless, the Cyrenaican colonization schemes were abandoned before they offered a profitable return and Libya did not experience a heavy drain on its own resources. Moreover, the large out-migration from Libya relieved the rural areas of a slowly increasing population pressure on a static resource base. As such, external human pressures permanently achieved what the environment had been forcing upon the indigenous population from time to time. The initiation of significant internal migrations implied that migration was a necessary response to a disturbed economic and social equilibrium.

Although Rostow's dynamic production theory has little relevance to the traditional economy under the Italians, the non-economic pre-condition factors have certain relevance. Without the affront to the Arab dignity caused by the intrusion of the Italians, the rate of modernization may well have been slower. In Cyrenaica, at least, local interests coalesced against a common enemy. Despite the eventual breakdown of the tribal structure in the coastal areas, a common feeling of resentment under the leadership of the Sanusi religious movement was effected. The Italian attempt to use traditional social structures in Tripolitania as an administrative basis created, in part, inter-provincial disdain and distrust. This dichotomy of provincial interests helped to determine the nature of independence in 1951, and still remains a potent force in political and economic life.

1.2.2 Post-War Administration 1943-51

With the British and French occupation of Libya in 1943 the period of fascism in the country came to an end. The withdrawal of many Italians and the suspension of the colonization schemes led to a new series of problems each necessitating a different response by the Libyan population and economy.

Control of all administrative departments remained in the hands of British and French officials until 1949. Cyrenaica was the first province to receive a measure of independence when a council of Ministers and an Amir were made responsible for internal matters. Triplitania followed suit two years later. The French executed a similar transfer of responsibility in the Fezzan, though the province had little need for an administrative structure. The change of political fortune from Italian control to Libyan representation took time to percolate to the district level. Consequently, a considerable number of Italians remained employed in higher technical positions, as civil servants, skilled workers and artisans. By 1946 over 40,000 Italians remained in Libya mainly in Tripoli, although some 16,000 were distributed in rural areas.[15]

With the progressive reduction in British personnel, however, an employment vacuum was created. Unlike the inhabitants of most other former colonial territories, Libyans had little experience in self government, even at the level of junior civil servants, and it was not until the transfer of responsibility that they gained a modicum of training and experience. Of the 26,000 Libyans employed by the British, most were engaged in service activities, unskilled labour and clerical work.

A paradoxical situation of urban employment demands and unemployment reflected both the nature of labour opportunities and the type of Libyan labour supply. Employment in which the Libyans had been engaged before the war was rapidly curtailed. Italian colonization schemes, foreign trade and construction work were replaced, in part, by conscription in the Italian army. With the defeat of the Italians and Germans in North Africa not only did many of these Libyans return in search of work, but a wave of refugees followed the advance of the British army through Cyrenaica. This resulted in a sudden rise in Tripolitania's population, particularly in Tripoli town where the population rose 20 per cent between 1938 and 1946. Urban growth was paralleled by an increase in unemployment and crime, caused partly by the control of wage rates by the British in 1943 which failed to keep pace with the rising cost of living.

However, some progress was made in necessary social services. The number of schools and pupils doubled between 1943 and 1959. Basic medical facilities for Libyans were introduced in Tripoli, although Benghazi's sanitary and postal facilities were disrupted by bombing. But with the help of three good harvests between 1944 and 1946, grants-in-aid from Britain, a measure of taxation, and a renewal of exports, Tripolitania became practically self-supporting.

The demographic changes between 1936 and 1954 were not marked (Table 1.1). The annual geometric growth rate of population remained at 2.3 per cent. Immigration of Libyans who fled during the Italian occupation may have accounted for a large part of this increase. The slight increase in the proportion aged over 15 years between 1936 and 1954 may indicate this feature. No significant change in the crude

fertility ratio was matched by the maintenance of high mortality rates, particularly infant mortality. The proportion of the total population resident in Tripoli and Benghazi also remained at about 16 per cent. It would seem that rural to urban migration had not developed above the inter-war level, assuming that natural increase had remained similar in both urban and rural areas.

1.2.3 Independence and Foreign Aid 1951-63

Once it was decided to have a state of Libya, comprising the three provinces of Tripolitania, Cyrenaica and the Fezzan, a federal solution was politically inevitable. Not that Libya's independence was a foregone conclusion. The rivalry of the three provinces, symptomatic of the different historical, geographical and ethnic backgrounds, resisted all efforts at centralization in order to safeguard provincial autonomy. But a deadlock over the administering authority led the United Nations to overlook the political disputes and economic poverty. In December 1951 Libya was constituted an independent state with Mohamed Idris Al Mahdi Al Sanusi of Cyrenaica as sovereign king.

Internal disputes were matched by external neutrality at a time of intense post-war nationalism, anti-colonial ferment, and unrest. Libya was not obliged to fight its way to independence and was in fact materially assisted both by the administering authorities and by the United Nations. Despite the Sanusi struggle against Italian occupation between 1911 and 1935, the country as a whole had no background of nationalism or patriotic psychology, a considerable factor in the disunity of the state.[16] While united in opposition to a return to Italian rule, the various Libyan representatives to the United Nations General Assembly in 1951 were much less of one mind about the conditions under which Libya should achieve independence.[17]

In an attempt to balance regional differences the constitution finally provided for a parliament consisting of a Senate and House of Representatives, the former maintaining the principle of equal representation for the three provinces and the latter introducing the principle of representation based on population. The existence of a federal structure, with three provincial governments, a central government, and two capitals, made it necessary to have more than thirty government departments. Quadruplication of administrative functions was particularly difficult to support in a country with a population of only one million inhabitants with no institutions ordinarily inherent to a functioning national administration. There were no social security, civil service or audit laws. Lack of a statistical bureau meant that the first parliament was constituted on the basis of proportions used by the Turkish population enumerations of 1911. But the most acute problem facing the new state was the question of finance.

Just as the political decision to form an independent Libya was initiated in the United Nations, so the post-independence economic growth depended primarily on external aid. International responsibility towards the country resulted in a series of bilateral agreements and multilateral aid. An expanded programme of technical assistance, for instance, was provided by the United Nations, its specialized agencies and member countries. The total value of all grants and loans from these sources rose three times to £L 13 million between 1952 - 58.[18] But from 1956 expenditure by companies searching for oil provided the bulk of the revenue on which the increasing imports depended (Fig. 1. 1). The Petroleum Law of 1955 necessitated the surrender of 25 per cent of the concession areas after five years. Fragmentation of concession holdings stimulated rapid oil exploitation and increased revenues to the federal

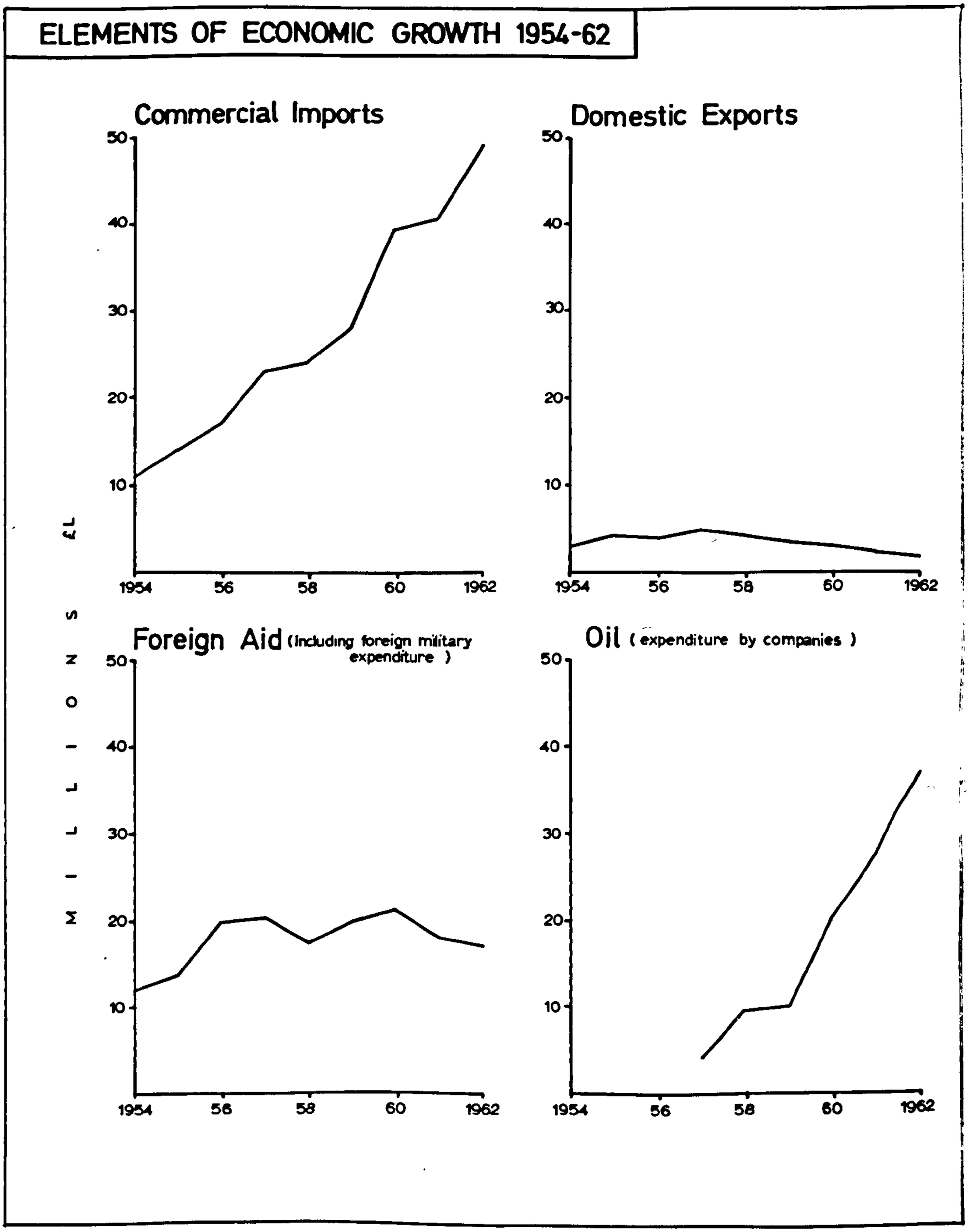

ELEMENTS OF ECONOMIC GROWTH 1954-62
Commercial Imports
Domestic Exports
Foreign Aid (including foreign military expenditure)
Oil (expenditure by companies)
MILLIONS £L
50
40
30
20
10
1954
56
58
60
1962

Figure 1.1

government. Local expenditure by the companies rose from £L 4 million to £L 45 million between 1957-62.[19] Most of the expenditure represented purchases of imported goods supplied through Libyan contractors, although about £L 2 million were paid to Libyan employees in wages and salaries. In addition, companies brought large quantities of supplies and equipment into Libya on their own accounts. Total external revenues to Libya between 1952 and 1962 are estimated to have been at least three times the amount invested in Libya by the Italians during the 1930's. Since 1955, therefore, the main factors affecting the monetary expansion in the country were the net inflow of foreign assets and the rapid increase in public expenditure, followed by credit expansion in the private sector.

The modern sector of the economy undoubtedly benefited from the external sources of income which supplied revenue for imports (Fig.1.1). By 1958 over half the gross domestic product was derived from the tertiary sector.[20] The Libyans who benefited most were the merchants and shopkeepers, building contractors, employees of foreign governments, hotel proprietors, taxi and truck drivers, waiters, domestic servants, and Libyan government employees. This varied group of occupations probably provided a living for 100,000 Libyans in 1959,[21] over three times the estimated level in 1946.[22]

However, economic viability was not purely a balance of payments surplus. While gross domestic product rose three times between 1950-58, only a quarter of the 1958 product was derived from agriculture. It was in this sector that nearly three-quarters of the economically active were still involved. The farmers, pastoralists and agricultural workers benefited little at first. Difficulties in finding markets for Libyan produce were aggravated by the large flow of imports financed out of foreign aid and grants, including gift wheat and subsidized flour. In 1957 and 1958

roughly one quarter of the goods imported consisted of food products that could have been produced in Libya. Some progress was made in domestic production; for instance, in the cultivation of groundnuts, in the growth of olive oil production, and in the cultivation of new potatoes and other winter vegetables. However, these were market-orientated commercial concerns, run mainly on large farms by Italian and foreign merchants.

The failure of the agricultural sector of the economy reflected the inherent difficulties of promoting balanced economic development rather than particular failings in the nature of foreign aid. Much of the initial financial effort had to be directed towards making good the neglect of education and training under the pre-war administration. In fact, more was spent on the social services than on promoting economic activities in 1954. In education, for instance, enrolment in elementary schools doubled between 1951-56 and in preparatory and secondary schools the increase was five-fold.[23] The repairing of physical war damage to the infrastructure, particularly harbours, roads and sanitary amenities, necessitated long term investments with little chance of a quick economic return. Moreover, the large size of the country, the wide scatter of population, and the poverty of its natural resources made heavy expenditure on internal transport and communications a political and economic requisite.

Other reasons for the slow success of the investment schemes were the administrative and institutional bottlenecks, the large turn-over of foreign experts, the lack of co-ordination between the various agencies, and the tendency to award contracts to Libyan nationals rather than to competitive international bidding. This last factor gave some

impetus to the growth of local entrepreneurial ability and private investment, although the Libyan people generally lacked a sense of identity with the development activities of the international agencies.

In large part, the regional distribution of the aid favoured the urban areas. Tripoli received two-thirds and Benghazi three-quarters of their provincial expenditures, which together made up one-third of Libya's domestic revenue in 1958.[24] Indirect economic growth based on imports was also concentrated at the break-in-bulk points on the coast. Until Benghazi's harbour was adequately repaired Tripoli thrived. Growth was concentrated in the wholesale and retail trading, personal services, building and construction, transport and particularly government service. But the greatest contrast remained between the modern and traditional sectors of the economy, which, in spite of Benghazi's slow post-war expansion, was reflected essentially in an urban-rural distintiveness.

Radical changes in production techniques had not percolated the traditional economy, nor had the social structure transformed itself But the processes initiated mainly by the Italians were given a further impetus during the period of independence and foreign aid. Per capita income rose four times between 1951 and 1961, though real wealth remained unevenly distributed. However, there were indications of rising levels of consumption, particularly of cereals and sugar and more expensive foods. Free medical services were available for those within reach of a hospital or dispensary, and free schooling, usually including a daily meal, formed the basis of a physically healthier society. For the new generation, at least, the prospect of rising standards of living were not illusionary.

1.3 Take-Off 1963-68

Some six years after Libya's initial entry into the petroleum export market (in late 1961), it now occupies seventh position as a world exporter. Stimulated by the rapid pace of oil development, gross domestic product rose from a 1958 level of £L 52 million to an estimated £L 475 million in 1966.[25] The suddenness of the growth after a period of relatively slow economic expansion based on foreign aid, fulfilled certain of the mechanisms of Rostow's take-off period. The rate of productive investment is now well above the ten per cent of national income stipulated for this phase. Tertiary activities have emerged as the fastest growing economic sector, while secondary activities showed some expansion.

Economic changes were accompanied by a revision of the administrative structure. In 1963 the federation was replaced by a unitary form of government, though the new twenty-eight Mutassarrifia, or districts, were more or less consistent with the old federal pattern.

While the political framework was organized to exploit the impulses of economic growth, the institutional and social restrictions remained. The creation of a new capital, Beida, in Cyrenaica, formed another administrative bottleneck rather than centralizing the existing institutions. Moreover, Libya is no different from other countries in having a number of traditions and customs which stand in the way of economic growth. The system of tribal ownership of land and water rights conflicted with the needs of security and incentives for individual cultivators in settled farming. Political and economic patronage favoured kinship ties rather than individual merit. The low status of women effectively removed half of the potential work-force from the economy. A sense of frustration among the younger generation at the maintenance of what they considered to be out-moded customs showed awakening interests in the possibilities of economic

growth. The exploitation of oil did not provide an easy or a complete solution to these problems.

The Libyan economy had already felt the influence of oil operations through the large expenditures incurred by companies' exploration during the 1950's. But the allocation in 1960 of 70 per cent of the oil revenue for development purposes guaranteed a new scale of investment.

Economic expansion between 1962 and 1966 is summarized in Table 1.2 by a number of indicators.

Table 1.2 Economic Expansion 1962-66

Year	(£L Million) Gross Domestic Product	(£L) Per Capita Share of GDP	State Oil Revenues (£L-Million)	Domestic Imports (£L-Million)	Domestic Exports (excl.) (£L-Million) oil
	(1)	(2)	(3)	(4)	(5)
1962	82	55.8	17	73	2.0
1963	91	60.0	42	85	1.7
1964	334*	213.6	83	104	2.0
1965	408	253.1	116	114	1.7
1966	475	286.3	138	n.a.	n.a.

* Figure suspect;
n.a. not available.

Sources:
(1) (4) (5) Statistical Abstracts of Libya 1964 and 1965
(2) 1954 and 1964 General Population Censuses, linear projection
(3) Seventh, Eighth, Ninth and Tenth Annual Reports of the Board of Directors, National Bank of Libya, 1963, 1964, 1965, and 1966 respectively.

The actual amount available for investment varied with the speed of exploitation, dependent on the physical limitations of production and supply, and on the marketing policies of the Organisation of Petroleum

Exporting Countries (OPEC). Given these limitations the actual Development Budget rose from £L 12.5 million to £L 90.9 million between 1963-66. Allocation of investment has attempted to meet all demands, including the social services and the administrative requirements. In the 1966-67 budget, for instance, only 16 per cent of the expenditure was in the productive sectors of agriculture, industry and the economy.

However, government policy has been unable to check the transformation in the production structure. The already growing tertiary activities indirectly received an added impetus, encouraging a transfer of resources from the traditional economic system. Quantitative analyses in many developing countries suggest that Libya's process of growth is not essentially different from some other Middle Eastern countries. Hypotheses devised by Kuznets[26] and Chenery[27] predict that a nation growing from a per capita level of $100 per annum to a level of $1,000 will, at first, produce more that half its Gross Domestic Product in agriculture, but less than 20 per cent in agriculture at the end of that amount of growth and transformation, The direction and quantitative amount of change in the production structures of 70 countries indicated a "normal" case. While no case is ever precisely "normal" the Kuznets-Chenery standard is helpful in establishing a comparative framework within which Libya's distinctiveness can be measured.

Supporting the hypothesis, there is a theory which relates the structural changes to increases in per capita production levels.[28] It states that the patterns of household, business, and government needs shift in favour of goods and services having their origins in non-agricultural production as per capita income rises. This results from shifts in the pattern of public and private expenditure to increases in

the investment ratio. Simultaneously with the rise in per capita income, productivity increases. This entails an accumulation of factors of production, human skill, and technology which typically alters comparative costs in favour of industrial and service production. The combined effect of changes in demand and costs is a tendency for production to grow most rapidly in industry and least in agriculture. The public investment policies frequently exaggerate these tendencies.

The change in Libya's production structure is related to empirical evidence from other countries in Figure 1.2. The cross-section analysis arrays countries according to the relationship between their level of per capita production and the share of agricultural production. Every Middle East country for which usable data could be found has been included, with all of the customary reservations about the reliability.

Findings of Kuznets (reference points in Fig. 1.2) plotted to form a generalized curve* cast new light on Libya's position and trend in relation to other countries. Historical data for Libya (and also for Egypt and Turkey) indicate that the production structure is becoming less agricultural as per capita income rises, and at a rate comparable to other countries though at a significantly lower level.

---

* Kuznets worked with Net Domestic Product, so his data have been shifted 15 per cent upwards on both axes (Fig. 1.2) to make them comparable with the Gross Domestic Product for the Middle East. A further shift to the right might also be made on account of the upward drift in dollar prices between the dates of Kuznets' estimates (about 1950) and the Middle East estimates (1955-64). If this were done, it would place the reference curve still further above the Middle East data.

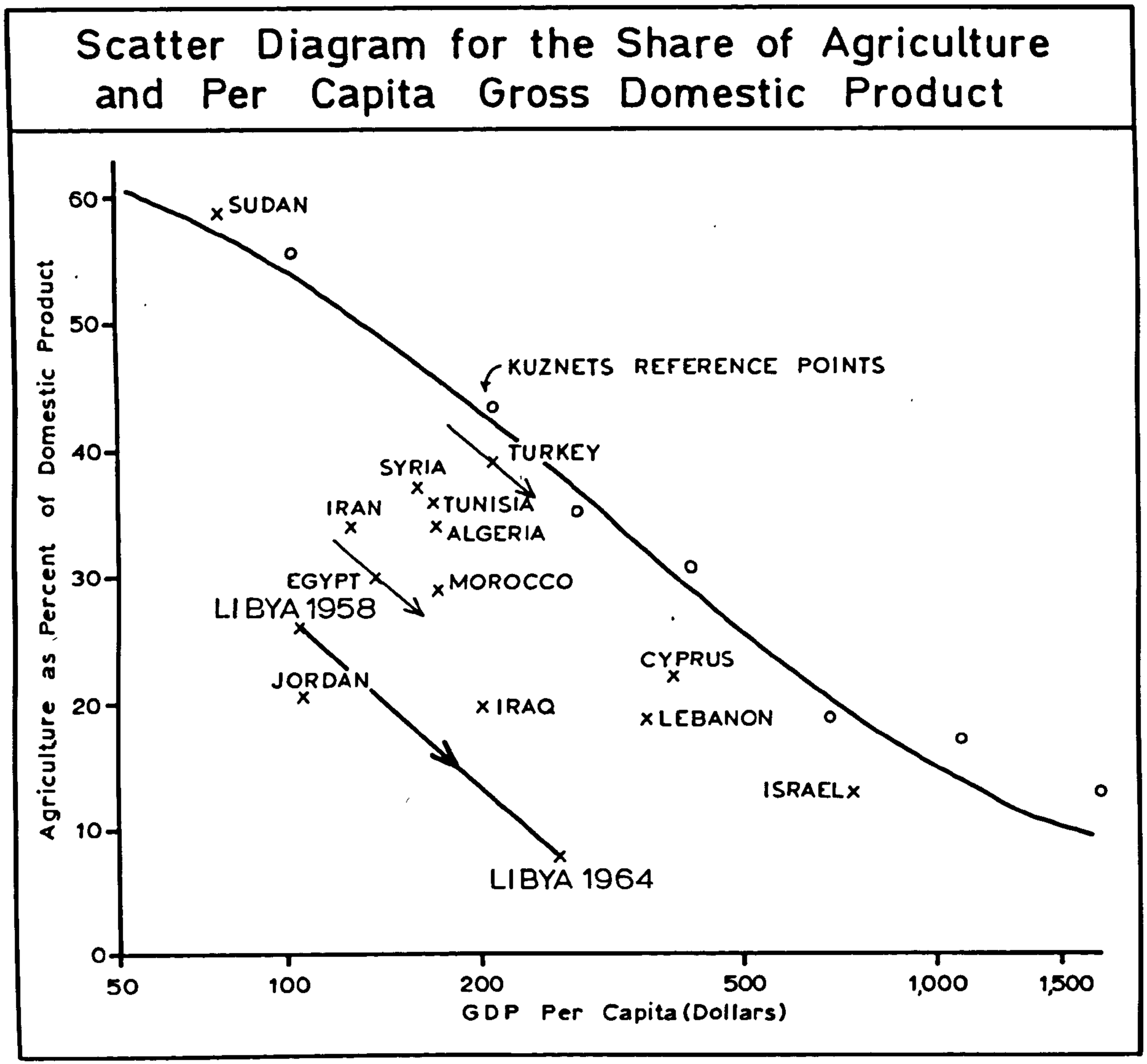

Scatter Diagram for the Share of Agriculture and Per Capita Gross Domestic Product
Agriculture as Percent of Domestic Product
60
50
40
30
20
10
0
SUDAN
KUZNETS REFERENCE POINTS
TURKEY
SYRIA
IRAN
TUNISIA
ALGERIA
EGYPT
MOROCCO
LIBYA 1958
JORDAN
IRAQ
CYPRUS
LEBANON
ISRAEL
LIBYA 1964
50
100
200
500
1,000
1,500
GDP Per Capita (Dollars)

Figure 1.2

Economists approach the problem of increasing specialization in tertiary and secondary production by reasoning that the particular possibilities for production and trade which each economy possesses determine the best possible way in which it can satisfy the effective demands for goods and services placed upon it by the people and the government. If either the possibilities for production and trade or the pattern of demand are unusual, the domestic production structure should deviate correspondingly from "normal"

Both the production and demand possibilities in Libya have been responsible for the "too small" agricultural sector, as in other Middle East countries. Scarcity of rainfall, shortage of water, and soils impoverished by centuries of neglect have set physical limitations to the rapid expansion of agricultural production. These difficulties have caused the incremental cost to be higher relative to alternative costs in other sectors of the economy. However, it has been the extraordinary concentration of oil supplies in Libya which has initiated new production opportunities. Though small in relation to the world economy, the tertiary sector is large in relation to the small-sized Libyan economy. These selected factors suggest that the comparative costs of agricultural and non-agricultural alternatives in Libya, and in the Middle East, make the optimum share of agriculture lower than that of Kuznets' "normal" case.

On the demand side, also, Libya has special characteristics. The large flow of foreign aid after independence initiated a demand in domestic trade and services which could not be met by local factors or production. Oil royalties and other revenues derived from oil production have intensified this process. By expanding development

projects the government has injected vast quantities of purchasing power into the income stream. Although some accumulation of foreign assets has been made by Libyan residents, a good deal has been spent locally to acquire factors of production and final goods and services. Inevitably these have had to be imported. The value of imports doubled between 1961 and 1965, while domestic exports, excluding oil, were 100 times smaller than imports in 1965 (Table 1.2). The import of £L 15 million value of food and livestock in 1965 also tended to substitute local commodity production in the agricultural sector, further suggesting the production emphasis on non-agricultural activities.

A recent report by economists[29] indicated that the relatively free import policy has been effective in reducing the pressure on local prices while satisfying the demand from foreign sources. The economy may have been spared the full impact of this expansion in demand but it has suffered repercussions.

Not every item which the increased purchasing power demanded could be procured abroad. Housing, rents, land and construction could only be satisfied by local domestic production and the pressure of demand has stimulated the expansion of production capacities. However, labour is now in particularly short supply. The inelastic supply has not been limited to the skilled labour categories, but is now extending critically into semi- and unskilled labour. A closed-door policy of labour importation coupled with traditional attitudes to female employment must result in price rises.

Although labour imports from abroad (particularly Morocco, the Lebanon and Yugoslavia) have brought economic relief on a limited scale, the import of finished products has had a more important side

effect. Imports of ready-made clothes, tinned milk and vegetables, and other items of demand in a highly finished state has discouraged the formation in Libya of a useful category of artisans. Under the impact of the rising volume of imports and the maximization of port handling capacities, even the import of goods cannot sidestep inflation in Libya.

In the Libyan context the government development programme is especially vulnerable to inflation.[30] Theoretically, as prices rise, larger expenditures are required to achieve the goals of a non-expanded programme. In a closed economy, inflationary induced rises in government expenditures would be wholly offset by a rise in government revenues leading merely to a redistribution of income. No compensatory balancing of expenditures and receipts can be expected in Libya. Government revenues are primarily derived from oil tax and royalty payments which are based on prices obtaining in the international market. These prices will not be influenced by local inflationary pressures. Consequently, inflation only affects the expenditure side of the government budget.

While oil exploitation and its consequences have affected the economy as a whole, the distribution of the oil resources have created particular regional problems. Initial finds at Atshan in the Fezzan stimulated hope for the development of this remote and sparsely peopled region. With the shift of commercial finds to the area south of the Gulf of Sirte, however, the question of provincial revenues became important. It was decided by the law of May 1960 to assign 70 per cent of the revenues from oil royalties to the Development Council for social and economic development on a national scale. The remaining 30 per cent was equally divided between the federal government and the province in question to be used for internal use. In this

way federal powers were augmented at the expense of constant provincial rivalry. This process of centralization was intensified after unification in 1963. Since then, the oil-rich Gulf of Sirte has become more a focus of national interest than a source of provincial diffraction.

Despite the quasi-concentration of oil resources in the zone between the three provinces, the geographical locus of production became increasingly compact, and manpower, families, and institutions were drawn into an urban framework. Possibly more than most forms of external stimulus, the oil industry has had little direct contact with the traditional economy. Not only are the industry's labour requirements small, but the oil exploitation takes place geographically outside the traditional economy. The urban nuclei of Tripoli and Benghazi not only became the administrative centres of the oil industry, but more important they became the receiving centres for the indirect benefits of oil revenues. As trade, transport and services activities grew in conjunction with imports, it was inevitable that the major ports and domestic markets should become the foci of the modern sector.

Geographical and occupational mobility have been the primary demographic response to the economic opportunities. In some respects, seasonal and temporary migrations had been a natural reaction to the vicissitudes of a harsh physical environment for many years. But the stimulus of new occupational opportunities produced a new form of migration, longer and more permanent than before. The international movements initiated by the Italians in the 1930's, were replaced by a rural-urban drift and a change from the agricultural to the tertiary and

secondary sectors. The chain reaction of secondary demographic responses, particularly social and educational characteristics of the population, have also begun to take effect. Despite the time lag in the process of demographic change, the tempo is quickening. This speed of change has in part left the traditional sector intact, while allowing a transformation of the modern sector in an urban framework.

1.4 Conclusion

The economic characteristics and processes have been analysed in some depth because they have been the main stimuli to social, cultural and political changes. Essentially, the economic changes have themselves been promoted from external sources. The implications of a long history of foreign rule were highlighted by the Italian occupation of Libya during the 1930's and by the British and French administrations in the immediate post-war period. The removal of foreign rule in 1951 was replaced by dependency on foreign aid and grants. Financial viability in 1963 freed Libya of foreign bounty but the international significance of the new oil wealth has once more involved the country in wider political and economic interests.

Against this background of foreign influence, which has shaped and exploited the country's development on a national scale, local problems and conditions have influenced the rate and nature of change. Four factors have been of particular significance.[31] First, the Libyans have lacked the capacity to direct and finance their own economic development. Entrepreneurial talent in growth sectors of the economy has been provided by the Turkish, Italian, Jewish, British and French, and recently by the American oil company officials. If the Libyans are to control a balanced and continuing development, the wealthy must learn to accept lower interest rates and the increasing group of middle-income Libyans must learn to invest savings, deposits and securities.

Secondly, the manpower problem has emerged as a serious restraint on continued non-inflationary economic growth. Inadequate skill and low productivity have been in part caused by foreign dominance, lack of education, and lack of specialized work; even on a small scale. Government policy encouraging Libyanization and restricting labour imports may intensify the problem of insufficient quality by insufficient quantity.

Thirdly, Libya faces a problem of incentive. Climatic and political fluctuations have continually encouraged the Libyans to take the short term view. Lack of education, lack of foresight, and foreign dominance may have added to the Libyan social behaviour an attitude inimical to progress. The strength of tribal organization in Cyrenaica has also tended to encourage provincial rivalry and conflicting values.

Finally, there is the problem of scale. In simple terms, the most efficient scale of operations for many types of undertaking is so large as to require mass production for its effective use. In a country of 680,000 square miles the scattering of one and a half million persons presents grave difficulties of production and supply. Large capital investments in plant and equipment are necessary on a long term basis with little chance of an early economic return on capital invested. Moreover, a large proportion of the public investment must be concentrated in the most productive and populated areas. With the difficulty of extending the agricultural or habitable area, these investment resources will inevitably widen the gulf between the developing and stagnant sectors of the economy.

The pithy maxim "growth breeds growth; stagnation breeds stagnation" may be true in Libya in a general sense. Once the vicious circle of poverty has been broken into by the precondition factors, a process of economic accretion continued. The Libyan example shows that regional disparities widened within the context of a national economic resurgence. As such, the economy as a whole has probably not achieved the self-sustained and balanced growth stipulated by Rostow. Instead, certain features of an expanding economy have been identified in the modern economic sector, though many of the traditional restraints remain. In particular, provincial differences have been paralleled by an urban-rural dichotomy. Both problems reflect the superimposition of a modern socio-economic system on a traditional system carefully adapted to its own environment. The regional delimitation of both these systems and their interrelations form the basis of Chapter II.

References

1. Rostow, W. W. The Stages of Economic Growth, Cambridge University Press, (1960).

2. Goodchild, R. G. "The Decline of Libyan Agriculture", Geographical Magazine, Vol.25, No.3, (July 1952), p.148.

3. Jusatz, H. J. (ed.) Libyen-Libya, Springer-Verlag, Berlin, (1967), p.106.

4. ibid, p.108.

5. Evans-Pritchard, E. E. The Sanusi of Cyrenaica, Clarendon Press, Oxford, (1949), p.194.

6. International Bank for Reconstruction and Development (IBRD) The Economic Development of Libya, Johns Hopkins Press, Baltimore, (1960), p.27.

7. Falchi, N. "Le peuplement rural des provinces Libiques" Le Travail Agricole International Review, Vol.2, Rome, (1939), pp.80-98.

8. Pan, C. L. "The Population of Libya", Population Studies Vol.3, No.1, (1949), p.114.

9. Agostini, E. di. Le popolazioni della Tripolitania. Notizie etniche e storiche, Governo della Tripolitania, Tripoli, Vol. 2, (1917).

10. Pan, C.L. op.cit., p.123.

11. Italy. Istituto Centrale di Statistica VIII Censimento generale della popolazione, 21 aprile 1936, Vol.5, Rome, (1939).

12. Kiser, L. "The Demographic Position of Egypt", in Milbank Memorial Fund, Demographic Studies in Selected Areas of Rapid Growth, New York (1944), p.116.

13. Pan, C. L. op. cit., p.110.

14. McLachlan, K. A geographical study of the coastal zone between Home and Misurata, Tripolitania; A geography of economic growth, Ph.D. thesis, University of Durham, (1961), p.302.

15. British Military Administration. Handbook on Tripolitania, Tripoli, (1947), p.77.

16. Lockwood, A. N. "Libya - building a desert economy" International Conciliation, No. 512, (1957), p.322.

17. Carpenter, B. R. "Libya. A United Nations Experiment", Focus, Vol. 6, No. 2, (1955).

18. I.B.R.D. op. cit., p.347.

19. Foreign Service Despatch, U.S. Embassy. Quarterly Economic Survey, Tripoli, (1963), p.7.

20. Ministry of National Economy, Libya. National Income Estimates 1958, Tripoli, (1959), p.5.

21. I.B.R.D. op. cit., p.34.

22. British Military Administration. op. cit., p. 87.

23. Lockwood, A. N. op. cit., p.359.

24. United Nations. Report on Income Tax, and Tax on buildings A/AC. 32/TA25, Rome, (1955).

25. Foreign Service Despatch, U.S. Embassy. Quarterly Economic Survey, Tripoli, (1966), p.7.

26. Kuznets, S. "Quantitative Aspects of the Economic Growth of Nations. II. Industrial Distribution of National Product and Labour Force", Economic Development and Cultural Change, Vol. 5, No. 4, (July 1957).

27. Chenery, H. B. "Patterns of Industrial Growth", American Economic Review, Vol.lOO, No. 4, (September 1960), pp.624-54.

28. Shorter, F. C. "The application of development hypotheses in Middle Eastern Studies", Economic Development and Cultural Change, Vol.14, No. 3, (April 1966), pp. 340-55.

29. Economist Intelligence Unit. The Price Control System in Libya; A Critical Analysis, London, (February 1965).

30. The Economic Research Department of the National Bank of Libya. Inflation in Libya, Tripoli, (March 1961).

31. Higgins, B. Economic Development: problems, principles and policies, New York, (1959), pp. 30-37.

CHAPTER II

DEMOGRAPHIC REGIONS IN LIBYA: A PRINCIPAL COMPONENTS ANALYSIS OF ECONOMIC AND DEMOGRAPHIC VARIABLES

The aim of this chapter is to analyse objectively the paradox of internal contrasts and overall unity identified in Chapter I. In doing so, it is hypothesized that having evolved to this stage of economic development the Libyan regions are beginning to form a system "comprising entities of interacting, interdependent parts".[1]

Before the Italian occupation in the 1920's the interconnections between the various parts of Libya were tenuous. Provincial distinctiveness was influenced by a complex of historical and geographical factors, but the provinces tended to have more in common with neighbouring countries than with other Libyan regions. The country consisted of a mosaic of discontinuous, better watered and settled territory, scattered in wide expanses of arid or semi-arid land. Even the various phases of foreign dominance failed to incorporate these independent units into a unified whole. But the dual impetus of political independence and oil exploitation has improved the efficiency of the system. Independence necessitated central responsibility, common policy and better communications. Discoveries of oil in the desert area of Sirte, situated between the three provinces, has refocused attention within Libya itself, and has given the country the necessary wealth and identity to function as one unit.

To determine the critical properties of Libya's socio-economic system is the crux of this section; to discover the dimensions of

variation along which Libyan regions can be arrayed and to probe some of the processes of the erosion of the traditional sector by the modern economy. By high-lighting the significant demographic elements and by relating them to economic conditions it is possible (a) to identify the regional response to the development processes operating in Libya, and (b) to hypothesize about certain factors generating these changes and the consequent chain-reaction of effects.

(a) Certain features of the present system have already been hinted at in the historical survey of Libya's economic development. These characteristics were both economic and geographical. Essentially, they delimited the country into modern and traditional sectors, but apart from the urban centres of Tripoli and Benghazi, little precision was possible in describing the continuum of these two sectors. Inadequate statistical data and lack of a common methodology of functional classification have made earlier regional groupings in Libya, subjective and piecemeal. Use of recently published economic and demographic data is therefore used objectively to characterize Libyan regions and to show the extent of the duality highlighted in Chapter I.

(b) Accepting that the impetus for rapid change has been mainly economic, it is pertinent to probe the chain reaction of events which have resulted in social, cultural and demographic changes. Demographic material has been used to characterize the social and cultural features in Libya because the various forces which impinge upon and mould a society are reflected eventually in the population. As such, the extraction and synthesis of significant demographic elements can form a basis for studying the linkage between economic impulses and social repercussions. However, the connection between economic and demographic elements is a complex one. There is little direct causation from one to the other

without a reciprocal effect.[2] Consequently, the economic-demographic interaction suggested by this statistical study forms only a preliminary examination. Later chapters elaborate the significant elements and hypotheses generated by this analysis.

It is relevant to outline the analytic procedure by which these generalizations are derived. Briefly, the steps are as follows:
(i) the usefulness of the model, - principal components analysis, (ii) selection of regions, (iii) selection of variables, (iv) the components analysis, (v) components and regional classification, (vi) evaluation of factor structure, (vii) variable association, and (viii) summary and conclusions.

2.1 The Model - Principal Components Analysis

The choice of the principal components analysis was based on several considerations. The regional study of economic, social and demographic characteristics and inter-relations is a problem of a multivariate nature. The multiplicity of variables found within large regions makes for a vast complexity of relationships that require simplification if the significant and independent elements are to be discovered.

Factor analysis provides one of the most powerful tools in the statistical analysis of multicomponent problems.[3] It attacks the problem at the very point where standardization fails and recognizes that all measurements are not of equal weight but that many of them overlap and indicate the same things about the ways in which a set of regions may vary. When several measurements show basically the same pattern of variation, it is likely that some are redundant and that a more basic pattern lies beneath: the principal component is an approximation of that 'basic pattern'.

Table 2.1

DEMOGRAPHIC VARIABLES.

POPULATION SIZE AND CHANGE.

1. Net migration, 1954-1964, as per cent of citizen population, 1954.
2. Per cent of total population, 1954.
3. Per cent of total population, 1964.
4. Percentage increase in total population, 1954-1964.

PLACE OF BIRTH.

5. Per cent of citizen population, 1964, born outside the region (Muqataa) of present residence.
6. Rate per 1,000 citizen population, 1964, born outside the region of present residence.
7. Per cent of citizen population, 1964, born in the region of present residence.
8. Per cent of citizen population, 1964, born outside the region of present residence but inside Tripolitania.
9. Per cent of citizen population, 1964, born outside the region of present residence but inside Cyrenaica.
10. Per cent of citizen population, 1964, born outside the region of present residence but inside Fezzan.
11. Per cent of citizen population, 1964, born abroad.

AGE GROUPS.

12. Per cent of total population, 1954, aged 0-14 years.
13. Per cent of total population, 1954, aged 15-59 years.
14. Per cent of total population, 1954, aged 60 years and over.
15. Per cent of total population, 1964, aged 0-14 years.
16. Per cent of total population, 1964, aged 15-59 years.
17. Per cent of total population, 1964, aged 60 years and over.
18. Dependency ratio, 1954, (children + aged ÷ adults).
19. Dependency ratio, 1964, (children + aged ÷ adults).

NATURE OF HOUSEHOLD.

20. Per cent of total population, 1954, classified "settled".
21. Per cent of total population, 1954, classified "semi-nomadic".
22. Per cent of total population, 1954, classified "nomadic".
23. Per cent of total population, 1954, classified "nomadic and semi-nomadic".

EDUCATION.

24. Per cent of total population (over 6 years), 1964, illiterate.
25. Per cent of total population (over 6 years), 1964, with secondary school certificate.
26. Per cent of total population (over 6 years), 1964, with preparatory school certificate.
27. Per cent of total population (over 6 years), 1964, with elementary school certificate.

MARITAL STATUS.

28. Per cent of citizen population (over 15 years), 1964, single.
29. Per cent of citizen population (over 15 years), 1964, married.

HEALTH.

30. Per cent of citizen population, 1964, with disabilities caused by sickness.
31. Per cent of citizen population, 1964, with disabilities caused by birth.

SEX RATIOS.

32. In-migrants, 1964, (males per 1,000 females).
33. Total population, 1954, aged 15-44 years, (males per 1,000 females).
34. Total population, 1964, aged 15-44 years, (males per 1,000 females).
35. Total population, 1954, all ages, (males per 1,000 females).
36. Total population, 1964, all ages, (males per 1,000 females).

POPULATION DENSITY.

37. Population density, 1954, (persons per sq. km.).
38. Population density, 1964, (persons per sq. km.).
39. Population density, 1964, (persons per ha. of settled and tribal holdings).
40. Net migration, 1954-1964, (absolute numbers).

The details of principal components analysis are complex and lie outside the scope of this study, although the mathematics are well documented.[4] However, the methods of analysis are significant. Since the main interest is in the demographic conditions pertaining in Libyan regions, a principal components analysis was undertaken of the demographic variables. Economic variables were then correlated with both the principal components and the demographic variables. Two matrices may be derived from the region/variable matrix; one shows the similarity between all variables (an R-type matrix), and the other, between all regions (a Q-type matrix) Because the aim of this study is the spatial variation of the regions, the Q-type analysis is used.

2.2. Selection of Regions

Ideally, the observations used, in this case the Libyan regions, should be homogeneous in type, randomly distributed, and small enough to be characterized by a number of published facts or observed conditions. Unfortunately, both the Libyan regions and published statistics are heterogeneous in nature and few in number. Twenty eight Mutassarrifia regions provided 77 variables, the maximum characterization for Libyan regions. Smaller administrative regions known as Mudiriah could only be characterized by twenty variables.

2.3 Selection of Variables

Two types of data were available for study in Libya, demographic and economic. Of the total demographic data published in the General Population Censuses of 1954 and 1964, forty variables related to the Mutassarrifia regions (Table 2.1). The data was grouped into nine sub-groups: population size and change, place of birth, age groups, nature

Table 2.2

ECONOMIC VARIABLES

ECONOMIC STRUCTURE

41. Per cent of total employees, 1956.
42. Per cent of total industrial establishments, 1956.
43. Per cent of citizen population (over 6 years),1964, in agriculture.
44. Per cent of citizen population (over 6 years),1964, in mining.
45. Per cent of citizen population (over 6 years),1964, in manufacturing.
46. Per cent of citizen population (over 6 years),1964, in construction.
47. Per cent of citizen population (over 6 years),1964, in electricity, water and gas.
48. Per cent of citizen population (over 6 years),1964, in commerce.
49. Per cent of citizen population (over 6 years),1964, in transport.
50. Per cent of citizen population (over 6 years),1964, in services.
51. Per cent of citizen population (over 6 years),1964, in other activities.
52. Economically active citizens as per cent of total citizens (over 6 years), 1964.

OCCUPATIONAL STRUCTURE

53. Per cent of citizen population (over 6 years), 1964, in professional and technical activities.
54. Per cent of citizen population (over 6 years), 1964, in administrative, managerial and executive activities.
55. Per cent of citizen population (over 6 years), 1964, in clerical activities.
56. Per cent of citizen population (over 6 years), 1964, in sales activities.
57. Per cent of citizen population (over 6 years), 1964, in farming activities.
58. Per cent of citizen population (over 6 years), 1964, in mining activities.
59. Per cent of citizen population (over 6 years), 1964, in transport activities.
60. Per cent of citizen population (over 6 years), 1964, in craft activities.
61. Per cent of citizen population (over 6 years), 1964, in service activities.
62. Per cent of citizen population (over 6 years), 1964, in other activities.
63. Economically active citizens in occupations as per cent of total citizens (over 6 years), 1964.

AGRICULTURAL STRUCTURE

64. Average size of holding in ha., 1960.
65. Average number of parcels of land per holding, 1960.
66. Per cent total area of holdings, 1960, owned by holder.
67. Per cent total area of holdings, 1960, rented from others.
68. Per cent total area of holdings, 1960, under tribal tenure.
69. Per cent of total holdings under 5 ha., 1960.
70. Density of farm population, 1960, on settled and tribal holdings (persons per ha.).
71. Per cent of farm population, 1960.
72. Per cent of total holdings, 1960, under arable crops.
73. Per cent of total holdings, 1960, under permanent crops.
74. Per cent of total holdings, 1960, under permanent meadow and pasture.
75. Per cent of total holdings, 1960, under wood and forest.
76. Per cent of total holdings, 1960, under other land.
77. Distance to nearest city over 100,000 by road.

of households, education, marital status, health, sex ratio, and population density. Thirty-seven economic variables were calculated from the population censuses and also from other governmental and private agency reports.[5] This data was grouped into three primary sections: economic, occupational and agricultural structures (Table 2.2).

Some of the data overlaps in coverage and some is of questionable quality, but an attempt has been made to compile a wide-ranging set of standardized variables relating to regional demographic and economic conditions. Where possible comparisons between the 1954 and 1964 population censuses have been made, while the possible shortcomings of the data have been considered in the text.

2.4 The Components Analysis

The raw data was subject to a two phase analysis*. First, after standardization the 40 demographic variables were subject to the Q-analysis of the principal components analysis. Three principal components were derived, accounting for nearly two-thirds of the total variance between the 28 Libyan Mutassarrifia regions. Secondly, the three factors were added to the 40 demographic variables and the 37 economic variables for each of the 28 regions. The programme edited the data and calculated univariates (means and standard deviations) and bivariate statistics (correlations).

---

* The principal components analysis was run on the University of Birmingham's up-graded English Electric K.D.F. 9 computing system.

The results of the component analysis are provided in Tables 2.3 to 2.4*. Table 2.3 summarizes the proportion of the total inter-regional variance accounted for by each of the three components. The three components together explain 64.1 per cent of the total variance of the 40 demographic variables. Thus, the variance between the 28 regions, as contained in the 40 variables can be attributed to three principal components. Subsequent factors were small and differed little in size indicating that no strong relationships remained within the data. Discussion is therefore restricted to the first three, mutually orthogonal, factors.

Table 2.3 Libyan Mutassarrifia Regions

Percentage of total variance explained by each component

Component or Factors	Percent of total variance	Number of significant correlations+	
		Demographic	Economic
1	38. 7	25	14
2	15. 1	9	5
3	10. 3	7	3

Percent of communality over all three components 64.1

+ Significant correlations $\pm$ O.5 and above.

Table 2.4 shows the percentage of variance of each primary demographic variable accounted for by the three major components.

---

* Detailed Tables 1 to 5 in Appendix C.

These values are the sum of the squares of the correlations of a particular variable with the three components, in other words, communalities.

Table 2.4 Percentage of variance (communality) of each of the forty demographic variables accounted for by all three components

Demographic Variables (see Table 2.1)	Percentage	Demographic Variables	Percentage	Demographic Variables	Percentage
1	55.8	15	50.6	28	67.2
2	61.2	16	47.9	29	74.7
3	73.0	17	46.1	30	29.5
4	52.1	18	75.2	31	28.9
5	88.1	19	42.8	32	62.1
6	89.7	20	71.4	33	63.8
7	91.9	21	42.8	34	71.8
8	84.0	22	43.8	35	63.4
9	74.0	23	71.4	36	66.7
10	28.6	24	62.7	37	58.0
11	78.4	25	54.3	38	82.1
12	68.5	26	87.1	39	82.9
13	74.6	27	67.9	40	72.6
14	52.1				

It is clear from Table 2.4 that some of the demographic variables are better represented than others by the three dimensions, so that the extent to which the components account for differences between the regions varies greatly between the variables. The demographic variables least well accounted for by the three components are total citizens born in the Fezzan (28.6 per cent) and citizens with disabilities by sickness (29.5 per cent) and by birth (28.9 per cent). However the

number of variables which are summarized by the three components is large (average 64.0 per cent). This implies that the variations of a large number of the 40 demographic characteristics are effectively captured by the three components, a desirable feature.

A strategy for the interpretation of the components, or factors, derived from this analysis has been developed[6] and is summarized below:-

(a) The 28 Mutassarrifia regions are plotted on co-ordinate graph paper by their values on two factors (Fig 2.1). The difference between regions at opposite ends of a factor are related to the meaning of the factor.

(b) These differences can be expressed in terms of the variables by adding values of the factors for each region to the original region/variable matrix and correlating the variables with the factors. A graph is drawn of the 40 demographic variables by their correlation with the factors (Fig 2.2). Some variables are highly correlated with a factor; it is their relationship which produces the factor, whose meaning is therefore closely related to these variables.

(c) In the same way, variables from outside the population system, but related to it, are correlated with the factor. Thus, the 37 economic variables are plotted on the graph (Fig.2.3). The factor is interpreted when a variable or combination of variables is found highly correlated with it.

(d) The correlations between variables, which are a by-product of factor interpretation, are used to investigate further the demographic conditions pertaining in the regions.

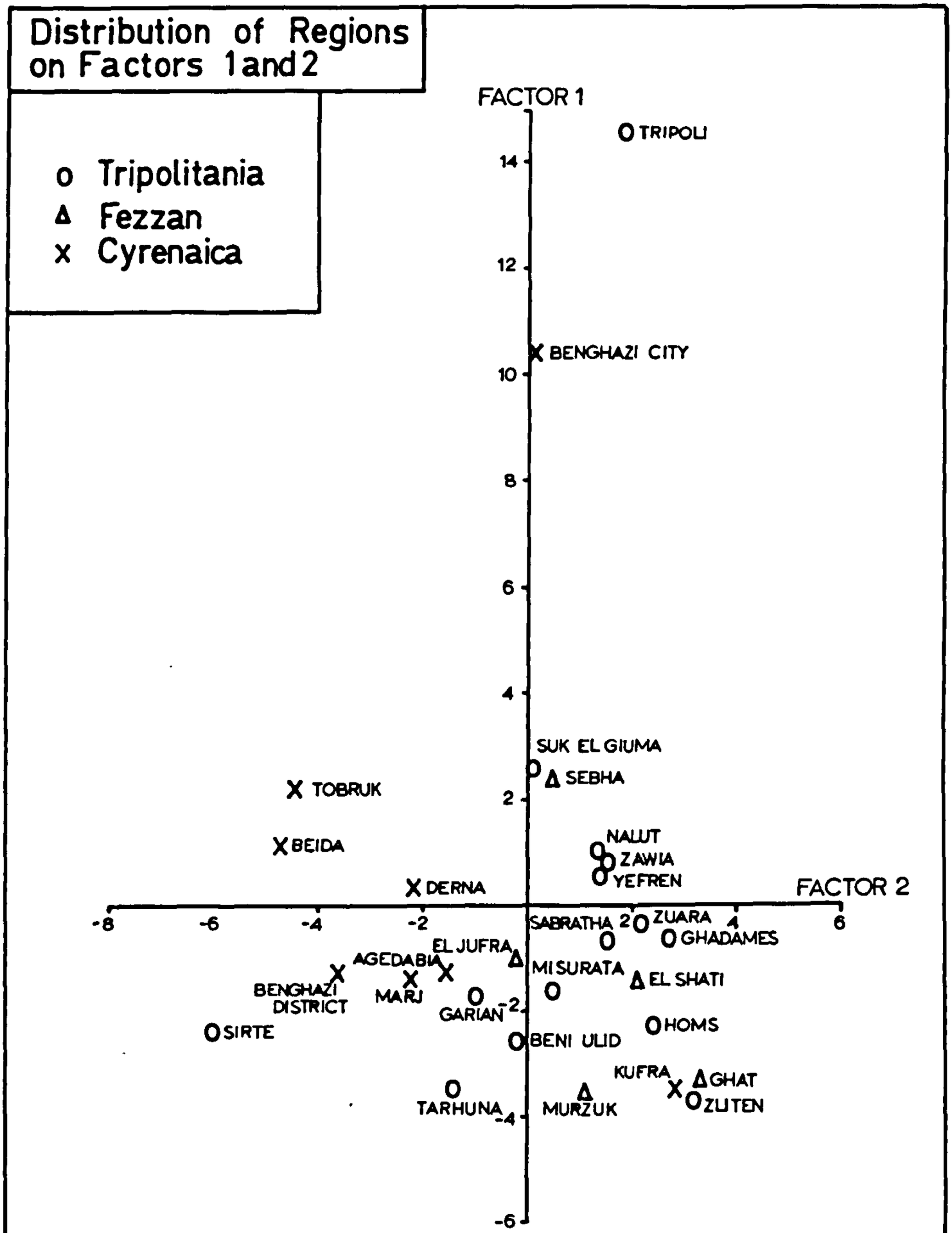

Distribution of Regions on Factors 1and2
o Tripolitania
Δ Fezzan
x Cyrenaica
FACTOR 1
FACTOR 2
TRIPOLI
BENGHAZI CITY
SUK EL GIUMA
SEBHA
TOBRUK
BEIDA
NALUT
ZAWIA
YEFREN
DERNA
SABRATHA
ZUARA
GHADAMES
EL JUFRA
AGEDABIA
MISURATA
EL SHATI
BENGHAZI DISTRICT
MARJ
GARIAN
SIRTE
HOMS
BENI ULID
KUFRA
GHAT
ZLITEN
TARHUNA
MURZUK
14
12
10
8
6
4
2
-2
-4
-6
-8

Figure 2.1

2.5 Components and Regional Classification

The names given to the components reflect the general nature of the variables which show high correlations with the component.

2.5.1 Factor 1: Urban-Rural Gradient

The first factor accounts for about 40 per cent of the total variance and is identified as an urban-rural axis. Figure 2.1 shows the regions plotted by their values on factors 1 and 2. Table 1, Appendix C gives precise rank groupings of the 28 Mutassarrifia regions on Factors 1, 2 and 3. The numbers refer to the Q-analysis values derived from the principal components analysis. Figure 2.2 shows the population variables plotted by their correlations with the same factors (numbers refer to Table 2.1). The population variables having the highest positive correlation with factor 1 (i.e. high values associated with urban regions) are as follows[+]:- in-migration from local areas (number 7 in Table 2.1) and from abroad (11), preponderance of males aged 15-44 years (33, 34), educated persons (25, 26, 27) and population densities (37, 38, 39). Variables with a high negative correlation with factor 1 (i.e. high values associated with rural regions) are old people (14, 17), high dependency ratio in 1954 (18), disabled caused by sickness (30), illiterates (24) and population born in the region of present residence (7).

The correlation of the economic variables with factor 1* (Fig 2.3) also indicate that this factor represents an urban-rural, or attractive-unattractive, gradient. Economic variables with high positive correlations are those related to urban functions which are associated with large proportions of the following:- industrial establishments and

---

[+] Detailed correlation co-efficients in Table 2, Appendix C

[*] Detailed correlation co-efficients in Table 3, Appendix C

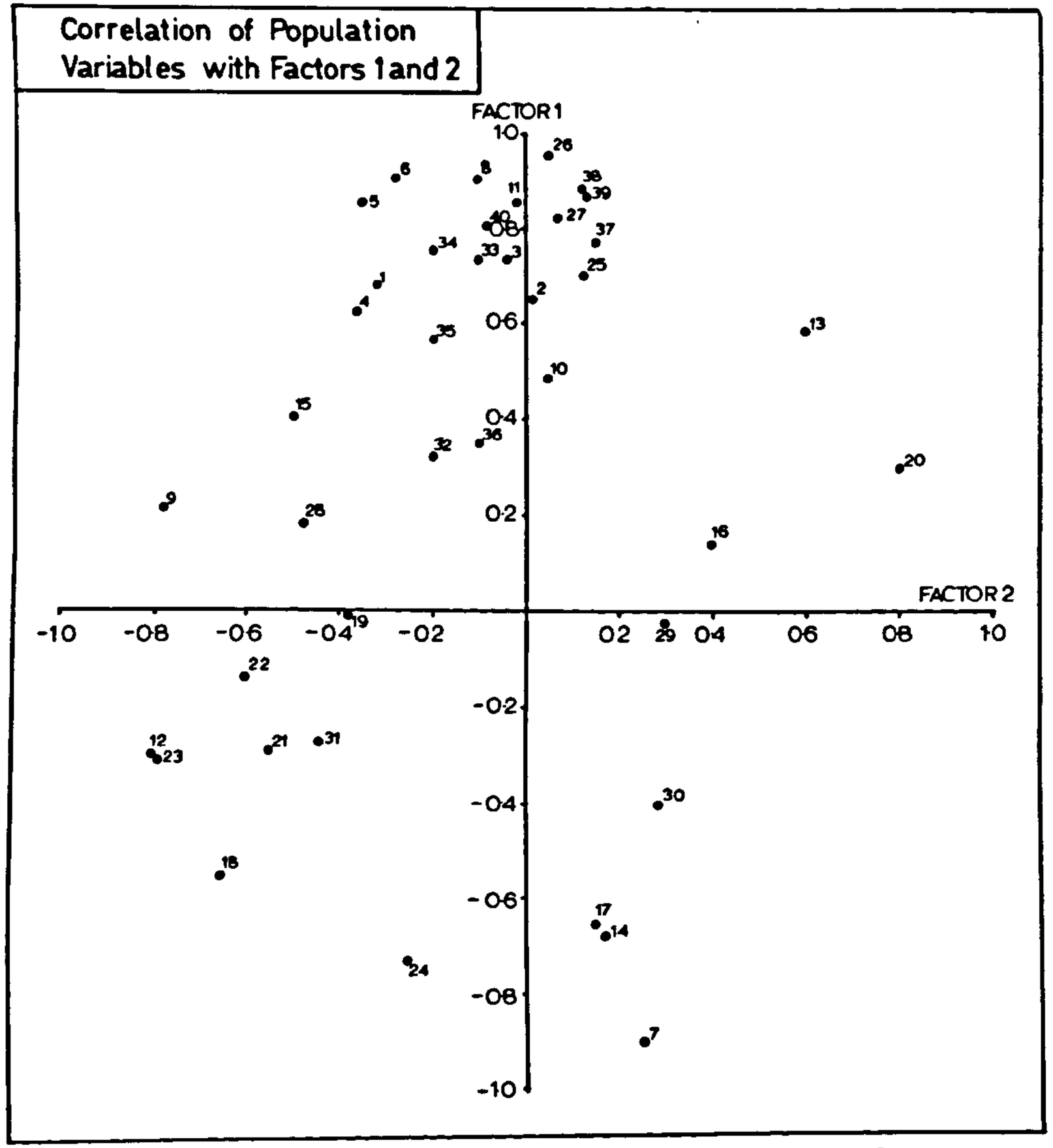


Figure 2.2

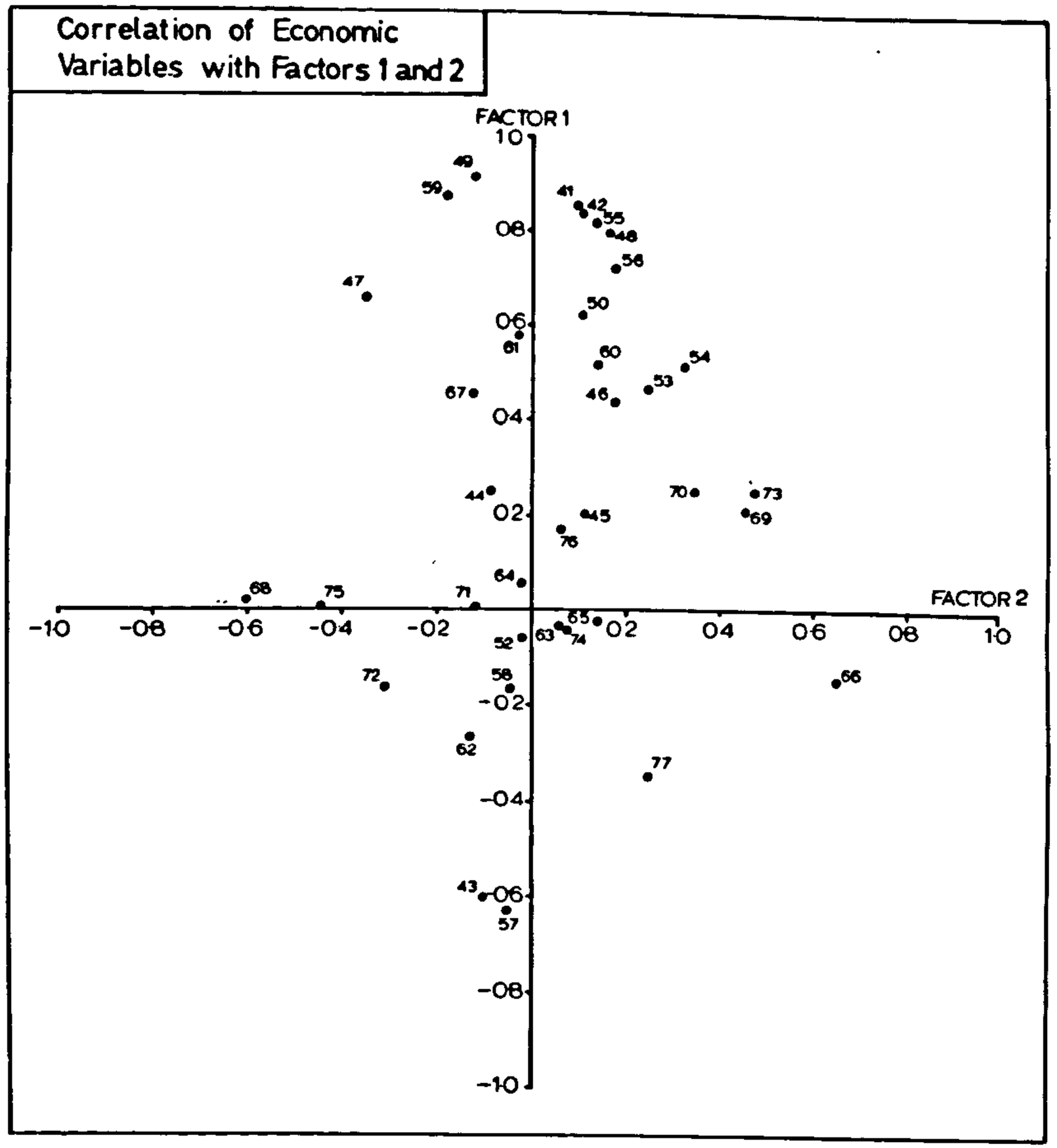


Figure 2.3

employees in 1956 (numbers 42 and 41 respectively in Table 2.2), working population in transport (49), public services (47) and commercial activities (48), sales (56), clerical (55) and craft occupations (60), and rented farm holdings (67). The variables indicating involvement in agricultural occupations (43, 57) have high negative correlations with factor 1.

Fig. 2.1 confirms that Tripoli and Benghazi measured demographically and economically are by far the most urban regions. Suk el Giuma, which is adjacent to Tripoli and part of its larger urban complex, comes next on factor 1. Sebha contains the ex-provincial capital of the Fezzan, while Tobruk, Derna and Beida each contain an important urban unit which contrasts sharply with their rural hinterlands. The western Gebel areas in Tripolitania (Nalut and Yefren) show a slightly positive urban element, a result more of the village structure than of any significant urban centres.

The most rural or economically unattractive regions are those east of Tripoli (Zliten and Tarhuna) and the southern regions of Ghat, Murzuk and Kufra. The former suffer from declining water tables, essential to the irrigated agriculture, while the latter experience extremes of climate and isolation. The Fezzanese Mutassarrifia of El Shati and El Jufra, the Cyrenaican regions of El Marj, Agedabia and Benghazi District, and the western Tripolitania areas of Sabratha, Zuara and Ghat appeared slightly less rural.

Fig 2.1 indicates the greatest range of values at the urban end of factor 1. Apart from, Tripoli and Benghazi Mutassarrifia, the regions are not widely spaced. There is a greater range, for instance, between Tripoli and its adjacent area of Suk el Giuma, than between

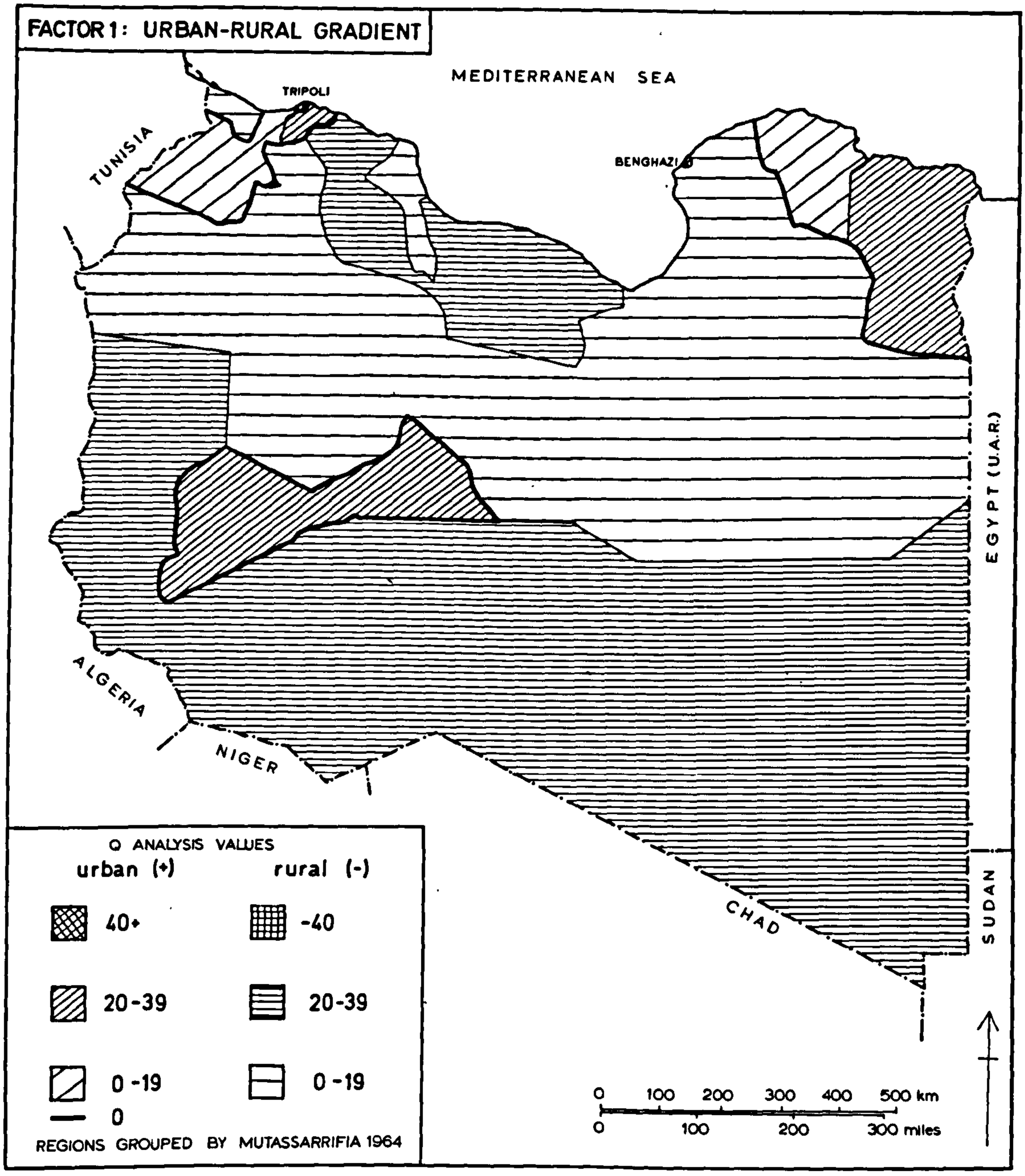

FACTOR 1: URBAN-RURAL GRADIENT
MEDITERRANEAN SEA
TRIPOLI
TUNISIA
BENGHAZI
EGYPT (U.A.R.)
ALGERIA
NIGER
CHAD
SUDAN
O ANALYSIS VALUES
urban (+)
rural (-)
40+
-40
20-39
20-39
0 -19
0 -19
0
REGIONS GROUPED BY MUTASSARRIFIA 1964
0 100 200 300 400 500 km
0 100 200 300 miles

Figure 2.4

Suk el Giuma and the most rural Mutassarrifia of Zliten. A broad north-south alignment of the axis is apparent (Fig. 2.4), broadly similar to the four physical regions of the coast, Gebel, steppe and desert; the urban regions are situated on the coast and the rural or unattractive regions inland. Even so, administrative decentralization has encouraged urban growth in the ex-provincial capitals of Sebha and Benghazi, in the new capital of Beida, and in the ports of Derna and Tobruk. Roughly half of the Cyrenaican regions were classified urban (i.e. regions with positive values on factor 1), compared with about one-third in Tripolitania and one-fifth in the Fezzan.

2.5.2 Factor 2: Agricultural Gradient

The second factor accounts for about fifteen per cent of the total variance of the data and is interpreted as a gradient from settled agriculture to shifting cultivation and pastoralism. Fig 2.1 shows the regions plotted by their values on factors 1 and 2, while Figure 2.2 shows the population variables plotted by their correlations with the same factors. The population variables with a high positive correlation with factor 2* are a proportion of the population "settled" (number 20 in Table 2.1) and aged 15-59 years in 1954 (13). High proportions of the population classed "nomadic" (22) and "semi-nomadic" (21) young (12), single (28), born in Cyrenaica (9) and with a large dependency ratio in 1954 (18) are associated with negative values on factor 2.

---

* Table 4, Appendix C.

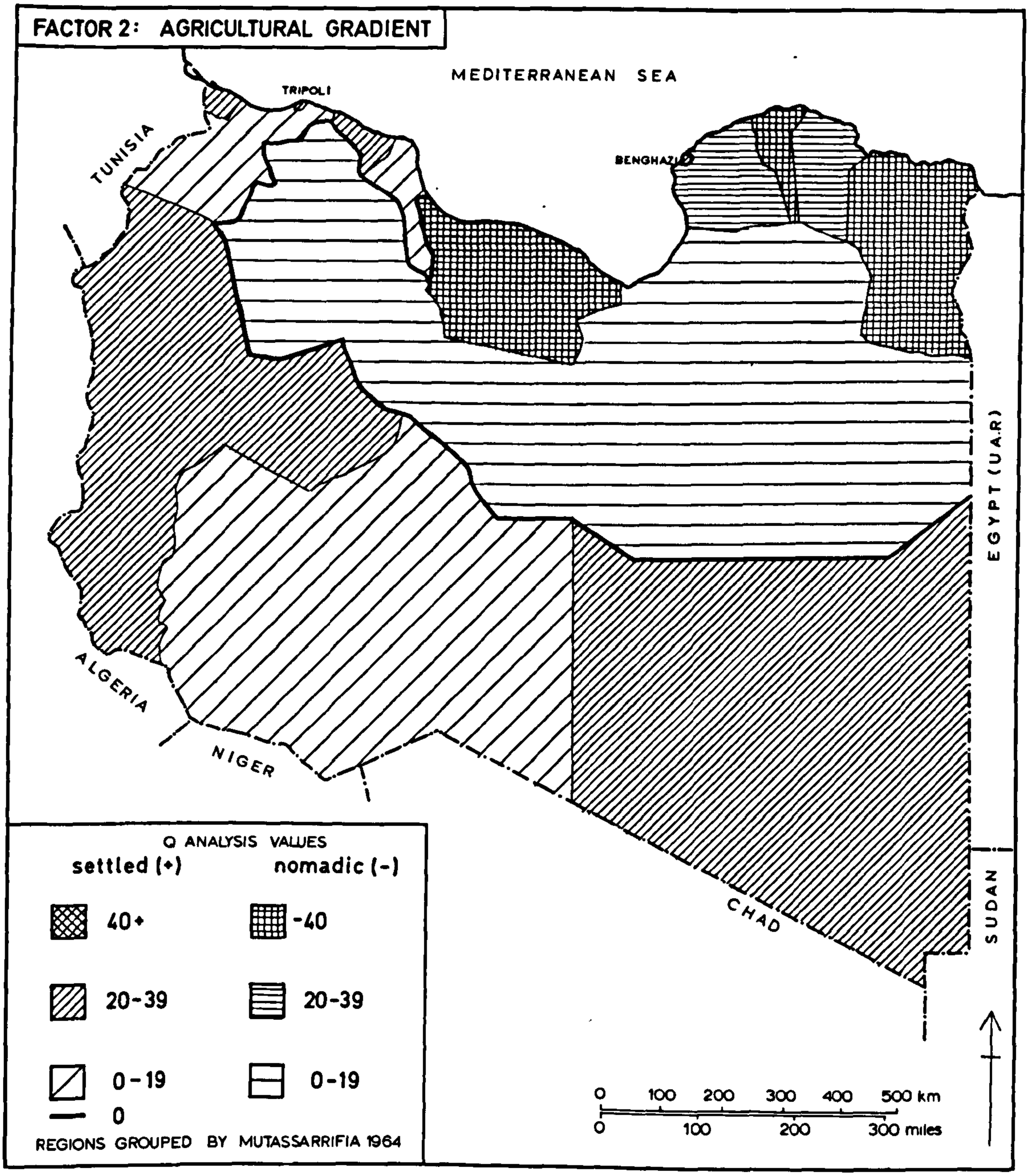

FACTOR 2: AGRICULTURAL GRADIENT
MEDITERRANEAN SEA
TRIPOLI
TUNISIA
BENGHAZI
EGYPT (U.A.R)
ALGERIA
NIGER
CHAD
SUDAN
Q ANALYSIS VALUES
settled (+)
nomadic (-)
40+
-40
20-39
20-39
0-19
0-19
0
REGIONS GROUPED BY MUTASSARRIFIA 1964
0 100 200 300 400 500 km
0 100 200 300 miles

Figure 2.5

The correlations of economic variables with factor 2 (Fig. 2.3) show that the proportion of farms which are owner held (number 66 in Table 2.2), small (69) and under permanent crops (73) have positive correlations, indicating a settled agriculture. In contrast, variables with a high negative correlation with factor 2 are proportions of farms under tribal tenure (68), arable crops (72) and woodlands (75).

Expressed regionally the agricultural gradient has a marked east-west alignment (Fig. 2.5). At the positive, or settled, end of factor 2 there are two groups of regions with different, though settled, agricultural systems. The first is an area of oasis agriculture, particularly in the Fezzan, including the Mutassarrifia of Ghat, Kufra, Ghadames and El Shati. A dependence on the cultivation of date palms by primitive, traditional techniques typify these regions and account for the out-migration of young males verified by negative values on factor 1. The second type of settled agricultural region is that dependent on irrigation in Arab gardens known as "saniya". These farming practices characterize the coast Mutassarrifia in Tripolitania.

At the negative end of factor 2 Sirte Mutassarrifia is prominent, followed by six of the eight Cyrenaican regions, and the eastern Gebel regions of Tripolitania. These regions have a strong tribal and nomadic tradition. The similar physical conditions between the eastern Tripolitanian Mutassarrifia of Garian, Tarhuna, Beni Ulid and Sirte, and northern Cyrenaica, dictate the type of agriculture and the demographic response. The three provinces showed marked regional differences. Whereas roughly three-quarters of the Tripolitanian and Fezzanese regions were classified settled agricultural (i.e. regions with positive

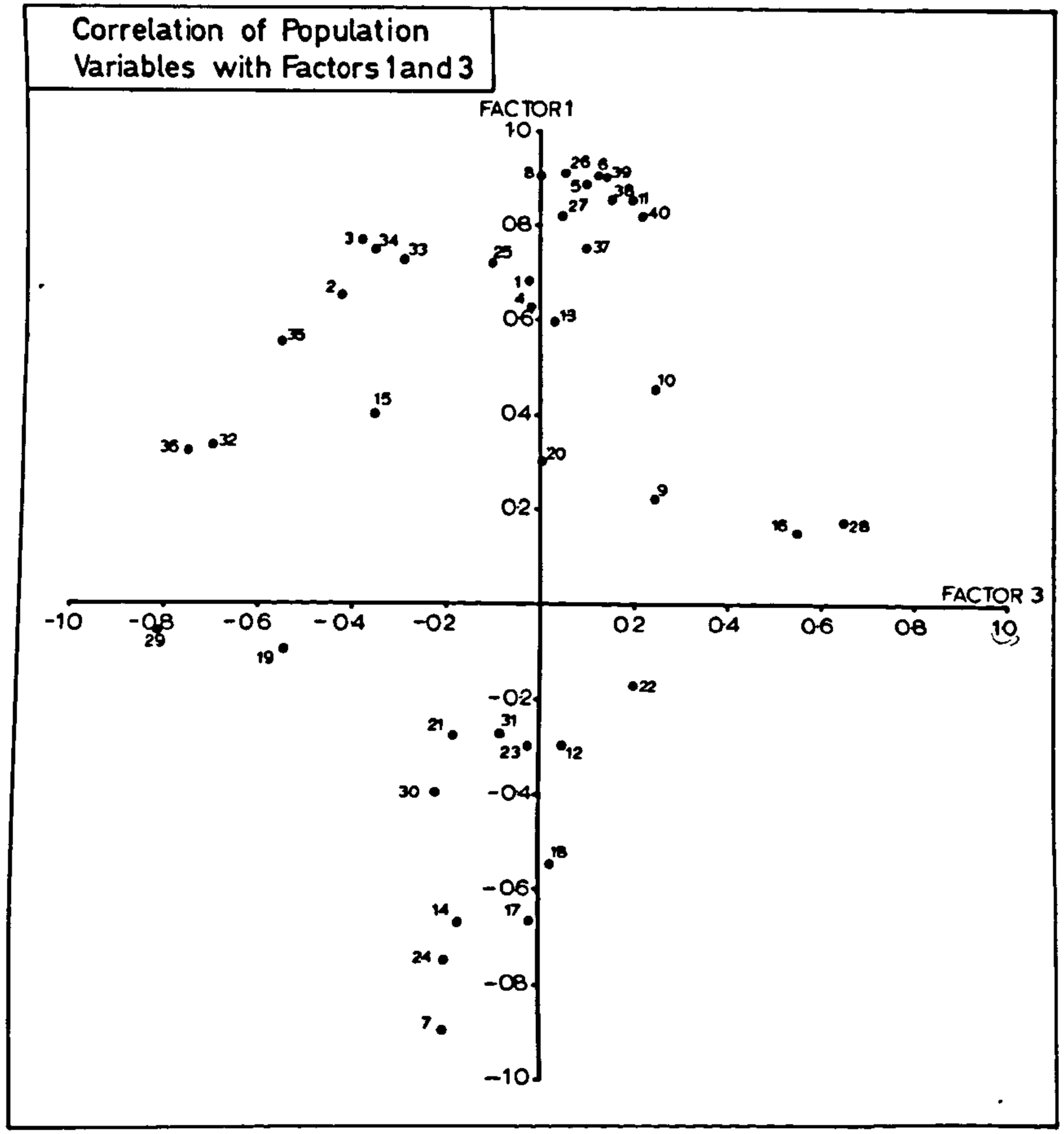


Figure 2.6

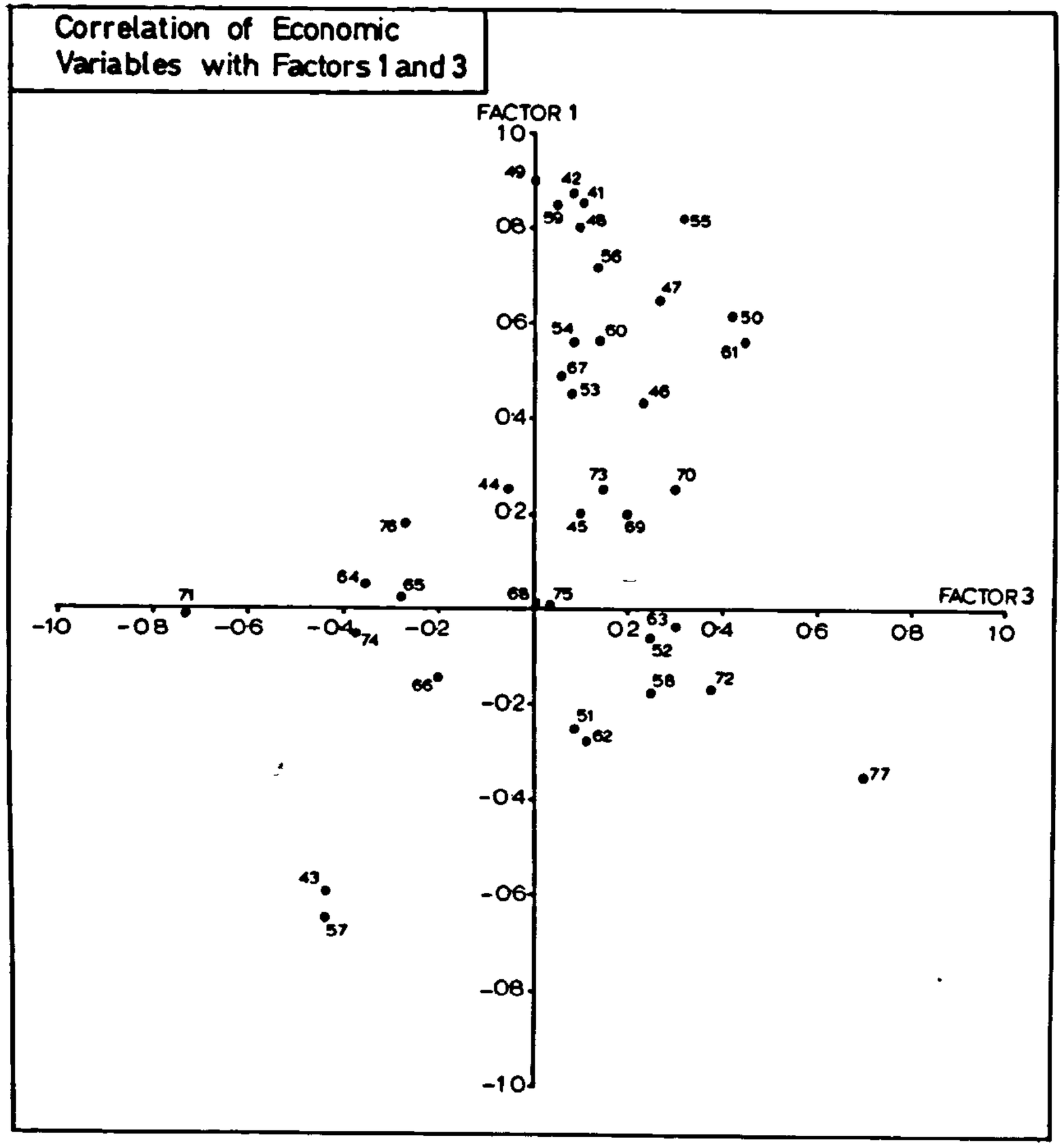


Figure 2.7

values on factor 2), three-quarters of the Cyrenaican regions were essentially nomadic.

2.5.3 Factor 3: Accessibility and Sex Ratio Gradient

The third factor accounts for about ten per cent of the original region/variable matrix, and is the weakest of the three significant factors. It is interpretated as a gradient of distance from the two urban regions of Tripoli and Benghazi, together with associated changes in age, sex ratios and marital status. There is an increasing proportion of married persons (29), an increasing excess of males (32, 35, 36), and a large dependency ratio in 1964 (19) nearer to the two centres of population with more than 100,000 inhabitants (77) (Figs. 2.6 and 2.7)* Moreover, there is an increasing proportion of the population engaged in agricultural activities nearer the two urban centres of Tripoli and Benghazi (43, 57 and 71). Figure 2.8 shows the range of regions along this factor. There is a contrast in the location of Tripoli and Benghazi in relation to their provincial Mutassarrifia (Fig. 2.9). The central situation of Tripoli accounts for the high accessibility values of surrounding regions, while Benghazi suffers from a peripheral location in Cyrenaica. The southern regions of the Fezzan and Kufra are areas of marked inaccessibility.

2.6 General Evaluation of the Factor Structure

A general evaluation of the three major dimensions of the 28 Libyan regions rests on a proper appreciation of the following points:-

(a) The factors, or components, have the important characteristic of being independent of each other, i.e., factors are not correlated with each other.

---

* Table 5, Appendix C

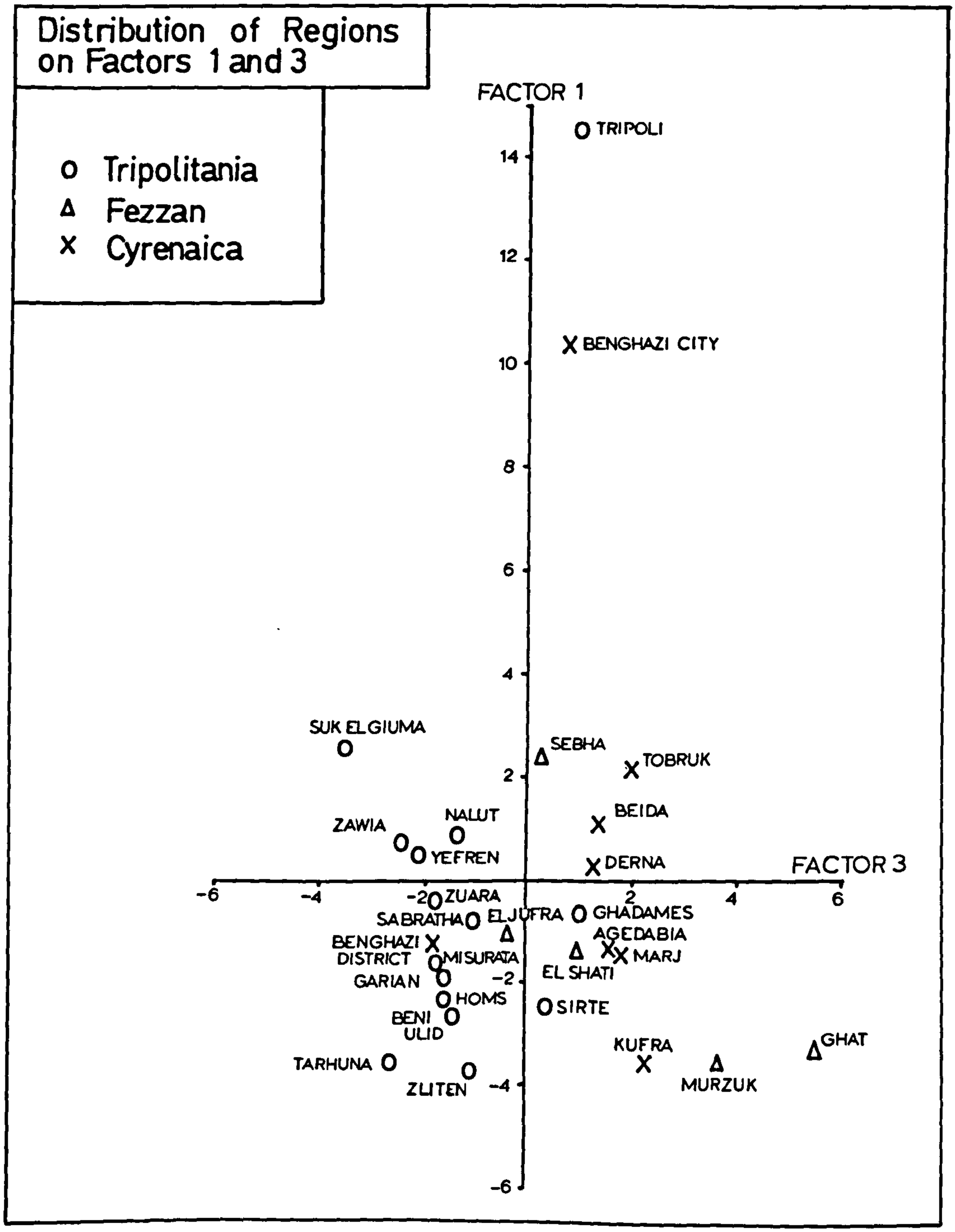

Distribution of Regions on Factors 1 and 3
o Tripolitania
Δ Fezzan
X Cyrenaica
FACTOR 1
FACTOR 3
TRIPOLI
BENGHAZI CITY
SUK EL GIUMA
SEBHA
TOBRUK
BEIDA
NALUT
ZAWIA
YEFREN
DERNA
ZUARA
SABRATHA
EL JUFRA
GHADAMES
AGEDABIA
BENGHAZI DISTRICT
MISURATA
MARJ
EL SHATI
GARIAN
HOMS
SIRTE
BENI ULID
KUFRA
GHAT
TARHUNA
ZLITEN
MURZUK
14
12
10
8
6
4
2
-2
-4
-6
-6
-4
-2
2
4
6

Figure 2.8

(b) The factors are additive, i.e., each component only tells part of the story, since it explains only part of the total variance, in the words of Moser and Scott[7], the components are "weighted averages of the primary variables, the latter contributing in very different degrees to the different components". In the case of the first component, the weights are greater and therefore the association stronger, for those primary variables which are highly correlated with it. The other components though counting for a decreasing proportion of the total variance, add, bit by bit, to the major part of the story. Furthermore, the fact that only three factors account for nearly two-thirds of the total variance is partly determined by the number of primary variables. "An analysis based on a smaller and more homogeneous set of variables would probably result in fewer components".[8] However, the small number of factors also reflects the lack of great diversity of Libyan regions in the tradional sector at this stage of their development.

(c) Moser and Scott[9] also mention the significance of the "input-output" relationship in a component analysis. How far the choice of variables influenced the factor structure as obtained in this study is difficult to determine. Certainly the first factor would probably have emerged in any set of variables covering the major demographic - economic structure of Libyan regions. Components 2 and 3, however, may have disappeared if other data had been used. The agricultural gradient, for instance, was more associated with the nature of settlement and economic characteristics of regions than with well defined demographic contrasts. This argument also applies to the third component which is related to urban accessibility and density of agricultural population.

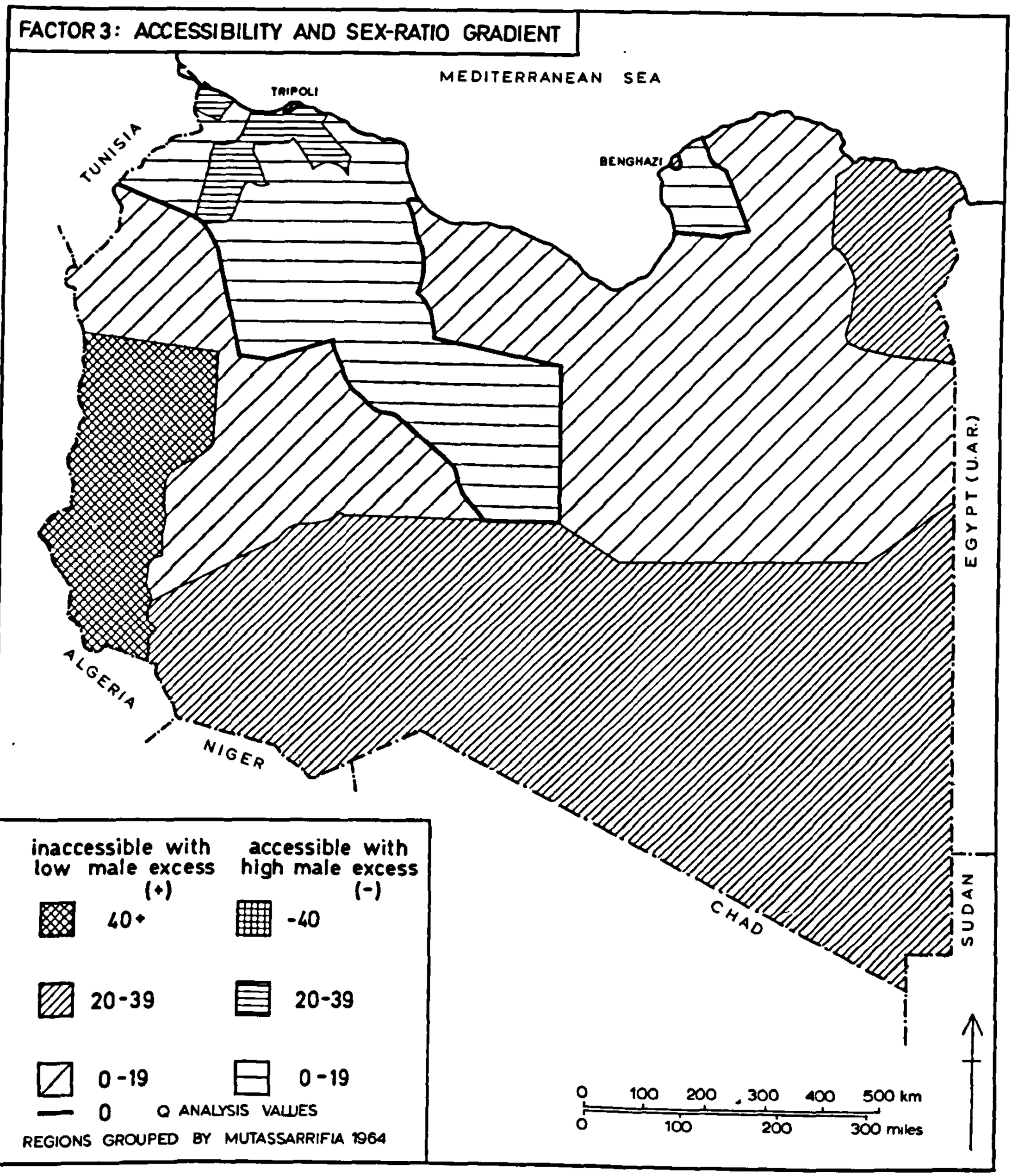

FACTOR 3: ACCESSIBILITY AND SEX-RATIO GRADIENT
MEDITERRANEAN SEA
TRIPOLI
TUNISIA
BENGHAZI
EGYPT (U.A.R.)
ALGERIA
NIGER
CHAD
SUDAN
inaccessible with low male excess (+)
accessible with high male excess (-)
40+
-40
20-39
20-39
0-19
0-19
0
Q ANALYSIS VALUES
REGIONS GROUPED BY MUTASSARRIFIA 1964
0 100 200 300 400 500 km
0 100 200 300 miles

Figure 2.9

(d) Equally pertinent in this discussion is the question of consistency of components. Repeating the test at another date may reveal a different pattern of significant demographic elements. The nature of oil revenue investments may determine the types of regional demographic change in the next ten years, particularly the primary demographic variables of fertility, mortality and migration.

2.7 Association of Variables

The correlation matrix of demographic and economic variables indicates certain associations* but fails to prove conclusively that a change in one variable causes a well defined change in others. Spengler has noted[10] that demographic (economic) variables may be complexly inter-related; that between demographic and economic variables a relation of mutual interdependence rather than one of unilateral "causation" may obtain; that the relation between the two types of variables may be conditioned by the presence or absence of intervening but non-identified variables; and that varying time intervals may separate a demographic (economic) change from its economic (demographic) effect. Any conclusions of association are therefore treated tentatively.

2.7.1. Demographic variables having the largest number of associations with other demographic variables, and also with economic variables, were migration, place of birth and educational status. Age and sex differentials, education, population increase, population distribution and population density all showed significant associations with migration and place of

---

* Appendix B

birth. Rented farm holdings, associated with the breakdown of tribal ownership, were also related to high in-migration. Occupational changes verified Spengler's theory of economic variables affected by internal migration changes, leading to more employment and a redistribution of income.[11]

Illiteracy showed high correlations with low population density out-migration and large dependency ratios. Lack of pre-natal care of children may have affected the high proportion of disabilities caused by birth, associated significantly with illiteracy; in contrast, urban areas, significantly associated with attainment of educational certificates, showed no greater proportion of disabilities by sickness than rural areas. The educational demands of technical, professional, managerial and urban occupations indicated significant associations with attainment of secondary school certificates. In contrast, rural occupations and semi-nomadic and nomadic nature of settlement were related to illiteracy.

2.7.2 Economic variables with the largest number of variable associations were urban occupations, type of agriculture and distance from urban areas.

The most "urban" based occupations, clerical, transport, sales, craft and services activities, were significantly associated with each other, with the 1956 industrial structure, with age and sex structures, and with education.

Type of agriculture was correlated with occupations, size and type of holdings, nature of settlement, place of birth, education and age structures.

Decreasing proportion of farm population, total population, married persons and male excess were significantly associated with distance from urban areas.

Despite the difficulties of highlighting chain reactions of associations, there is a tendency for demographic variables to have a closer association with other demographic, rather than economic variables. Detailed results of these correlation co-efficients are grouped in Appendix B.

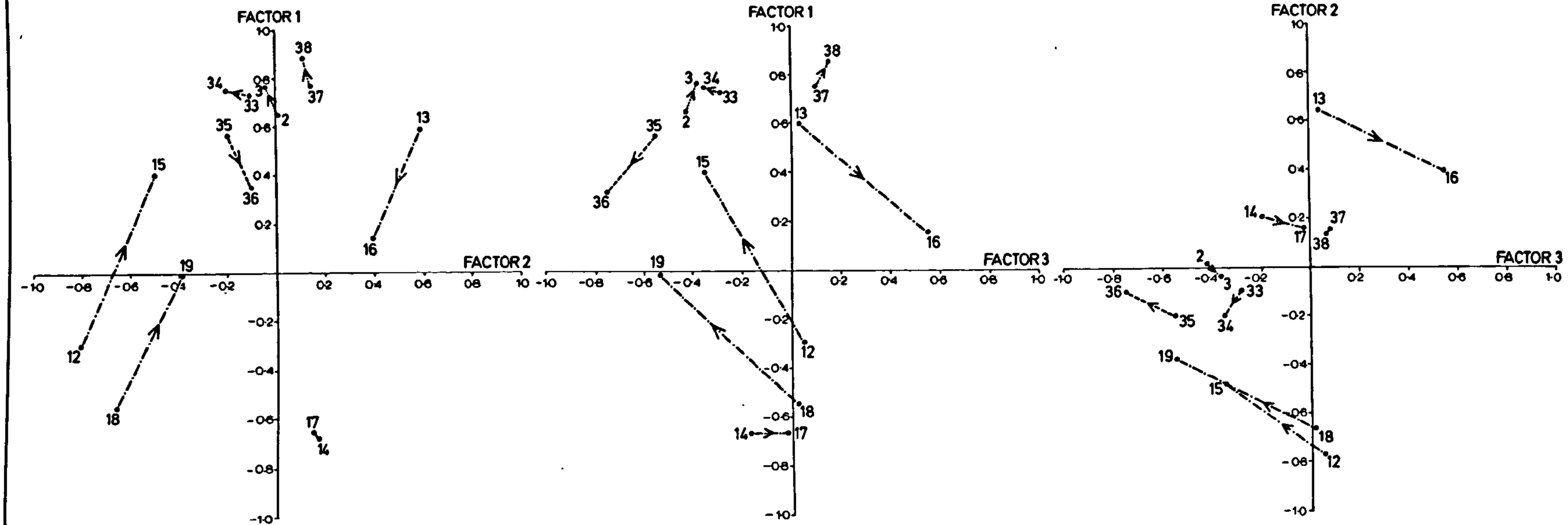
2.7.3. Changes in Variables 1954-64

Only three sets of comparable demographic data were available in the two population censuses of 1954 and 1964; age and sex structures, and distribution and density of population (Fig. 2.10)

Both the density and distribution of population have become increasingly concentrated in urban areas, i.e. they have moved upwards on factor 1. This occurred without any appreciable movement on factors 2 or 3. Thus, distributional changes did not make the population more "settled", and it is likely that a sizable nomadic group remained in 1964 (according to the 1954 and 1964 censuses there was an increase of 13,000 tent dwellers in Libya over the ten year period)

Changes in the dependency ratios summarize more detailed changes in the three age groups under 15 years, 15-59 years, and 60 years and over. Between 1954 and 1964 high dependency ratios appeared to be increasingly associated with urban areas, i.e., they moved upwards on factor 1. The main element of change was the increase in both absolute and proportional terms, of the age group under 15 years.

CHANGES IN SELECTED POPULATION VARIABLES 1954-64



POPULATION DENSITY AND DISTRIBUTION VARIABLES 1954-64

SEX-RATIO VARIABLES 1954-64

AGE GROUP VARIABLES 1954-64

2 - 3	% total population in each district 1954 and 1964
37 - 38	density of total population (persons/sq.km.) 1954-64
33 - 34	sex-ratio of total population aged 15-44 yrs. 1954-64
35 - 36	sex-ratio of total population all ages 1954-64
12 - 15	% total population 0-14 yrs. 1954 and 1964
13 - 16	% total population 15-59 yrs. 1954 and 1964
14 - 17	% total population over 60 yrs. 1954-64
18 - 19	dependency ratio (children + aged ÷ adults) 1954-64

Figure 2.10

While age group changes on factor 2 were small, factor 3 indicated an increasing proportion of the population aged 15-59 years in areas distant from urban centres, particularly the southern oases. It is possible that the level of migration had declined thereby accounting for the large number of young people remaining in the total population, or the migration may have been more of a family unit. This would help to explain the increase in the dependency ratio in areas accessible to urban areas (i.e., negative values on factor 3)

Sex ratio changes reflected a continued male excess in urban areas. The male excess in age groups 15-44 years was higher than total age groups in urban areas. While the male excess in younger adults (15-44 years) remained between 1954 and 1964, the sex ratios of the total population showed an increase in the number of females in urban areas. There was no significant distribution or change of sex ratios on the agricultural gradient (factor 2). Accessibility to urban areas (factor 3), however, indicated an increasing male excess between 1954 and 1964. This took place in both adult groups and total population.

2.8 Summary and Conclusion

The major research finding is the discovery that nearly two-thirds of the variance of 28 Libyan administrative regions on 40 demographic variables is accounted for by only three dimensions. These three components are to some extent composite statements of the way Libyan regions differ from each other demographically. When the factors are correlated with 37 economic variables an indication is given of regional economic variations. Thus, for the first time, as a result of this study, it has been possible to discern systematic spatial variations of the demographic

and economic characteristics of Libyan regions based on certain well-defined dimensions.

Although economic wealth derived from oil revenues has brought the means to unify Libya, established provincial characteristics remain. But the independence, isolation and uniqueness of the provinces are being eroded. The urban-rural dichotomy shown by factor 1 is now the most significant demographic element in the country, rather than provincial distinctiveness. It is in fact this contrast between town and country which has facilitated increasing contact and interdependence, even if the flow of resources and manpower has been mainly in one direction. The primary elements of a system have therefore been established.

Juxtaposition of the three provinces is best captured by a combination of factors 2 and 3 (Fig. 2.11). The majority of Tripolitania's regions are typified by their settled agriculture and accessibility to a major urban centre (positive factor 2 and negative factor 3 respectively.) The Fezzanese regions appear as a buffer zone between these two extremes.

However, several shortcomings and imperfections of the study are self-evident. Scarcity of desired data decreased the quality of the statistical analysis performed. The use of only 28 heterogeneous regions gave only a broad indication of the regional demographic patterns. Demographic-economic variables provide only tentative pointers concerning the inter-relations of demographic and economic systems. It is along these lines, rather than a mere elaboration of the three components, that further study will be concentrated.

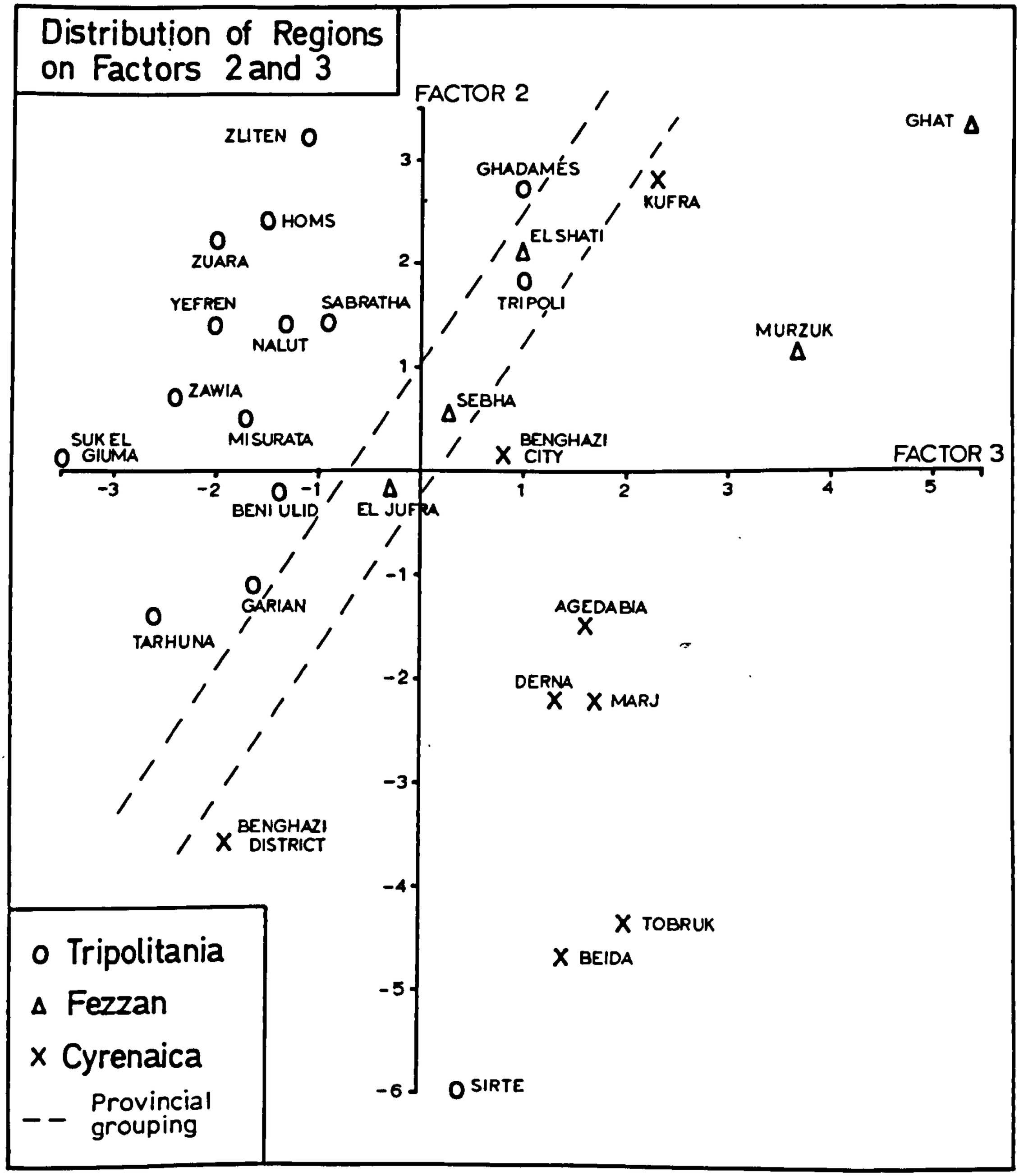

Distribution of Regions on Factors 2 and 3
FACTOR 2
FACTOR 3
ZLITEN
GHAT
GHADAMÉS
KUFRA
HOMS
EL SHATI
ZUARA
TRIPOLI
YEFREN
SABRATHA
NALUT
MURZUK
ZAWIA
SEBHA
MISURATA
SUK EL GIUMA
BENGHAZI CITY
BENI ULID
EL JUFRA
GARIAN
AGEDABIA
TARHUNA
DERNA
MARJ
BENGHAZI DISTRICT
TOBRUK
BEIDA
SIRTE
3
2
1
-1
-2
-3
-4
-5
-6
-3
-2
-1
1
2
3
4
5
o Tripolitania
Δ Fezzan
x Cyrenaica
Provincial grouping

Figure 2.11

References

1. Berry, B.J.L. 'Cities as Systems within Systems of Cities", in J. Friedman and W. Alonso (eds.). Regional Development and Planning, M.I.T. press, Cambridge, (1964), p.132

2. Spengler, J.J. "Economics and Demography", in P.M. Hauser and O.D. Duncan, The Study of Population, The University of Chicago, (1959), pp. 803-816.

3. Haggett, P. Locational Analysis in Human Geography, Edward Arnold, London, (1965), p.223

4. inter alia Hotelling, H. "Analysis of a Complex Statistical Variables into Principal Components", The Journal of Educational Psychology, Vol.24, (Sept. 1933), pp.417-41; Seal, H. Multivariate Statistical Analysis for Biologists, Methuen, (1964); Lawley, D.N. and Maxwell, E.A. Factor Analysis as a Statistical Method, Butterworth, London, (1963); Kendal, M.G. A Course in Multivariate Analysis, Griffin, London, (1957).

5. Ministry of Economy and Trade, Libya. Statistical Abstract 1965 Tripoli, (1966), and Ministry of Agriculture, Libya. 1960 Census of Agriculture, Tripoli, (1962).

6. Moss, R.P., Barkham, J.P. and Norris, J.M. "An application of Principal Component Analysis to the study of soil and vegetatinn in some beechwoods in the mid-Cotswolds", Trans. Inst. Brit. Geogr. (in press); also Norris, J.M., The Variation of Soil in some Cotswold Beechwoods, Ph.D. Thesis, University of Birmingham, (1958).

7. Moser, C.A. and Scott, W. British Towns: A Statistical Study of Their Social and Economic Differences, Oliver and Boyd, Edinburgh, (1961), p.75

8. Ahmad, Q. Indian Cities: Characteristics and Correlates, University of Chicago, Department of Geography Research Paper No. 102, (1965), pp. 44-45

9. Moser and Scott, op. cit., pp.16, 76.

10. Spengler, op. cit., p. 791.

11. ibid., p. 792-3

CHAPTER III

DISTRIBUTION AND DENSITY OF POPULATION 1954-66

The three principal components highlighted in Chapter II were all associated with gradients reflecting regional differences in Libya. Of particular importance as common denominators were the distribution and density characteristics of the population. Both were significantly associated with factor 1, the urban-rural gradient, and both had a wide variety of individual variable linkages. Association with factor 1 is understandable; urban and rural areas in part reflect two extremes of a continuum reflecting concentration and size of population. While statistical correlation with factors 2 and 3 was not significant, both the agricultural and accessibility gradients contain specific patterns of population distribution and density.

Elaboration of these patterns not only helps to explain the three principal components themselves, but also indicates some of the causes, characteristics and consequences of demographic change. As Zelinsky[1] maintained ... "If we learn to explain numbers, more than half the battle has been won in explaining the location of age groups, literacy and mortality, etc." Spengler[2] has been more specific in identifying the economic-demographic interrelations of population distribution. Defined as secondary demographic variables, distribution, and hence density, are determined by the dynamic variables of fertility, mortality and migration. In turn, numerical aspects of the population influence, and respond to, changes in net national product, distribution of income, employment, investment, consumption and savings. In short, the distributional aspects of population are sensitive indicators of economic

and demographic change.

While the demographic-economic interrelationships are reflected in the numerical division of the population, it is hypothesized that physical controls in the environment set critical, quantitative limits to the distribution and density of Libya's rural population. Thus, the process of adjustment from one socio-economic system to a new equilibrium takes place within well-defined and reasonably stable limits. Within the limits set by the physical environment, however, particularly rainfall distribution, the controls are morea complex of physical and human determinants and are more emphatically qualitative. This section attempts to define these "limits" and to highlight the particular controls which have shaped the current distribution and density changes of the population.

3.1 General Characteristics of Population Distribution and Density

The outstanding feature of Libya's population distribution is the marked coastal concentration. About three-quarters of the population live within twenty miles of the sea, this proportion being similar in both Tripolitania and Cyrenaica. However, while the density of population doubled between 1936 and 1964, it remained under one person per square kilometre. On a provincial basis the proportions of total population remained relatively stable.

Tripolitania with only 14 per cent of the total area contained two-thirds of the total population in 1964. With a density only one-eighth as large, Cyrenaica contained nearly one third of the 1964 population on roughly half of Libya's total area. The Fezzan is the most sparsely populated province, containing 37 per cent of the area and only 5 per cent of the total population.

Table 3.1 Provincial Changes in Population Distribution and Density, 1936-64

	Area 1964		Population Distribution 1936			1954			1964		
	000's sq. kms.	% total	Total 000's	% total	Density sq. km.	T	%	D	T	%	D
Tripolitania	250	14	547	64	2.2	738	68	3.0	1034	66	4.1
Cyrenaica	855	49	137	28	0.2	291	27	0.3	451	29	0.5
Fezzan	654	37	48	8	0.1	59	5	0.1	79	5	0.1
Libya	1759	100	733	100	0.4	1089	100	0.6	1564	100	0.9

Sources (a) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959) and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).
(b) Pan, C.L. "The Population of Libya", Population Studies, Vol. 3, No. 1, (1949), p.119.

Within each of the three provinces, however, different micro-distributional patterns were determined by a variety of 'controls' or influences. Figures 3.1 to 3.4 describe the distributions of population in the two most densely peopled areas of Northern Tripolitania and Northern Cyrenaica. The proportional circles relate to the total populations of administrative units known as Mudiriah; these were the most detailed population subdivisions afforded by published data for the years 1954, 1964 and 1966. Location of circles correspond to the approximate centres of population in the Mudiriah; accurate in small

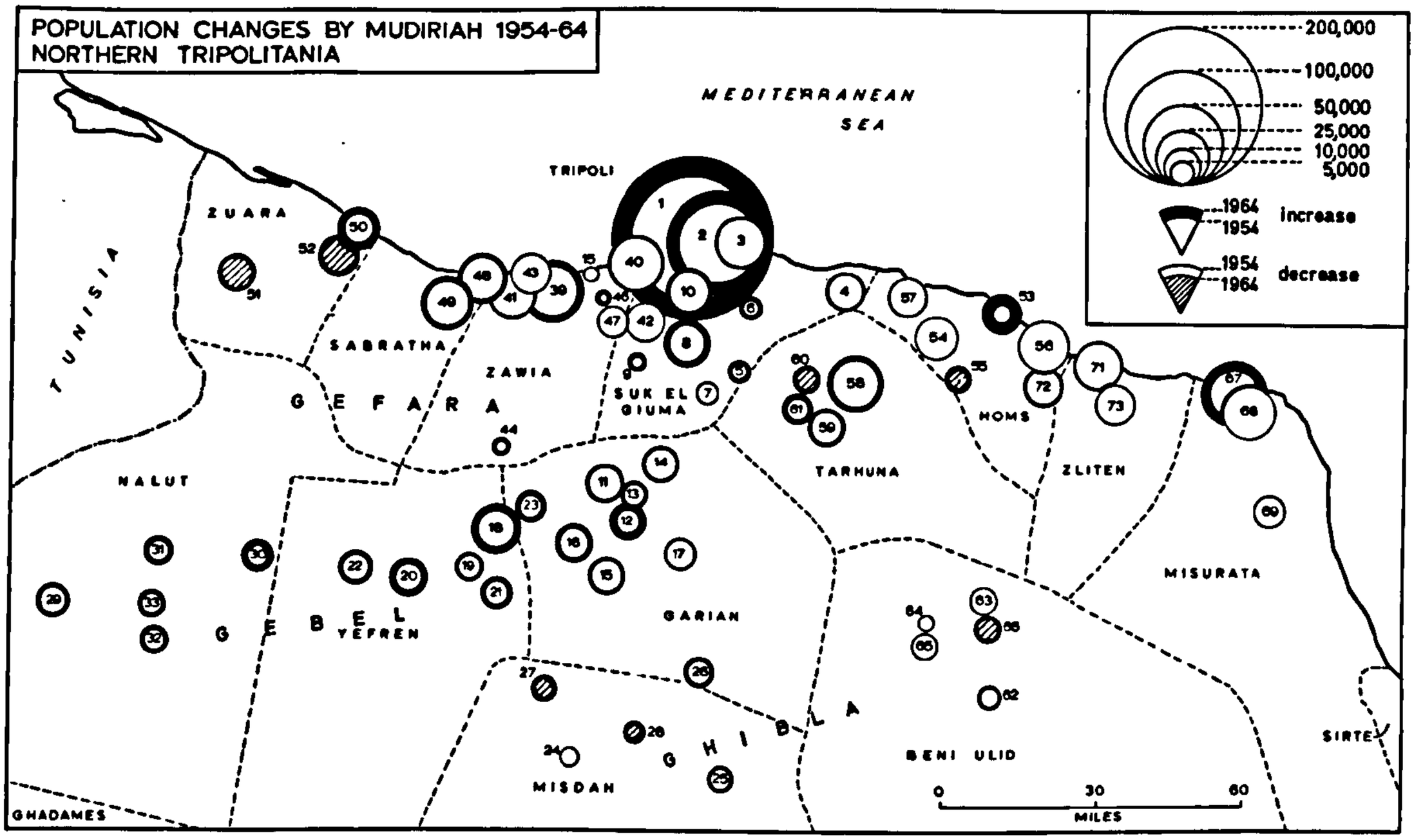
Table 3.2 Mudiriah Administrative Districts in Northern Tripolitania

1954 - 66

1. Tripoli City
2. Suk El Giuma
3. Taguira
4. Garabulli
5. El Khitna
6. El Alawna
7. Arrgaiat
8. Aulad Ouein
9. Al Ganafdha
10. Accara
11. Beni Daud
12. Beni Khalifa
13. Beni Nuseir
14. El Guassem
15. El Assabaa
16. Kikla
17. El Orban
18. Yefren
19. Arriaina
20. El Zintan
21. El Rujban
22. Giado
23. Irrheibat
24. El Moshashia
25. Aulad Abu Seif
26. El Magarah
27. El Zintan
28. Gantrar
29. Nalut
30. Giosc
31. Tiji
32. El Haraba
33. Cabao
34. Wazzin
35. Ghadames
36. Foughas
37. Derj
38. Sinawin
39. Zawia
40. Zanzur
41. Sorman
42. Ezzahra
43. El Harsha
44. Bir El Ghnem
45. Jude Eddaiem(Olivetti)
46. El Maamura
47. Bianchi
48. Sabratha
49. Al Ajeilat
50. Zuara
51. El Assa
52. Regdalin
53. Homs
54. Cussabat
55. El Amamra
56. Suk El Khamis
57. Gasr Khiar
58. Aulad Muselle
59. Aulad Maarref
60. El Hawatin
61. El Drahib
62. El Wasat
63. El Oteyin
64. El Sabayeh
65. El Saadat
66. El Jamamla
67. El Zarrug
68. El Mahjub
69. Tauorgha
70. Aboungim
71. El West
72. El Guima
73. El Fuatir

Geographical Index of names mentioned in Auble, A. Statistical Paper No. 13, Ministry of Planning and Development, Tripoli, (1966), pp. 1 - 5.

Figure 3.1



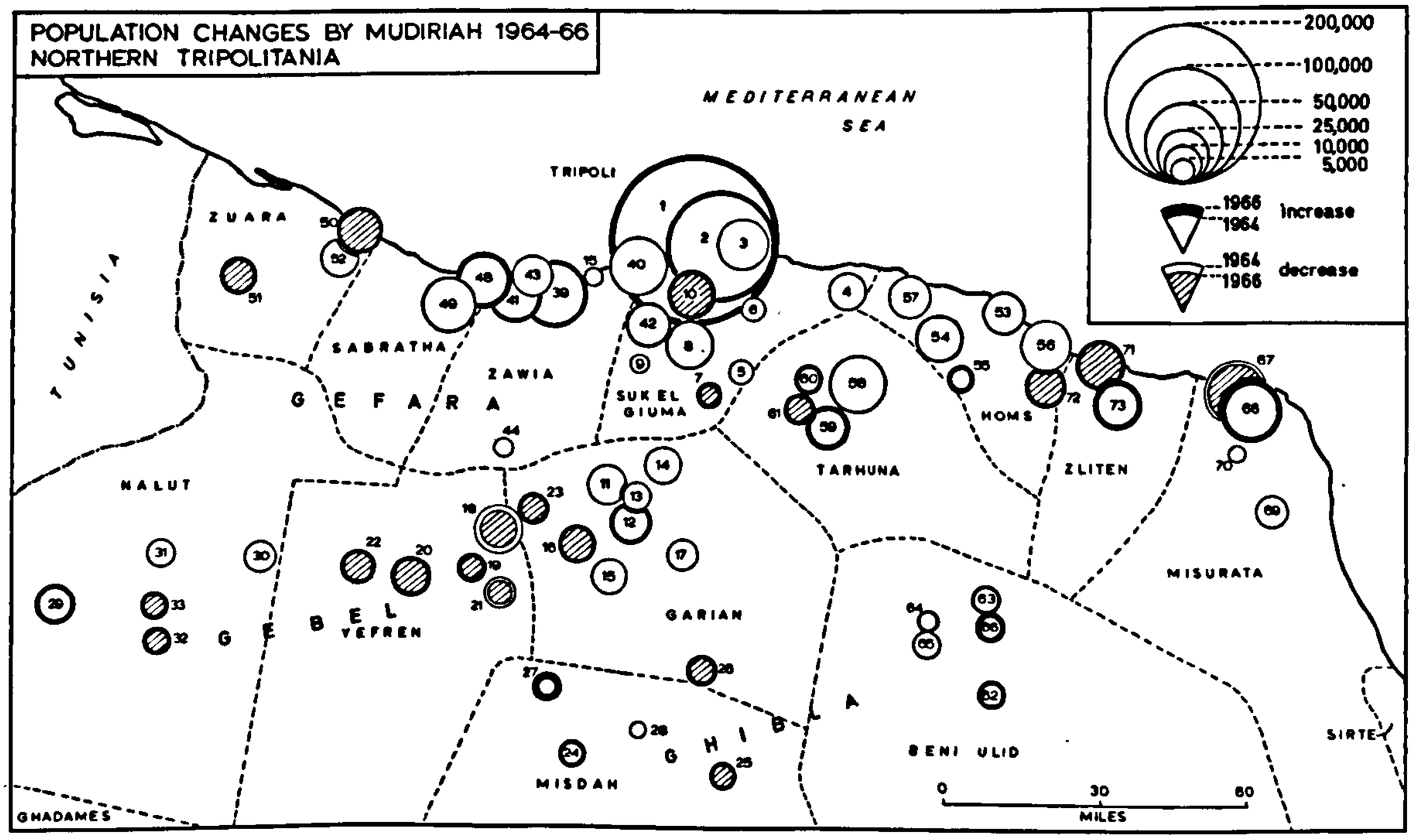


Figure 3.2

agglomerated populations, but approximate in large dispersed units, for Mudiriah boundaries are unknown and unmapped in many areas. Amalgamation of administrative units between 1954 and 1966 account for changes in the number and location of circles. Place names for the Mudiriah numbers are contained in Tables 3.2, 3.3 and 3.4.

3.1.1 Population Distribution in Northern Tripolitania

With a marked coastal and inland escarpment concentration Tripolitania's population distribution forms a wishbone shape (Figs. 3.1 and 3.2). The large number and size of Mudiriah populations emphasize the fact that in 1964 Tripolitania contained about 66 per cent of the national total, dominating the central coastal zone and forming a pivot for three limbs of population distribution each containing similar proportions of the national total. The eastern coastal zone contained approximately 13 per cent and had a more dispersed Mudiriah distribution than its western counterpart. Centred on Zawia, the Mudiriah populations of the western zone were clumped to the western and southern boundaries of Tripoli, forming a more clustered contingent. The whole coastal zone, stretching from Zuara in the west to Misurata in the east,contained about half the country's total population.

A third zone can also be distinguished. Containing about 13 per cent of the national total, the Gebel Mudiriah form a subsidiary inland alignment. While the population distribution follows a 150 mile escarpment trending south-west from Tarhuna to Nalut, the central areas around Garian are the most important. The remainder of

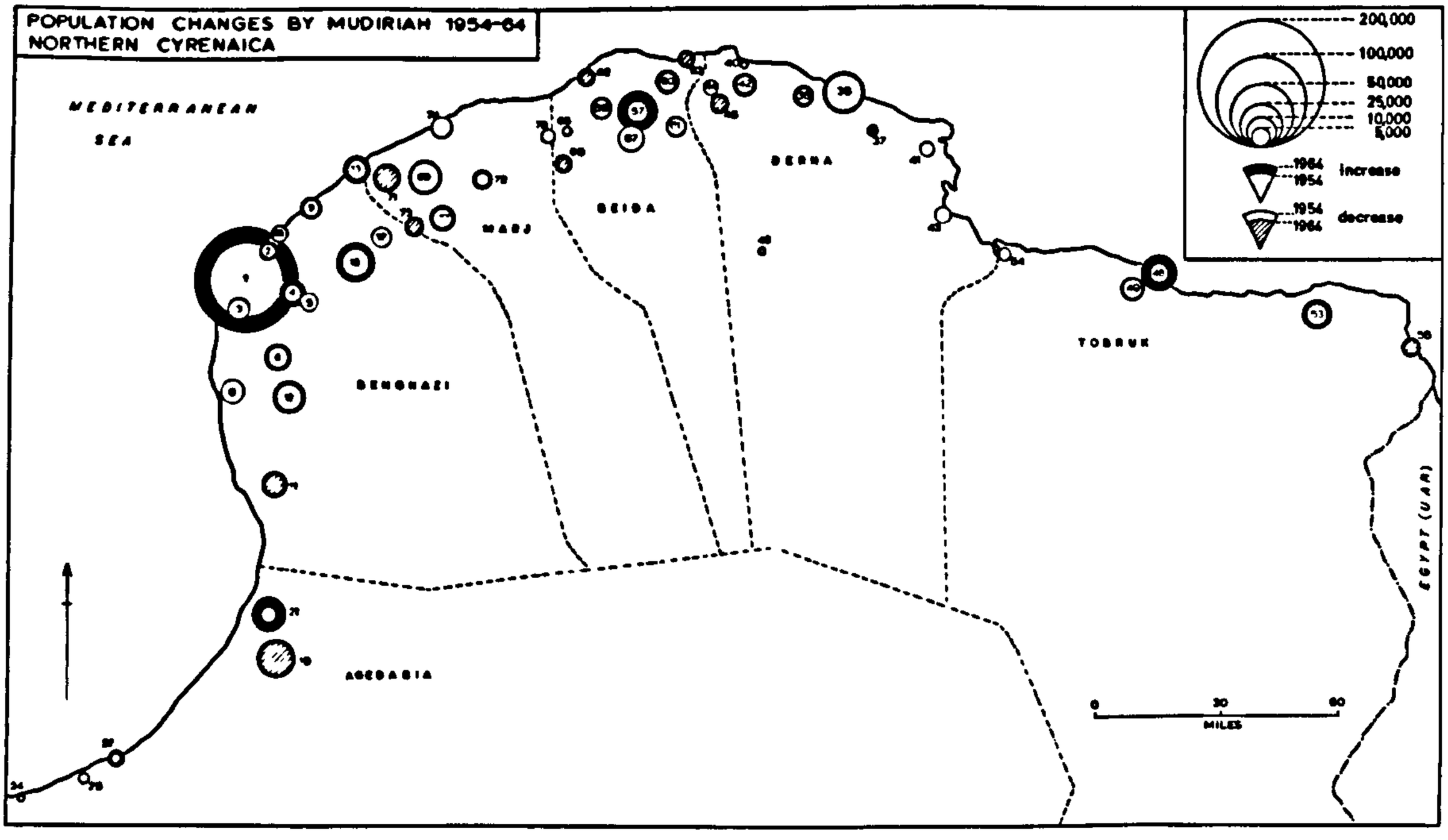
Table 3.3. Muririah Administrative Districts in Northern Cyrenaica,

1954 - 66

1. Benghazi City
2. Kwefia
3. Guarsha
4. Benina
5. Regima
6. Jardina
7. Al Hamda
8. Ghemines
9. Diriana
10. Bu-Meriam
11. Magrun
12. Solluk
13. Tocra
14. Sidi Mahieus
15. Abiar
16. Nuaghia
17. Alemeittaniya
18. Sidi Kalifa
19. Agedabia (Ijdabia) Town
20. Agedabia
21. Zuetina
22. Brega
23. Sidi Sultan
24. Ageila
25. Bishr
26. Marada
27. Jalo
28. Jikerra
29. Aujila
30. Eljof
31. El Hawari
32. Attulab
33. Tazirbu
34. Ribiana
35. Derna Town
36. Derna
37. Martuba
38. Ain Mara
39. Latrun
40. Ras Hilal
41. Um Er Rezzem
42. El Gubba
43. El Temimi
44. Labrag
45. El Giacab
46. El Mikheili
47. El Ezziat
48. Tobruk Town
49. Tobruk
50. Kanboot
51. Kasir El Jidi
52. Bir El Ashab
53. Ain El Gazala
54. Al Gartabah
55. El Berdi
56. Jaghbub
57. Beida Town
58. Beida
59. Messa
60. Shahat (Cyrene)
61. Faydiya
62. El Haniya
63. Sussa (Apollonia)
64. Saltna
65. Al Argub
66. Gandula
67. Omar El Mukhtar
68. Marawa
69. Marj Town (Merj of Barce
70. El Marj
71. Farzugha
72. Tackinnes
73. Sidi Buzeid
74. Tolmeitha
75. Batta
76. El Beyada
77. Gerdes El Abid
78. El Bunnaia
79. Gasr Libya.

Geographical Index of names mentioned in Auble, A. Statistical Paper No. 13, Ministry of Planning and Development, Tripoli, (1966), pp. 1 - 5.

Figure 3.3



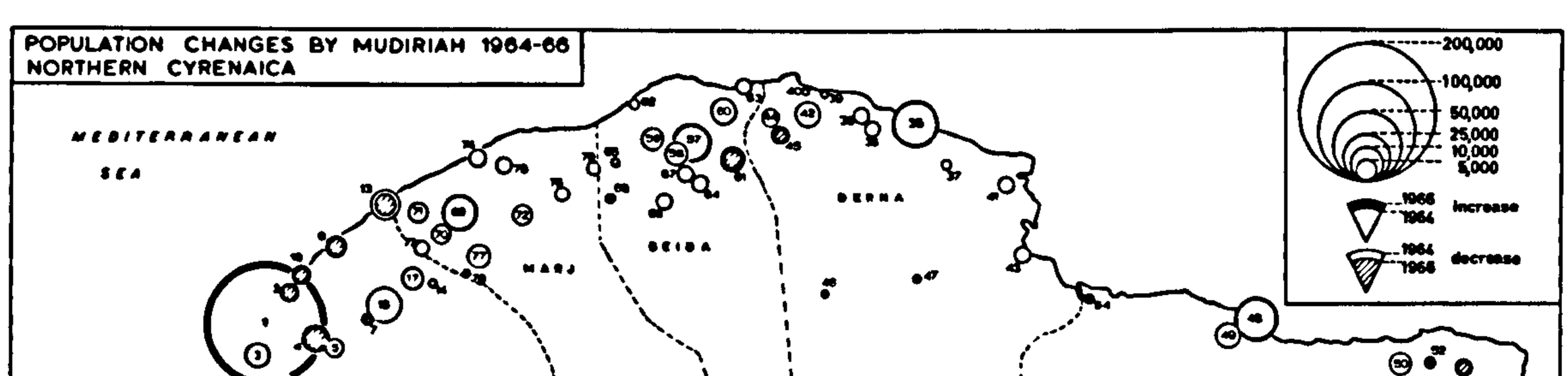


Figure 3.4

Tripolitania's population is dispersed in the southern part of the province. While scattered, most of the Mudiriah are located around oases, generally aligned parallel with the Gebel escarpment though at the foot of the southern dip slope known as the "Ghibla".

3.1.2 Population Distribution in Northern Cyrenaica

Although Cyrenaica's distribution of population shows a similar coastal concentration, both its proportions and groupings of Mudiriah differ markedly from Tripolitania (Figs. 3.3 and 3.4). Benghazi City, though eminent amongst Cyrenaican Mudiriah, is smaller than its Tripolitanian counterpart accounting for only 10 per cent of national total. Mudiriah adjacent to Benghazi are also less imposing, while the coastal plain to the north and south of the city forms only 6 per cent of the national total. Most of this population is distributed south of Benghazi City. A further 8 per cent of the Libyan population is concentrated on the Gebel Akhdar trending approximately 120 miles north-east of Benghazi. It is grouped in two similar sized units, one around Marj Town and the other around Beida Town. Derna and Tobruk, as coastal towns, form the bulk of the remaining population concentrated on the northern coast, containing about 3 per cent of the national population. Most of these Mudiriah are small and regularly dispersed.

A similar proportion of the provincial population is distributed in the desert interior, principally in the oases of Jaghbub, Jalo and Kufra.

3.1.3 Population Distribution in the Fezzan

The small size of the Fezzan population is emphasized by the fact that the total 1964 population could be contained in circle number 2 on Figure 3.1. Despite the small scale and dispersed nature of the Fezzan population, however, the region claimed provincial status until 1963.

Table 3.4 **Mudiriah Administrative Districts In the Fezzan, 1964**

1. Sebha Town
2. El Gedid and Buanis
3. Brak
4. Idri
5. Bergin
6. El Hassawna
7. El Maguartia
8. Hon
9. Waddan
10. Socna
11. Zella
12. El Fugha
13. Ubari
14. Garifa
15. Bint Bayyah
16. Oragen
17. Murzuk
18. Traghen
19. Um el Araneb
20. Zuila
21. Gatrum
22. Wadi Atbah
23. Ghat
24. El Berket
25. Ouinat

Geographical Index of names mentioned in Auble A. Statistical Paper No. 13, Ministry of Planning and Development, Tripoli, (1966), pp.1 - 5.

DISTRIBUTION OF POPULATION IN THE SOUTHERN REGION (FEZZAN) 1964

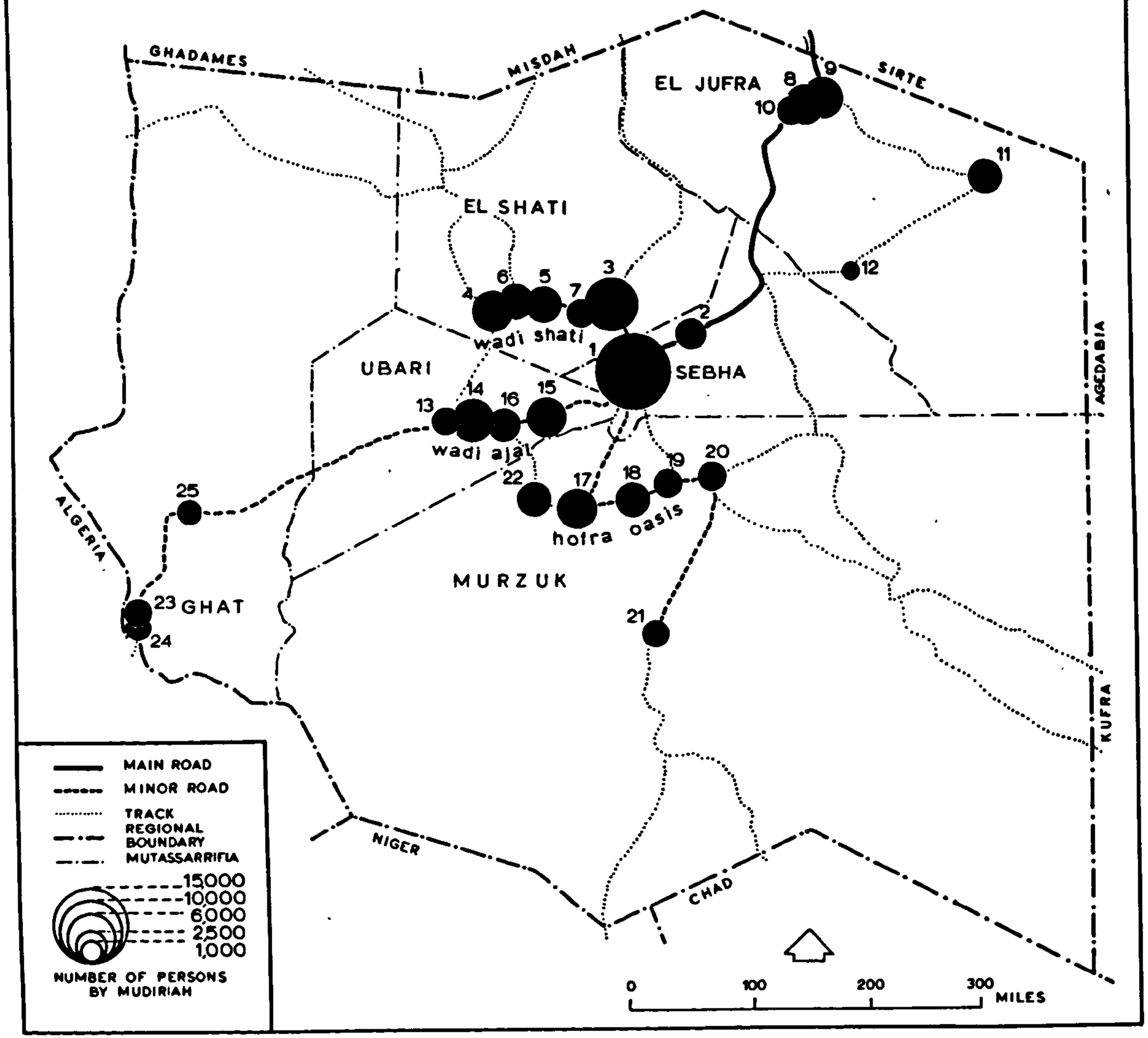


Figure 2.5

Separated from the two northern provinces, the Fezzan achieved a measure of self-sufficient independence based on the old capital of Murzuk but more recently on Sebha. As Figure 3.5 shows, the 1964 population was aligned in three parallel zones. The largest group was centred on Sebha containing only about one per cent of the national population, but 18 per cent of the Fezzanese total. The parallel groupings in the north and south, based on Brak and Murzuk respectively, contained a further one per cent of the Libyan population. The outlying oases of Hon, Ghat, and Gatrun, made up the remainder.

3.2 Distributional Changes 1954-66

While information for northern Tripolitania and Cyrenaica relates to three specific dates, 1954, 1964 and estimates in 1966, a two-phased change in population distribution is apparent.

Between 1954 and 1964 Tripolitania's main increase was concentrated dramatically in the Tripoli complex (Fig. 3.1). Increases in the settled areas of the coast occurred around Zuara, Zawia, Homs and Misurata. All the Gebel areas extending from Cussabat to Nalut showed sustained increases. Slight decreases were apparent in the western Gefara and the southern Gebel dip-slope, while the eastern coastal region showed a stagnant situation outside the coastal towns. The distribution pattern changed radically after 1964. Half of the western Mudiriah showed a decrease, together with the western Gefara and eastern coastal Mudiriah (Fig. 3.2). In fact, only Tripoli City and its surrounding districts experienced any significant increase, although districts adjacent to Tripoli began to show a decline.

Although Cyrenaica's population distribution has a different pattern from Tripolitania's, a similar two-phased change could be identified.

Benghazi City dominated the provincial growth during 1954-64, although there was less repercussion on its neighbouring Mudiriah than in the Tripoli complex (Fig. 3.3). The new capital of Beida, the eastern port of Tobruk, and the oilfield exploration centre of Agedabia were the major subsidiary growth points. The main areas of decrease occurred in the small Mudiriah surrounding Beida and Marj, and in the plain south of Benghazi. The devastation of Marj by the 1963 earthquake undoubtedly influenced the decrease in population. This pattern was re-emphasized after 1964 (Fig. 3.4). Benghazi City continued to expand, but this time at the expense of the surrounding Mudiriah. The main towns grew steadily, while the Benghazi plain increasingly became an area of declining population.

The large growth of the Fezzan population from 59,000 to 79,000 between 1954 and 1964, and to 86,000 in 1966, cannot be explained purely by demographic processes. Some local population adjustment has taken place. For instance, the old capital of Murzuk has been replaced by Sebha, which doubled its population during 1954-64. However, evidence from recent field work in the Fezzan [3] suggests that the proportions of total population in the three major wadis have remained relatively stable in recent years. Consequently, census enumerations in either 1954 or 1964, together with boundary changes, must account for the exceptional growth in Libya's southern province.

3.3 Changes in Population Density 1954-64

Ways of depicting geographical distributions depend as much on cartographic convention as on the inherent nature of the phenomena being shown. The clustered nature of mudiriah represented by proportional circles, for instance, indicates changes over time effectively, but fails to relate the population to area. The patterns of density in Northern Tripolitania and Northern Cyrenaica are summarized in Figures 3.6 to 3.11.

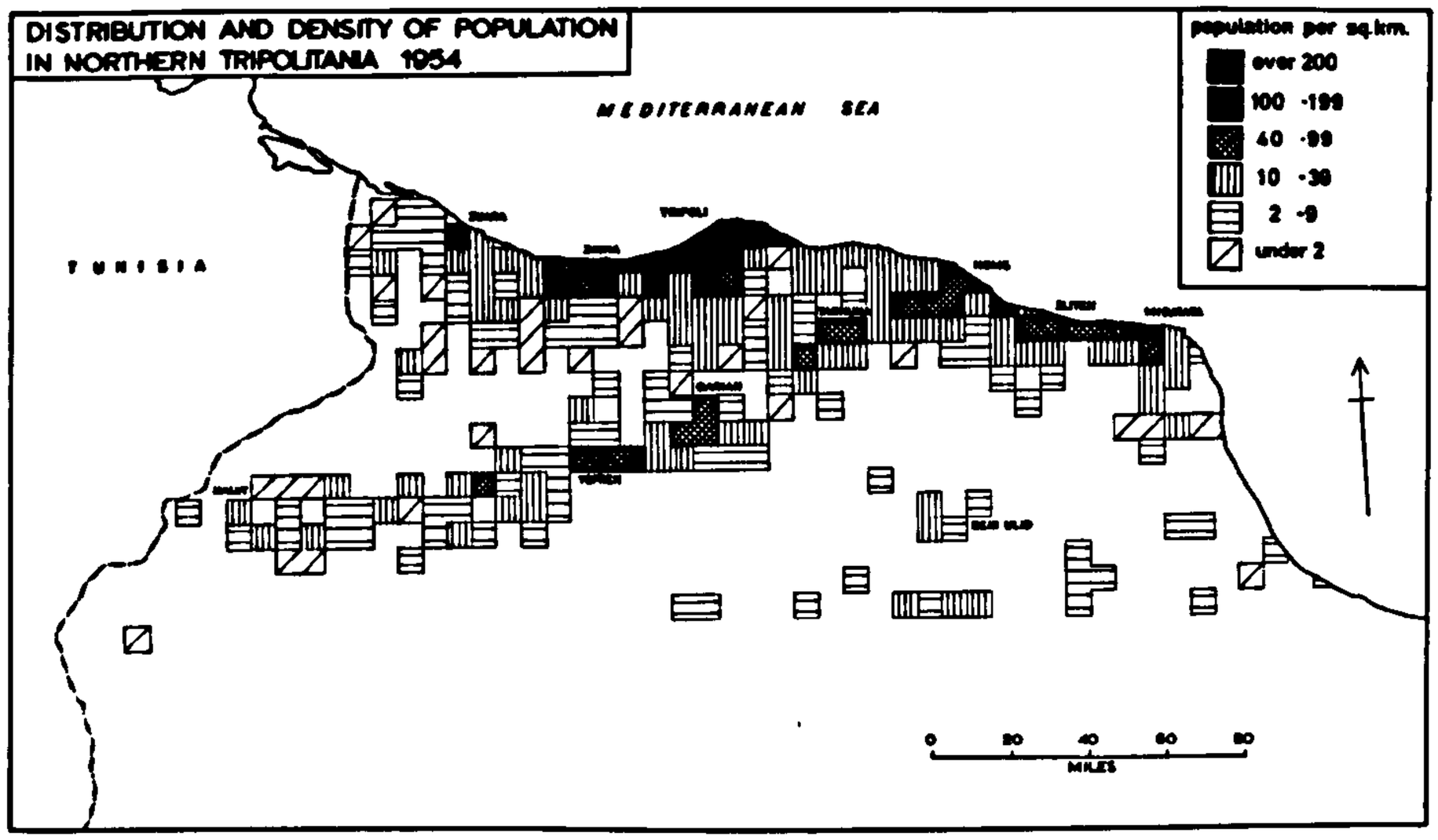


Figure 3.6

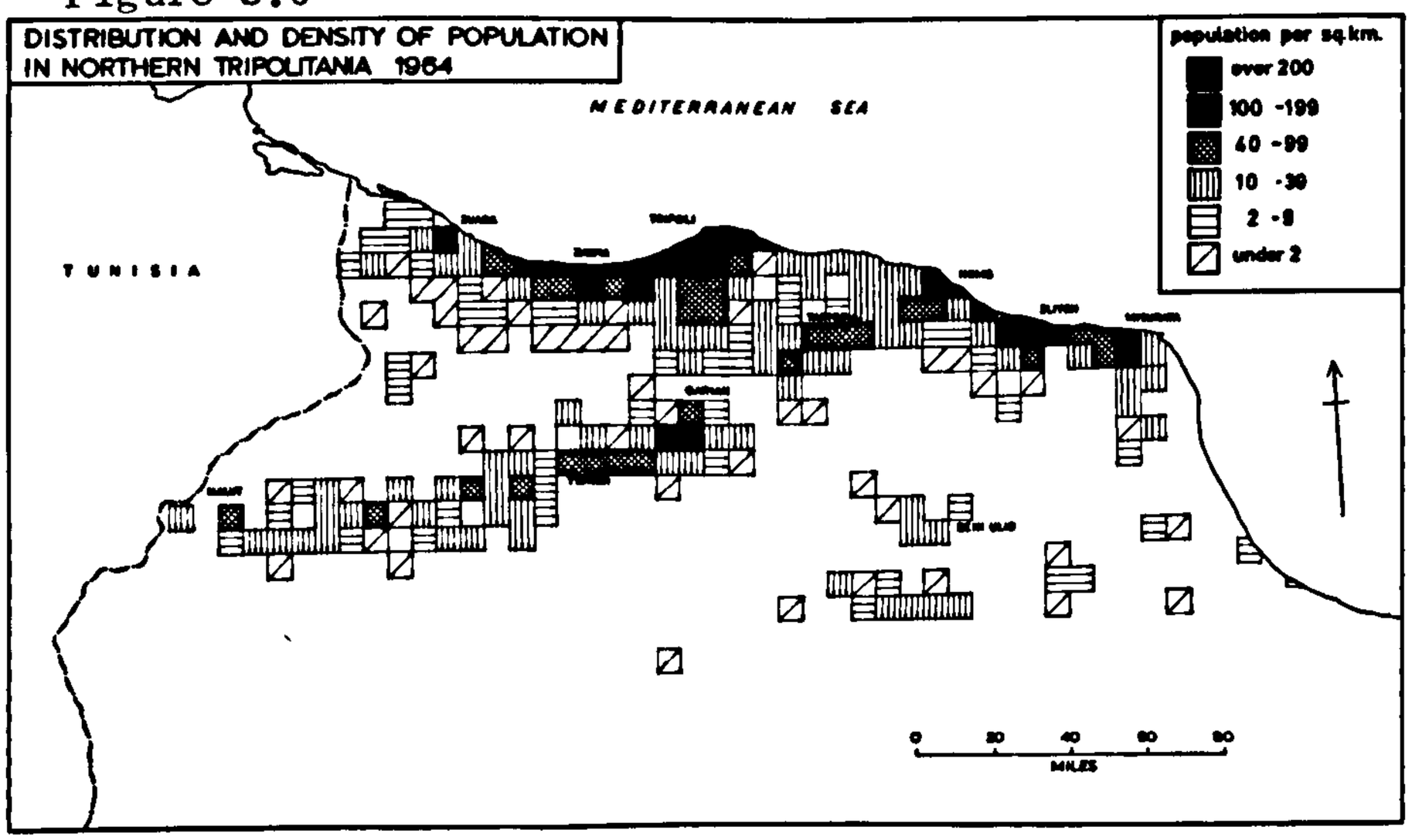


Figure 3.7

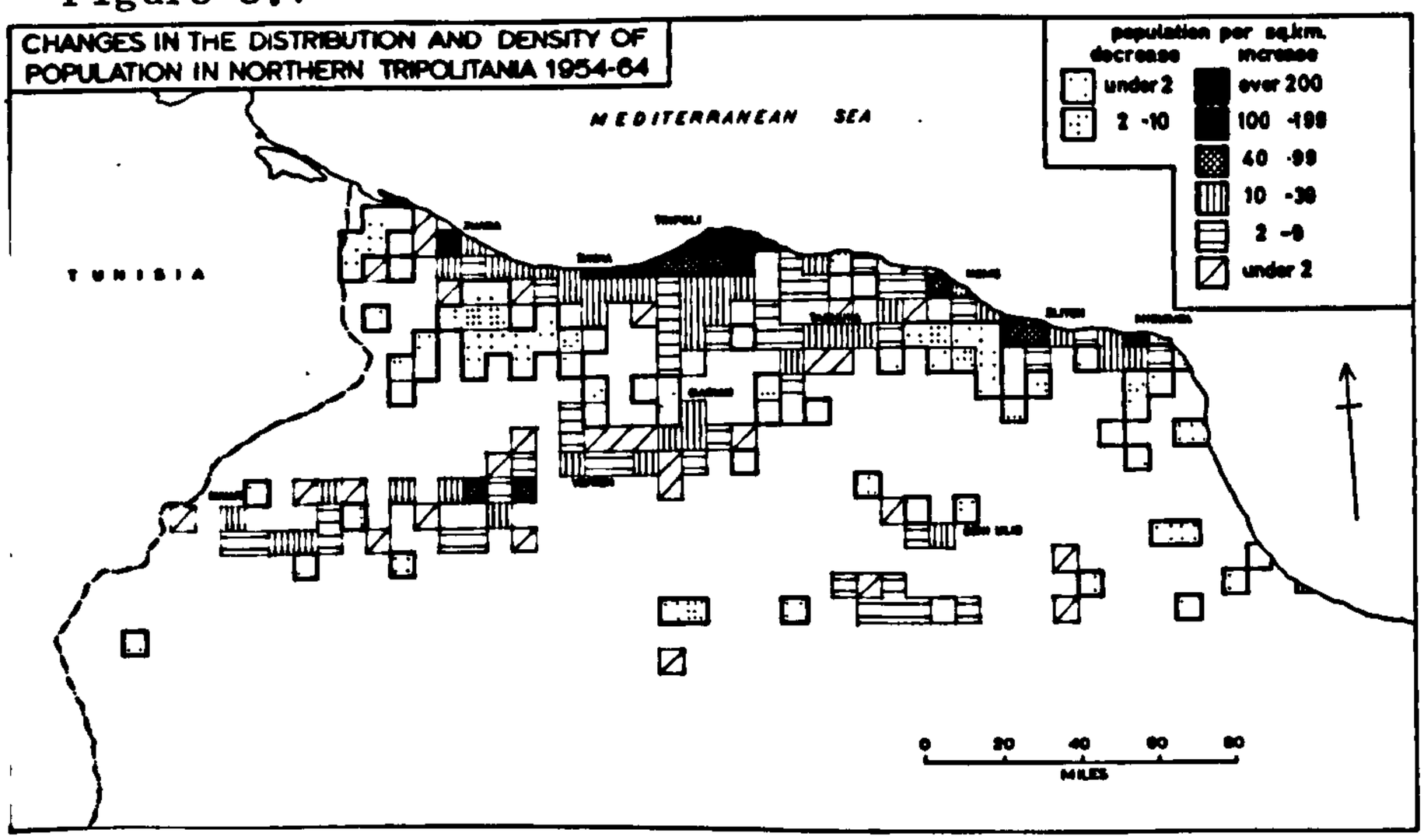


Figure 3.8

These density surfaces may be thought of statistically as a response surface in which height, i.e. population density, varies as a response to controlling factors. While the density gradients highlight regional disparities and suggest particular environmental controlling factors, the method used in portraying the densities is inevitably a generalization. A 10 kilometre square grid was placed over a dot map for the 1954 population[4] thereby creating an artificial, though standardized, relationship between area and population. *

The settled population in 1954 and 1964 identified in the density maps indicates a similar basic pattern to the Mudiriah distribution; coastal concentration, inland Gebel alignment in Tripolitania, and minor interior oasis groupings. Tripolitania had higher average densities than Cyrenaica though it also experienced steeper density gradients, especially inland from the coast (Figs.3.6 and 3.7). Cyrenaica displayed more uniform densities, particularly on the upland Gebel Akhdar, and lacked high rural densities along the coast. Urban centres in Cyrenaica contrasted sharply with low surrounding population densities, a feature nd so significant in Tripolitania (Figs. 3.9 and 3.10).

---

* A map was published in 1964 on the scale 1:1,000,000 by the Department of Regional Geography, Warsaw, which showed the 1954 distribution of Libyan population using standard size dots, each dot representing 200 persons. The map was checked at the Mutassarrifia district level and was found to be accurate. The 1964 population distribution and density was based on a 1966 map devised by the Ministry of Planning and Development, Libya, although each standardized dot represented 1,000 persons. A more detailed distribution of population in northern Libya on the scale 1:1,000,000, and with each dot representing 200 persons, was undertaken by the writer in 1967.

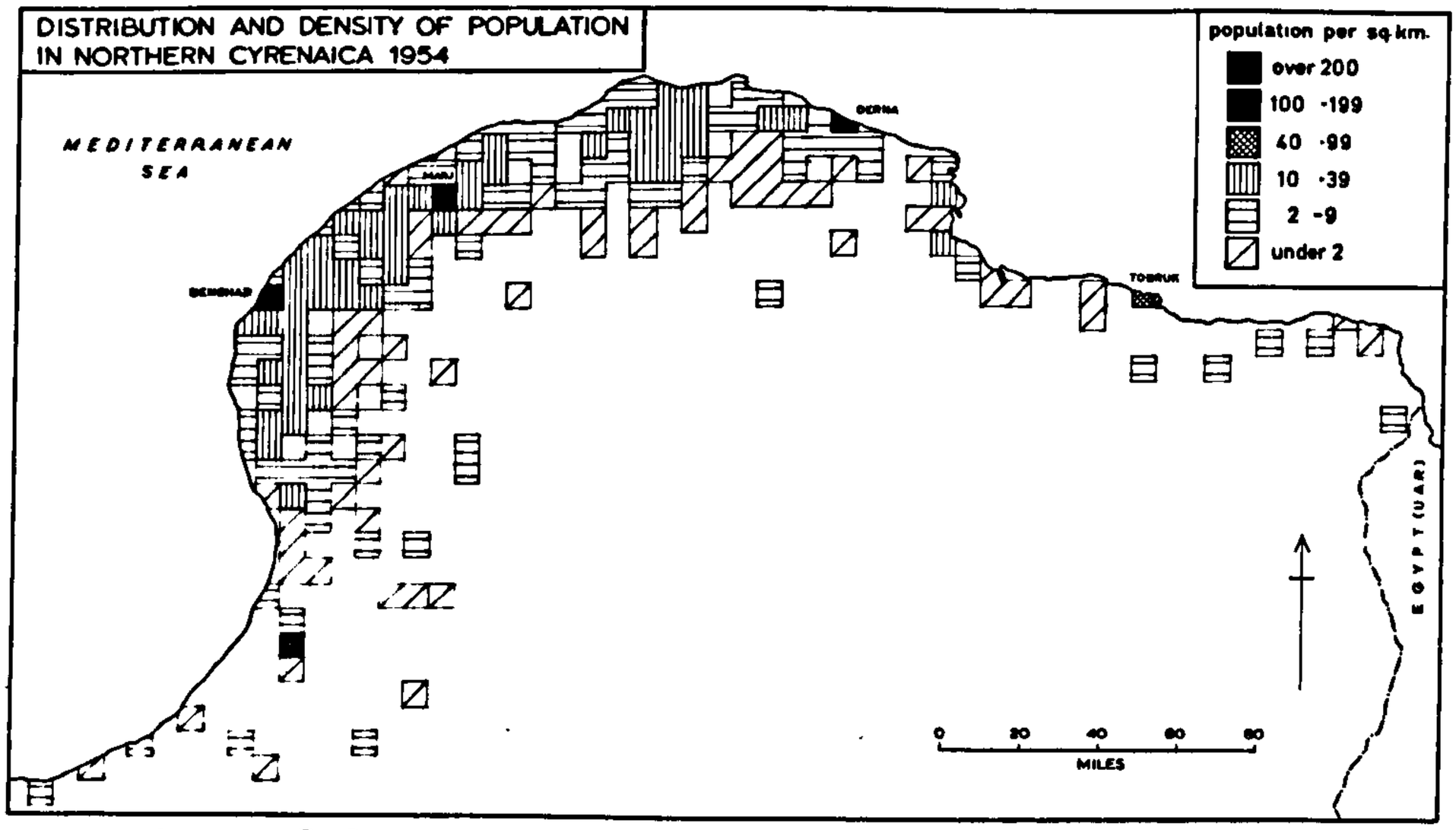


Figure 3.9

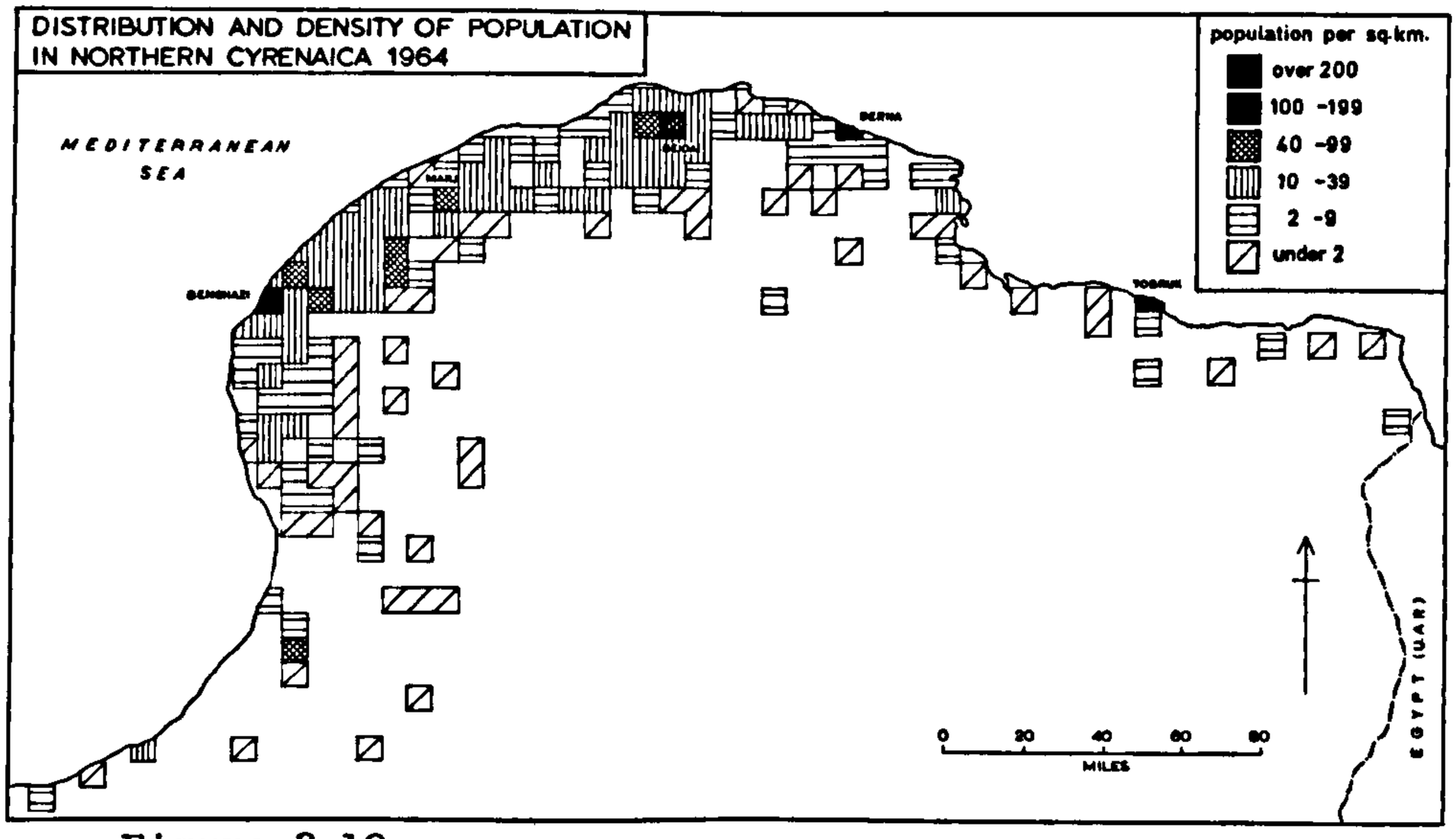


Figure 3.10

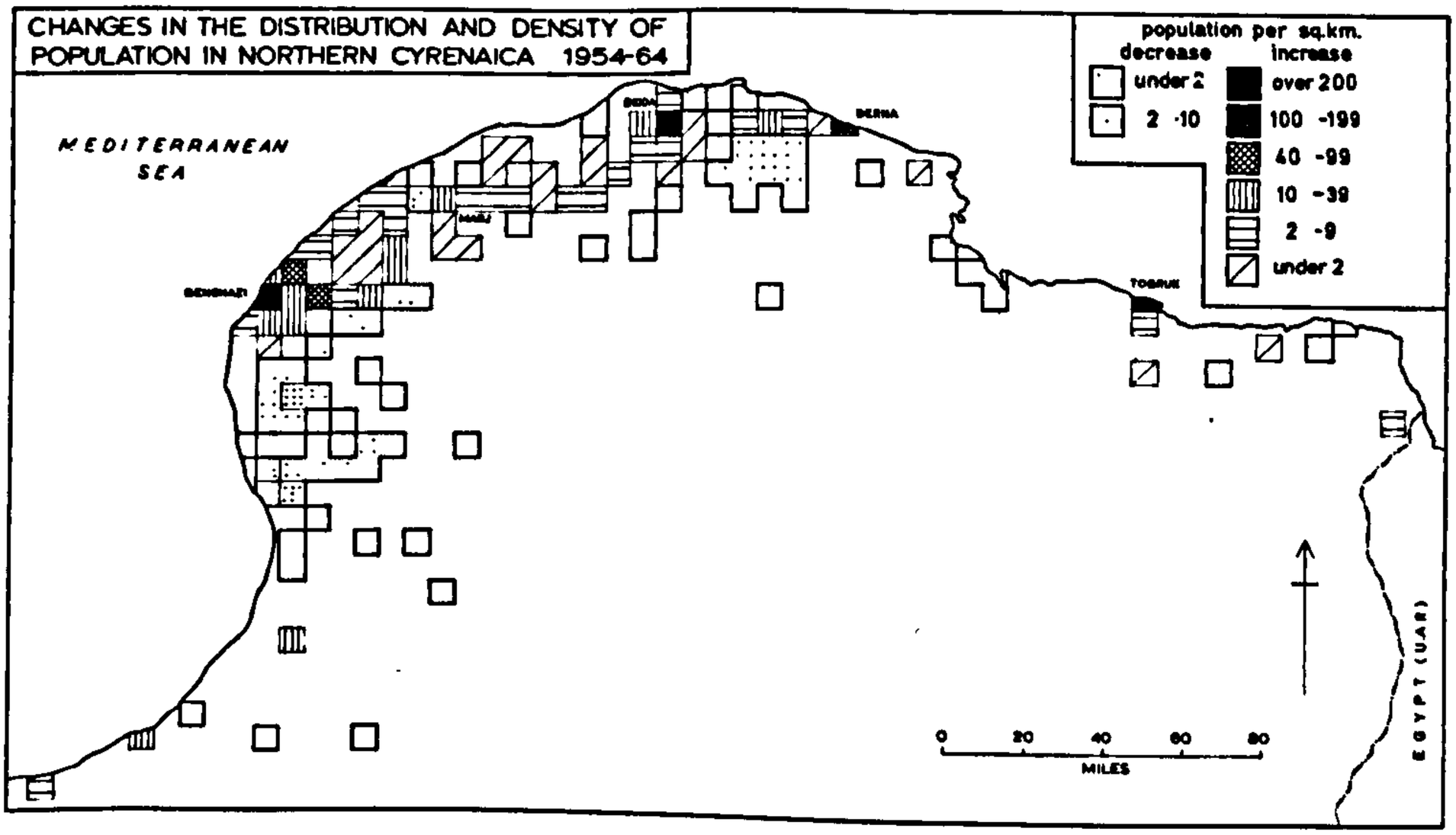


Figure 3.11

Urban centres in both provinces dominated the density increases during 1954-64, particularly Tripoli and Benghazi Cities. Areas of decrease in Tripolitania were the western Gefara, the southern slopes of the Gebel escarpment, and the eastern coastal areas between Tarhuna and Misurata (Fig. 3.8). The extreme western Gebel around Nalūt, and interior oases near Beni Ulid also indicated a decrease. Cyrenaica displayed a similar pattern of change. The southern Benghazi plain was the major zone of decrease, although the Gebel Akhdar, particularly between Beida and Derna, also showed a marked change during 1954-64 (Fig.3.10).

3.4 Regional Co-efficients of Distributional Evenness

As rainfall is a vital element in the land use of northern Libya and hence in the distribution of rural population, an association between rainfall zones and population density provides a basis for inter-provincial comparison. Lorenz curves (Fig.3.12) indicates the degrees of population concentration in each northern province, giving some quantitative basis for inter-provincial comparisons.[5] An area of similar size was selected in northern Tripolitania and Cyrenaica, containing approximately 90 per cent of each province's population and equivalent rainfall zones. Rainfall isohyets at 50 mm. intervals were interpolated on a dot map of the 1954 settled population in Cyrenaica.[6] Estimates of the rural population in each rainfall zone had been made in northern Tripolitania.[7] Areal units were arranged in order of decreasing density of population, Both population and areas of rainfall zones were totalled for each density class. Cumulative percentages of rainfall zones (Y-axis) were plotted against cumulative percentages of population (X-axis). The more unevenly the population was distributed the more closely the distribution of population approached the X and Y axes.

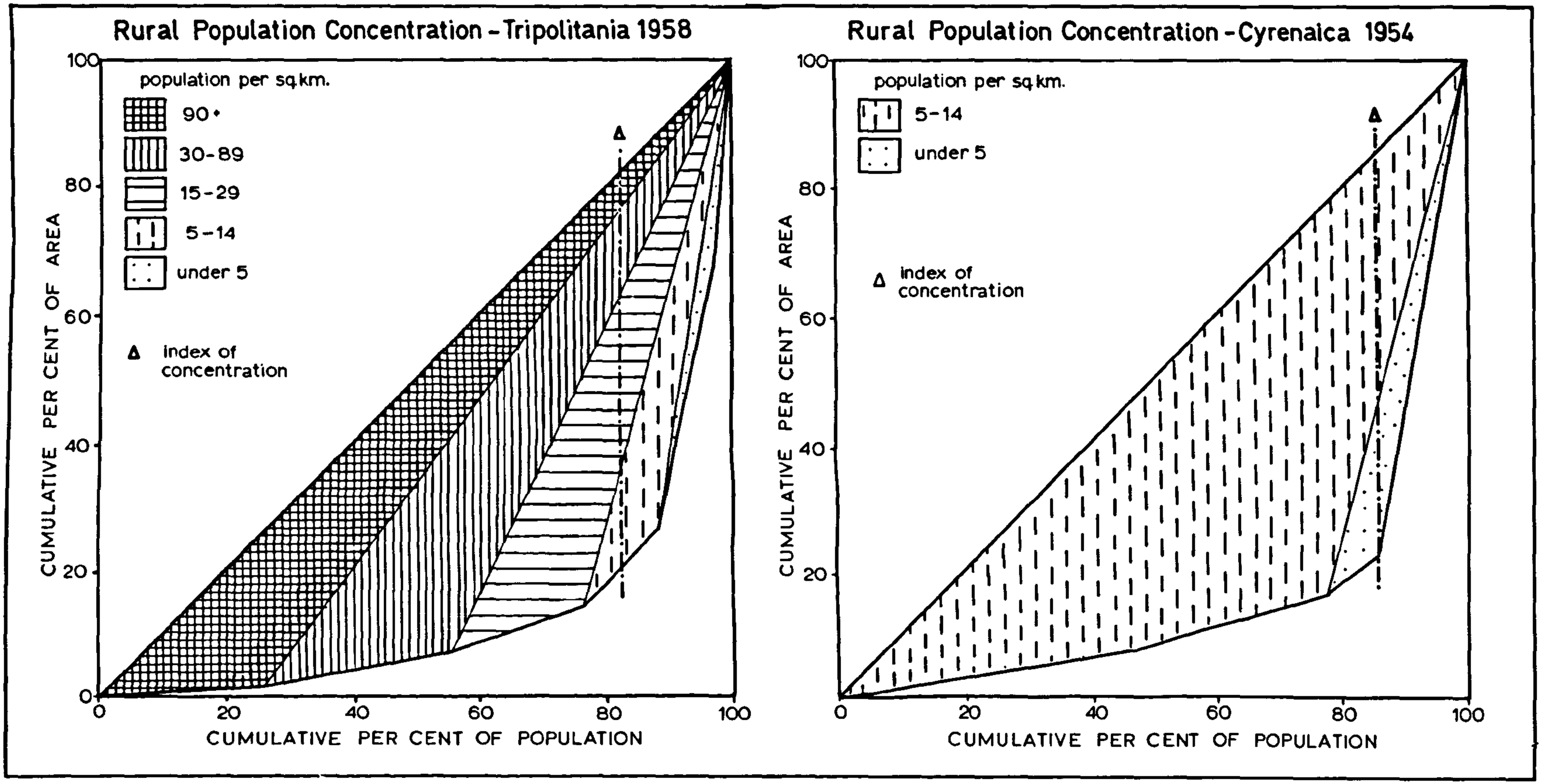

Rural Population Concentration - Tripolitania 1958
population per sq.km.
90+
30-89
15-29
5-14
under 5
Δ index of concentration
CUMULATIVE PER CENT OF AREA
CUMULATIVE PER CENT OF POPULATION
0
20
40
60
80
100
Rural Population Concentration - Cyrenaica 1954
population per sq.km.
5-14
under 5
Δ index of concentration
CUMULATIVE PER CENT OF AREA
CUMULATIVE PER CENT OF POPULATION

Figure 3.12

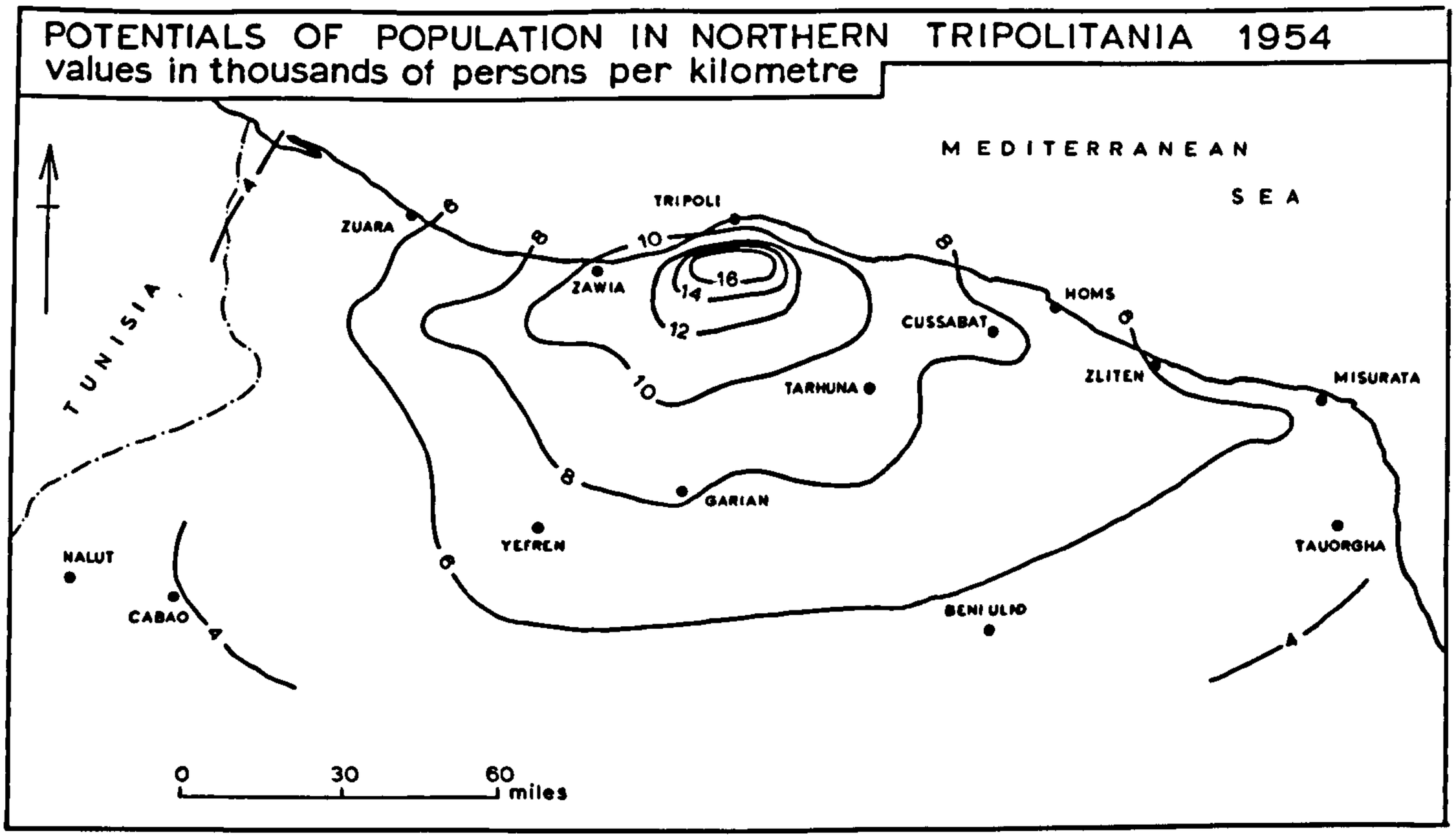
A concentration ratio, expressing the area on the graph between the Lorenz curve and the diagonal, as a proportion of the total area below the diagonal, revealed 11 per cent for Tripolitania and 22 per cent for Cyrenaica. Tripolitania therefore had higher densities, a greater variety of density groups and a larger co-efficient of unevenness than Cyrenaica.

3.5 Population Potentials in Northern Libya

There is an evident tendency for the Libyan population to concentrate in particular areas; in towns, along the coast, and in the higher rainfall zones. Some of these areas have a high population potential. Stewart[8] refers to a population potential as a measure of nearness of people to that point, as a measure of general accessibility, or as a measure of influence of people at a distance. This tendency to congregate represents an attraction of people for people that turns out to have a mathematical as well as a merely verbal resemblance to Newton's law of gravitation. In the physical analogy, the potential is the energy in the field (gravitation) of a unit mass (charge). The energy of a given mass at a point is the potential of that point multiplied by the said mass. Likewise, the "demographic energy" or "interchange" between a population N, and a second population N2 at distance d is N, times N2/d. In other words, potential varies inversely with distance.

Four maps were constructed in northern Libya to measure the population potential and to note provincial changes between 1954 and 1964. The procedure in constructing isopleths of equipotentials of population were the same for the four maps. A grid containing 10 km. squares was placed over maps of northern Tripolitania and Cyrenaica, similar to the density maps (Figs. 3.6 and 3.11). Calculation of the populations in each square revealed 234 locations in Tripolitania in 1954 and 223 in 1964; Cyrenaica's equivalent locations were 168 and 151 respectively. The

Figure 3.13



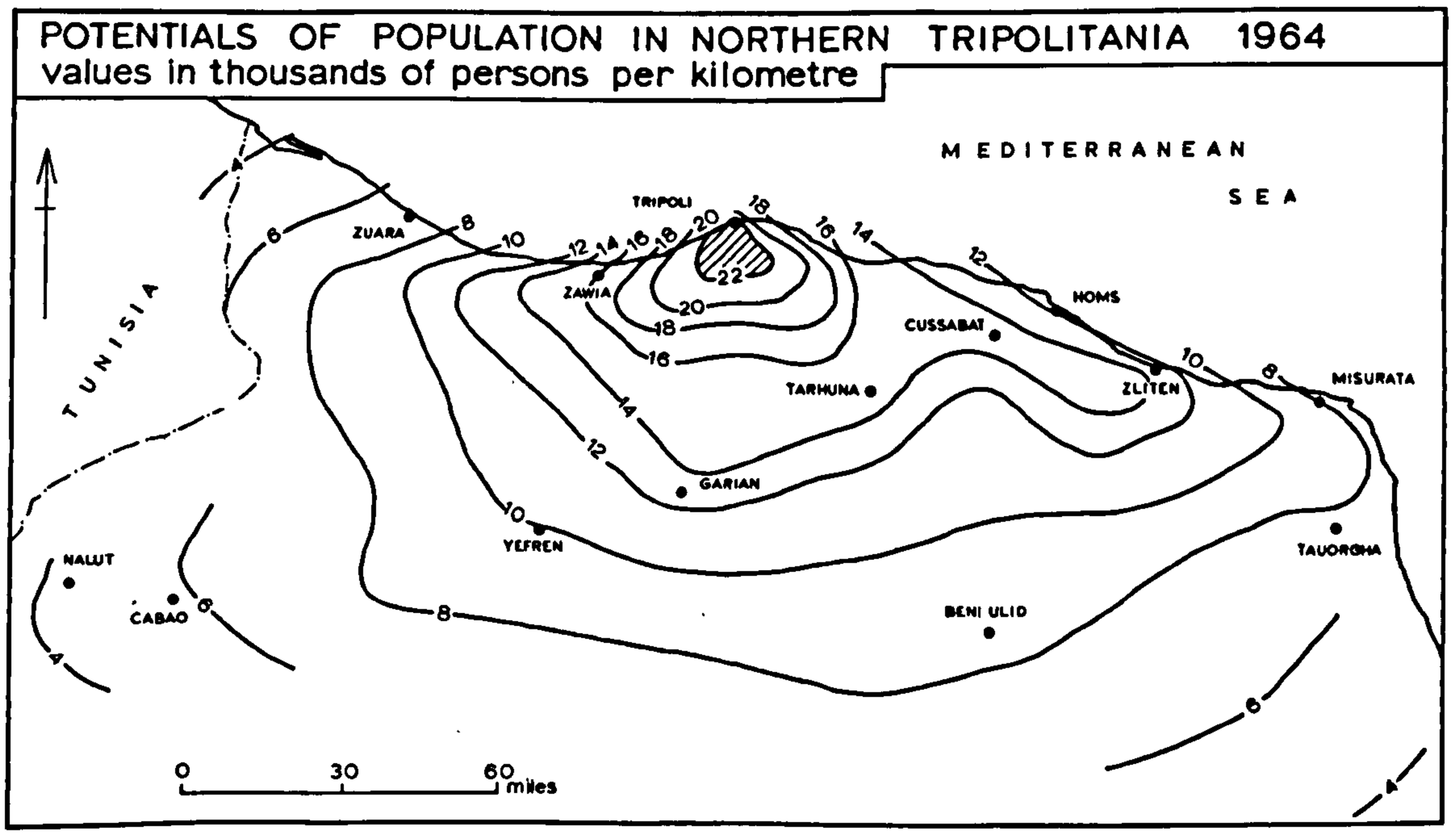


Figure 3.14

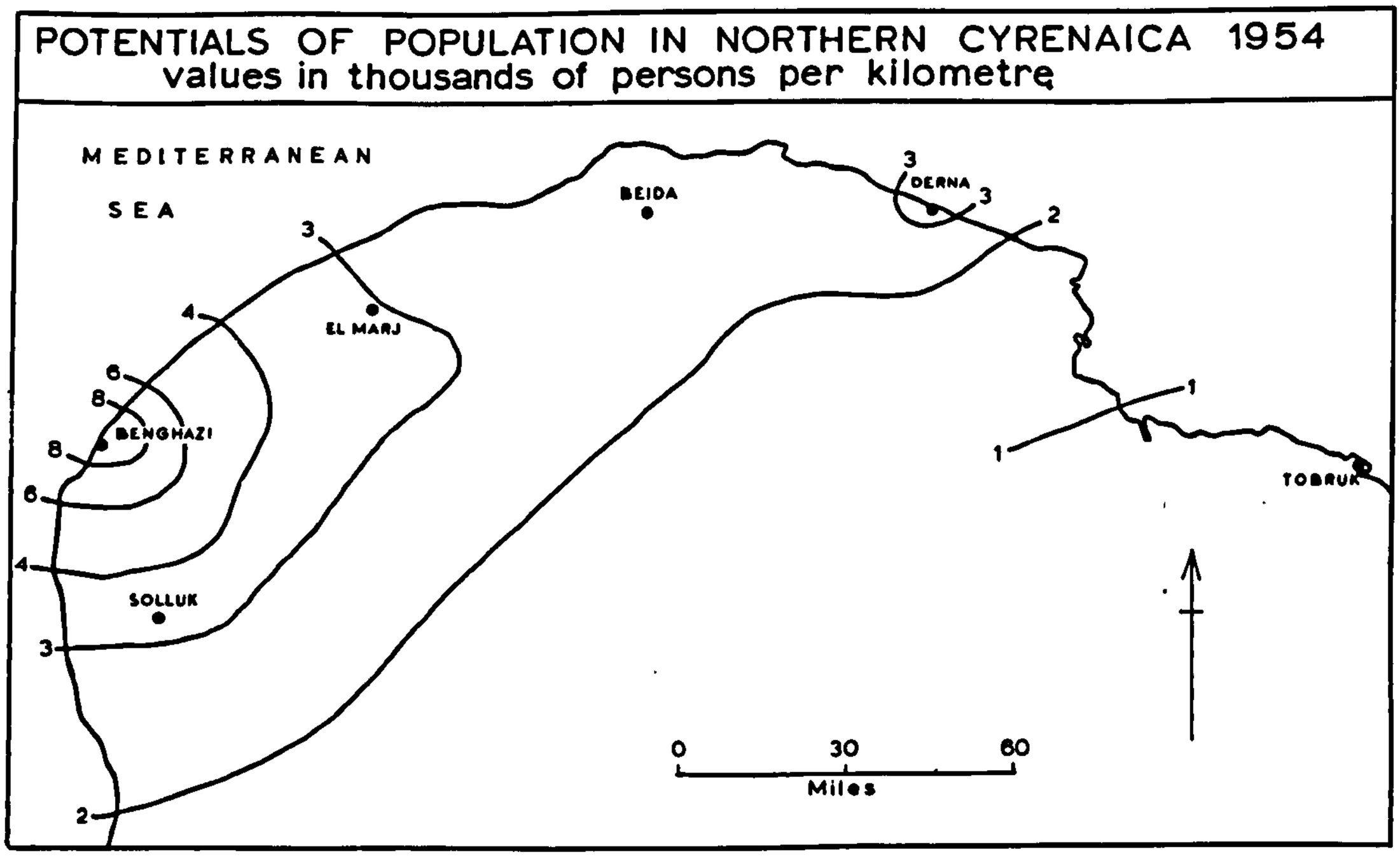
population of each district was arbitrarily supposed to be concentrated at the centre of each square. Distance in kilometres was measured by means of two axes, X and Y, giving a 17 x 40 square matrix for both provinces. The sum of a point to all other points on the grid divided by its distance, plus the potential of the point on itself, were calculated on an I.B.M. computer.

The maps of population potential in Tripolitania in 1954 and 1964 (Figs. 3.13 and 3.14) have two striking features in common. The major peak in both concentrations is Tripoli City. A dominant axis, or ridge, runs east and west from Tripoli, descending rapidly towards the desert interior. The pattern remained similar during 1954-64, with a slightly higher eastern ridge in 1964. However, values increased about one and a half times over the ten year period.

Cyrenaica shows the increasing importance of Benghazi, but without a well-defined ridge along the coast. A rapid fall of potential inland is broken by a plateau covering the whole of northern Cyrenaica with local peaks around the towns of Derna and Tobruk (Figs. 3.15 and 3.16). It is significant that the new capital of Beida has had little influence on the equipotential values.

In physics the rate of change of potential with distance in any direction measures the "field intensity" in that direction. The field intensity is the number of people divided by the square of their distance away; it is a directed, or "vector", quantity, while potential is a "scalar" quantity, without direction. "Lines of force" define the field and always run at right angles to the contours of equipotential. The sharpening of the Tripoli and Benghazi peaks, which presumably is still going on, indicates that in this respect also the physical analogue carries into demography. Populations tend to shift slowly along the lines of force towards the peaks

Figure 3.15



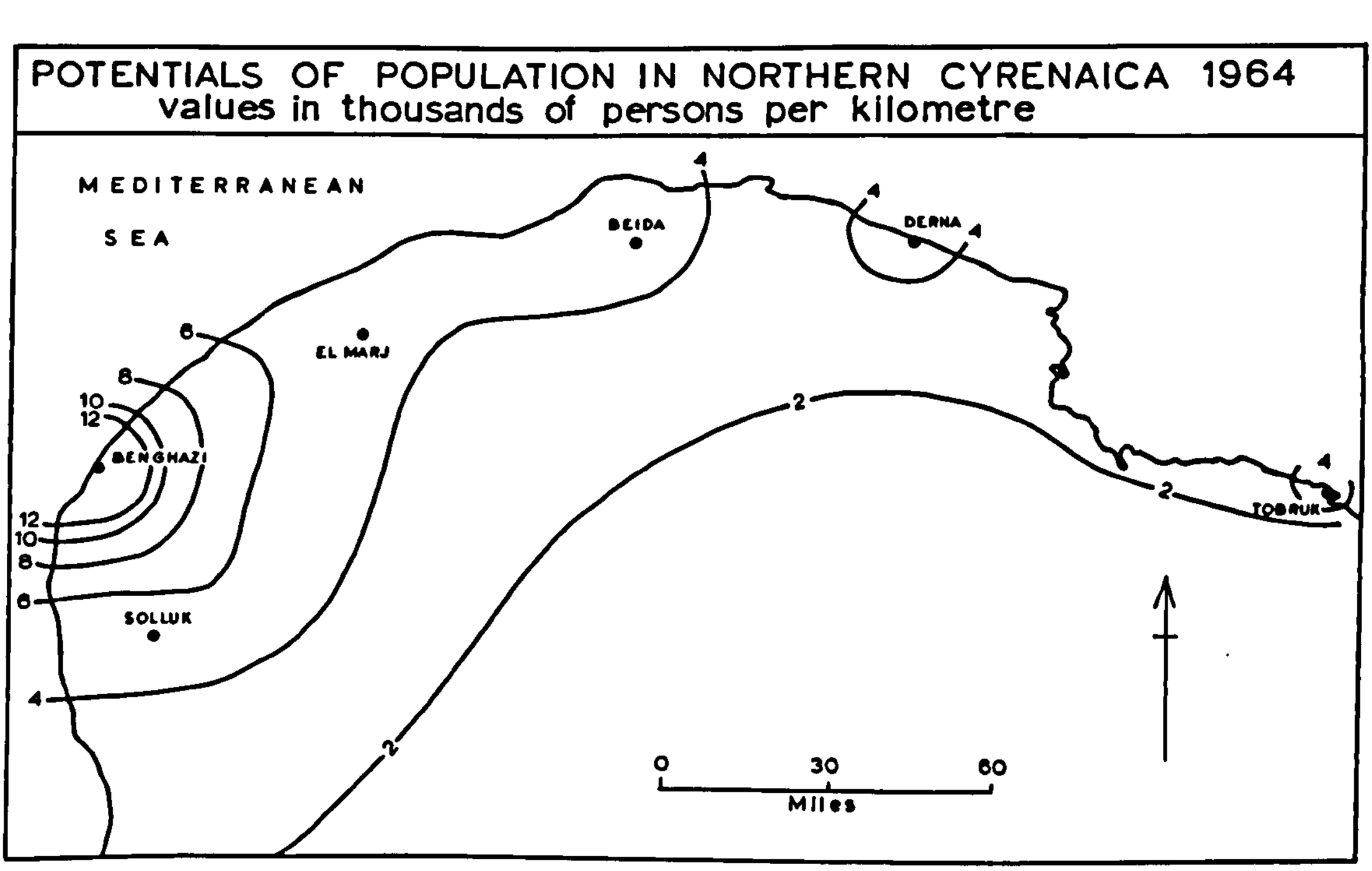


Figure 3.16

of potential. Cyrenaica's triple peak has endured in defiance of this tendency, because the hill and arid areas that intervene keep the Benghazi-Derna and Derna-Tobruk concentrations separated, notwithstanding their mutual attraction.

There is, thus, a tendency of human groupings toward a maximum. In Libya this maximum appears to be in urban areas, rather than coastal or higher rainfall zones. The maximum is never fully achieved because of a counterbalancing tendency and demographic force; otherwise there would be one city at the peak and no ridge or rural lowland. Therefore, while the tendency of accretion of people at peaks and ridge increases, some people must remain spread out to maintain contact with the rural occupations and environment.

The patterns and measures of population distribution, density, concentration and potential outlined in the foregoing section form the basis for a more detailed investigation of the determining influences. United Nations' studies have indicated that....."within limits man determines his pattern of population distribution".[9] In order to identify some of these 'limits' and controls, each province's population distribution is analysed in terms of its physical and non-physical conditions.

3.6 Tripolitania's Rural Population Distribution

3.6.1 Temperature, Humidity, Rainfall and Agricultural Production

While atmospheric temperature alone need not impose undue limitations on man's physiology or on his ecological environment, a large temperature range combined with relative humidity can set limits. Optimum living and working conditions are not necessarily coincident in all parts of the province. The selection of four climatic regimes shows the northward amelioration of extremes (Fig. 3.17). Moderating influences from the Mediterranean Sea make Tripoli's location the most favoured

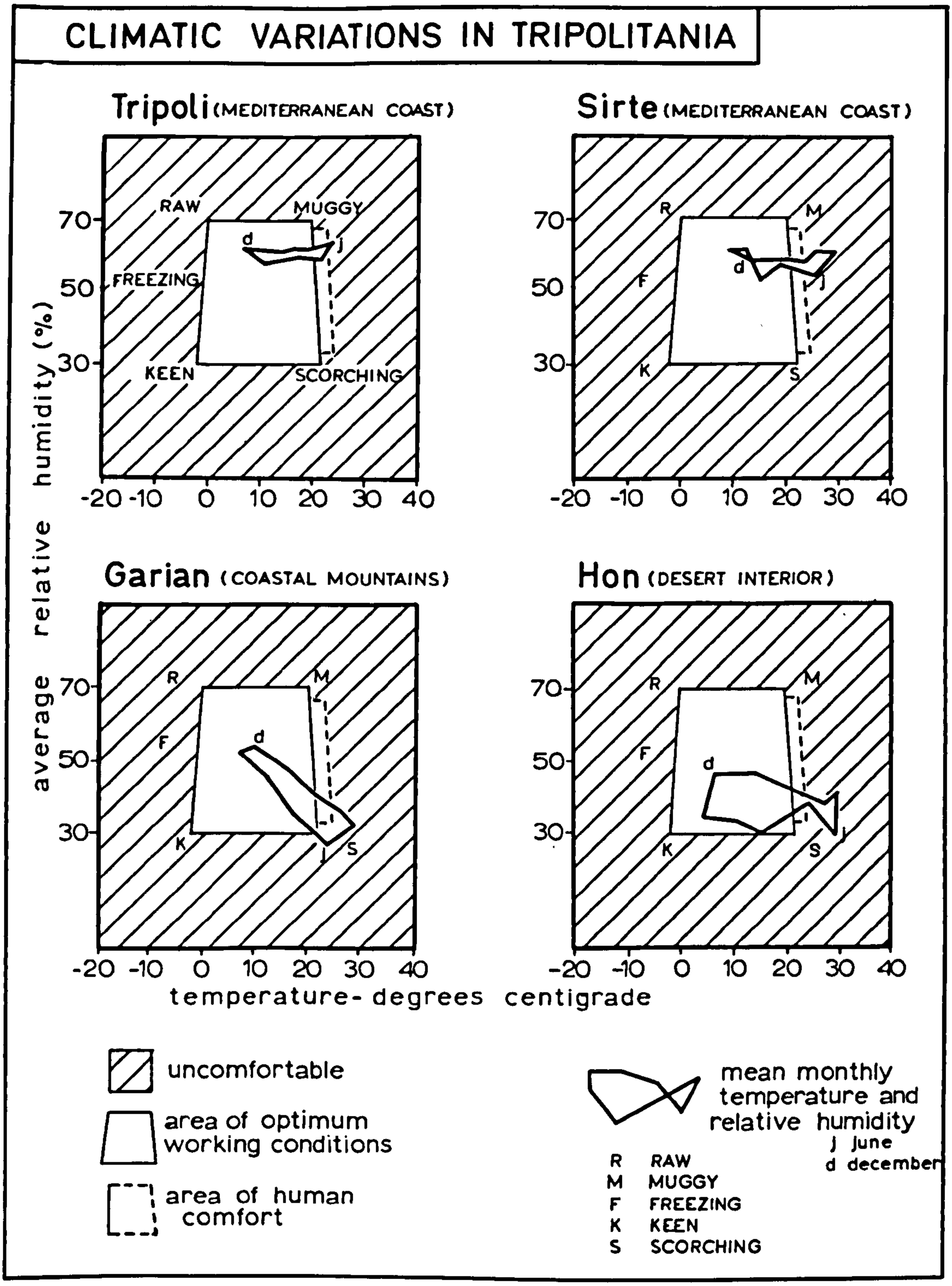

CLIMATIC VARIATIONS IN TRIPOLITANIA
Tripoli (MEDITERRANEAN COAST)
Sirte (MEDITERRANEAN COAST)
Garian (COASTAL MOUNTAINS)
Hon (DESERT INTERIOR)
RAW
MUGGY
FREEZING
KEEN
SCORCHING
R
M
F
K
S
d
j
70
50
30
-20 -10 0 10 20 30 40
average relative humidity (%)
temperature- degrees centigrade
uncomfortable
area of optimum working conditions
area of human comfort
mean monthly temperature and relative humidity
j June
d december
R RAW
M MUGGY
F FREEZING
K KEEN
S SCORCHING

Figure 3.17

physical environment for optimum working and living conditions. Extremes of temperature increase both east and west along the coast, but are particularly sharp inland. Only the Gebel acts as a moderating influence. Thus, mean annual temperature ranges of 14°C on the coast increase by 4°C only forty miles inland, and may reach 25°C in interior regions.[10]

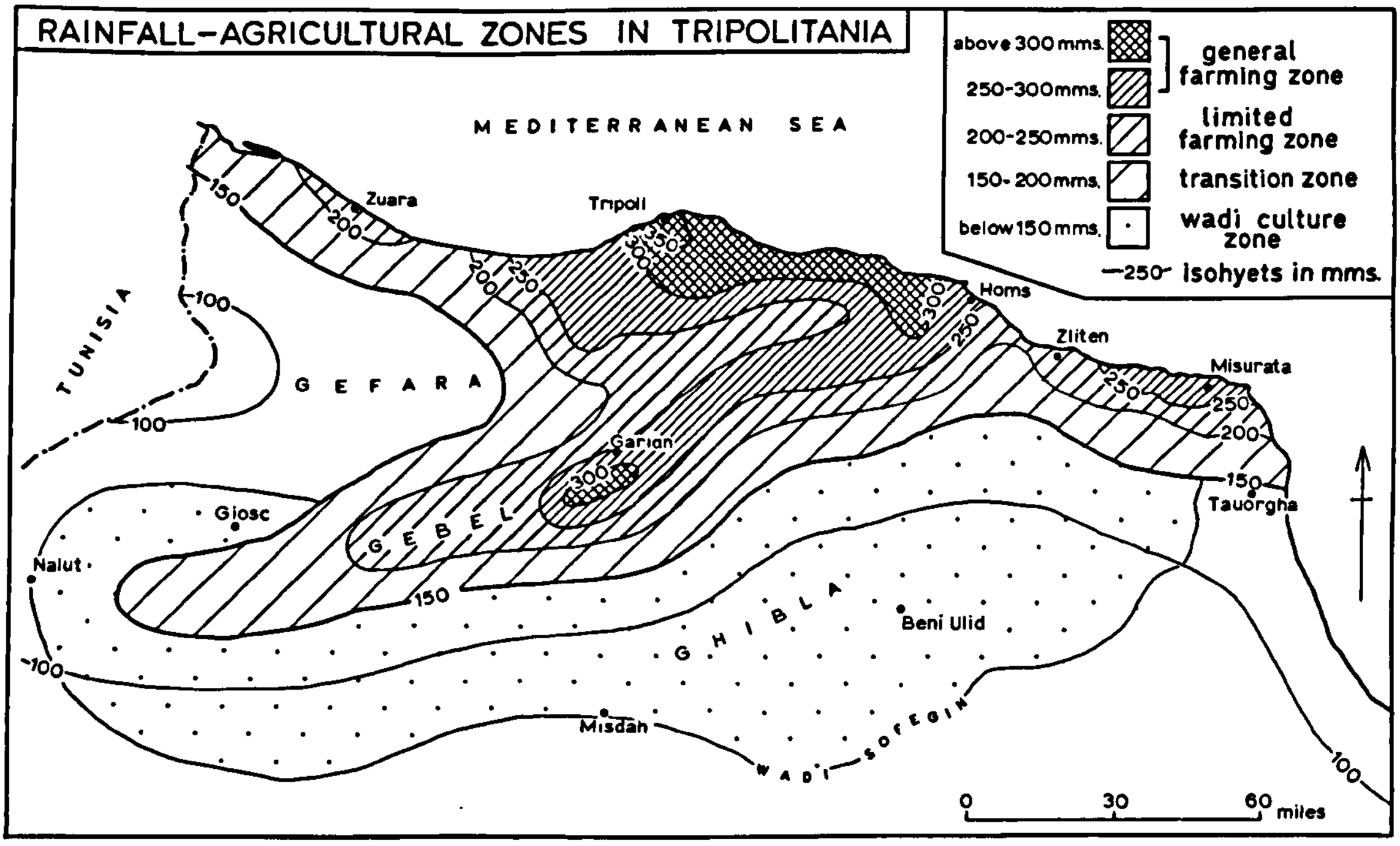
However, it is the indirect influences of the physical environment which set more specific limits to Libya's œcumene.* The presence or absence of water is the critical factor in Tripolitanian agricultural production, and hence in influencing the distribution of the rural population. Low precipitation limits water supply in general and soil moisture in particular, thus imposing limits on the size of the animal population and agricultural production. The reliability and effectiveness of precipitation tend to increase where diurnal and annual temperature ranges are of moderate proportions, thereby affecting vegetation types and growth conditions. Stewart[11] estimated that seven out of twenty years have damagingly low rainfalls, particularly effective in areas existing on marginal amounts of rainfall.

The optimum conditions for the various types of agricultural production vary throughout the country. However, barley, the principal annual crop, seldom produces a profitable yield in a location where the average rainfall is less than 200 mm. per annum. This occurs even when the rain falls during the growing season and does not vary with the quality of the land.[12] Even the olive, second in value of Tripolitanian crops produced, and well suited to the north Mediterranean lands, is confined basically to areas where annual average rainfall does not fall below 200 mm.[13]

---

* As defined by Trewartha, G.T. "A case for Population Geography", Annals Assoc. Am. Geog., Vol. 43, (1953), p.92.

Figure 3.18



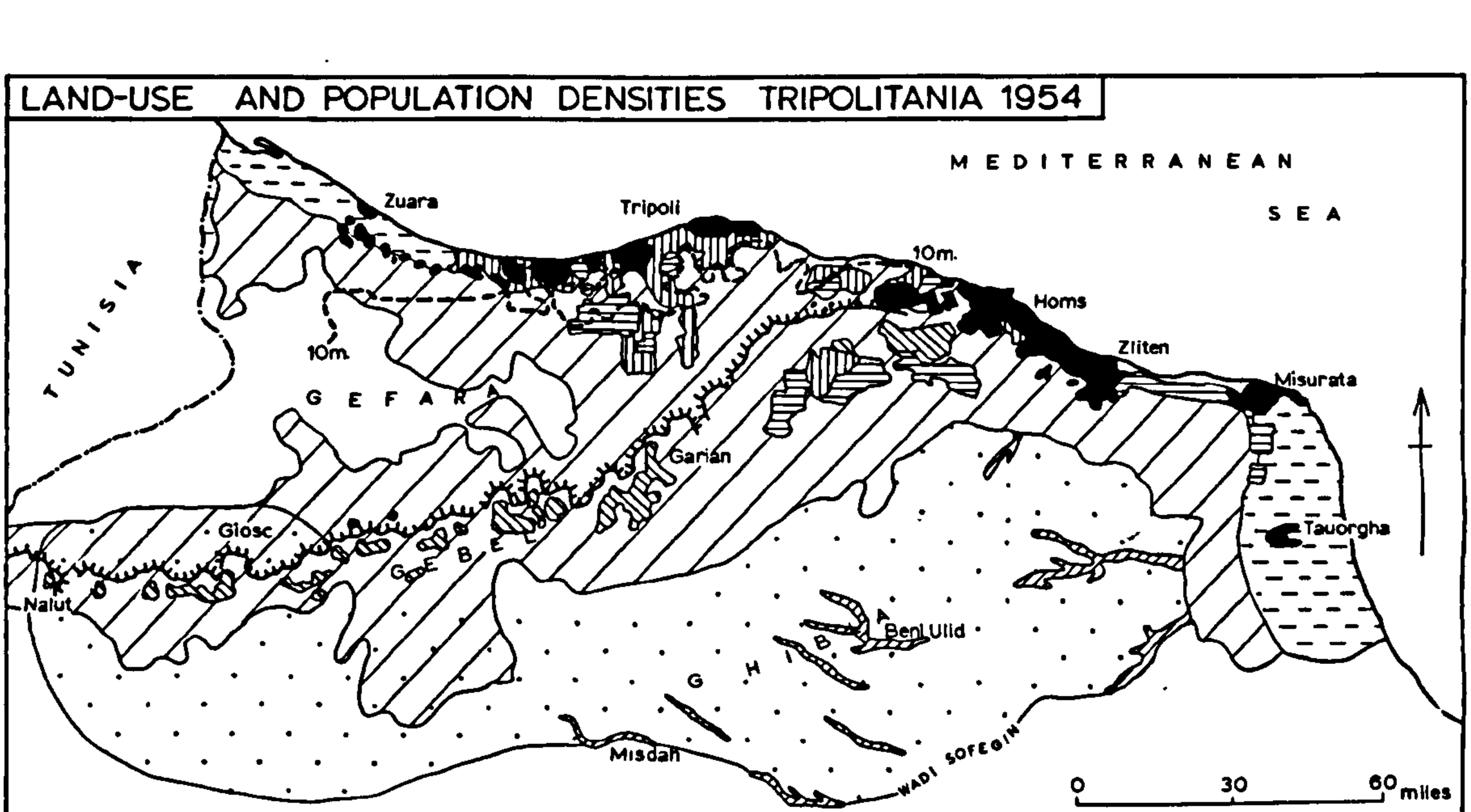


Figure 3.19

Despite the fact that scattered oases and areas benefiting from wadi moisture exist productively in regions with less than 200 mm., it can be considered to be the minimum amount of moisture required to yield reliable crops. Moreover, levels of agricultural technology pertaining in Tripolitania have developed little in the field of extending the cultivated area beyond these limits. Perennial crops can produce profitable yields with less moisture than is required by cultivated annual crops. Below 150 mm. of rainfall, however, a definite break appears in the density of vegetation. Between 150 - 200 mm. constant overgrazing prevents the growth of perennial forage grasses, and profitable non-irrigated farming is limited to grazing and forestry.

The Tripolitanian agricultural zone, bounded approximately by the 150 mm. isohyet, covers about 24,570 sq. kms., comprising 8 per cent of the provincial area. This land, all in one piece except for a small wedge of better watered land on the littoral at Sirte, is actually a coastal strip extending from Tunisia to Misurata. It averages about 30 kilometres wide at both eastern and western ends, with a 100 kilometre wide bulge in the central section, and with one projection or "tongue" extending westwards along the Gebel Nefusa from about Yefren to Nalutt (Fig. 3.18).

The relationship between population density and the rainfall zones is tabulated in Table 3.5 and portrayed graphically in Figure 3.20. Rural population density, on both total and non-irrigated land, increased from zone to zone much more rapidly than annual rainfall. In other words, rather than varying in a straight-line linear ratio with rainfall, population density increased in a so-called "geometric", or "exponential" rate as rainfall increased. Stewart[14] maintains that... "it indicates in general how productivity is controlled by rainfall, and

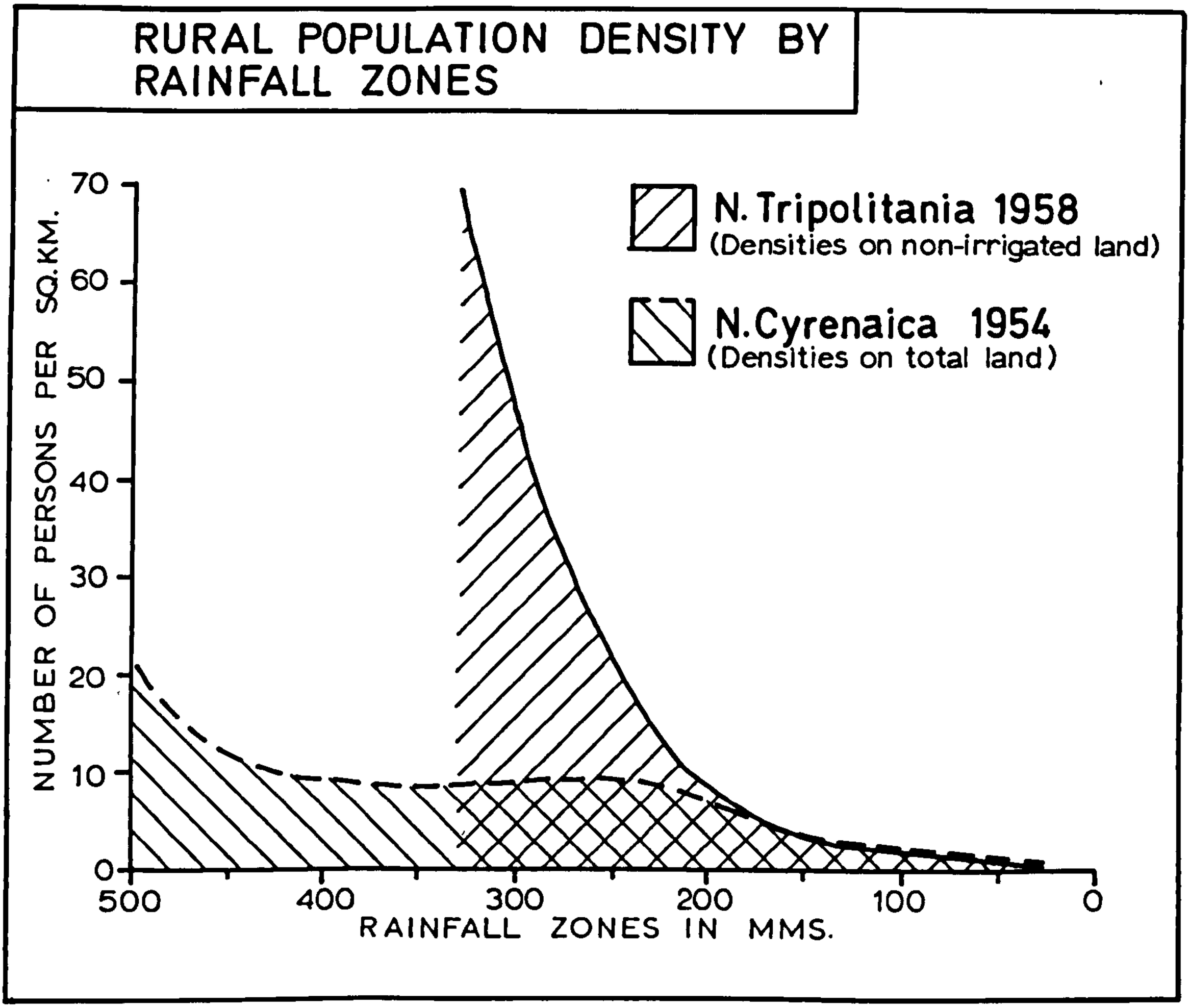

RURAL POPULATION DENSITY BY RAINFALL ZONES
NUMBER OF PERSONS PER SQ.KM.
70
60
50
40
30
20
10
0
500
400
300
200
100
0
RAINFALL ZONES IN MMS.
N. Tripolitania 1958
(Densities on non-irrigated land)
N. Cyrenaica 1954
(Densities on total land)

Figure 3.20

to some extent how population density responds to that productivity. There are undoubtedly other factors, some technical (such as ease of communication and transportation) and some sociological, that cause an even greater concentration of rural population in the higher rainfall zones than would be the result of productivity alone".

Table 3.5 Rainfall Zones and Rural Population Density in Northern Tripolitania, 1954*

Rainfall Zone	Rural Population 1954 No. persons	% total pop.	Area sq. kms.	% total	Density pers./sq.km.
300 mm.+	153,000	26.4	1,555	1.7	98
250 - 300	175,000	30.3	4,543	4.9	38
200 - 250	110,000	19.0	6,840	7.4	16
150 - 200	70,000	12.1	11,530	12.5	6.1
100 - 150	50,000	8.7	28,430	30.8	1.8
100	20,000	3.5	40,000	42.7	0.5
	578,000	100	92,898	100	5.8

* location of region in Figure 3.6

Source:- Stewart, J. H. Land and Water Resources of Tripolitania, U.S. Technical Aid, Tripoli, (1958), p.27.

3.6.2 Sample Survey: Population Distribution and Rainfall Zones

A simple correlation statistical test related population density to the rainfall zones in an area of 20,000 square kilometres in western Tripolitania (Fig. 3.21). The results dispel the impression of uniform

RAINFALL ZONES v RURAL POPULATION DISTRIBUTION
(correlation coefficients for sample area 20,000 sq.kms.)

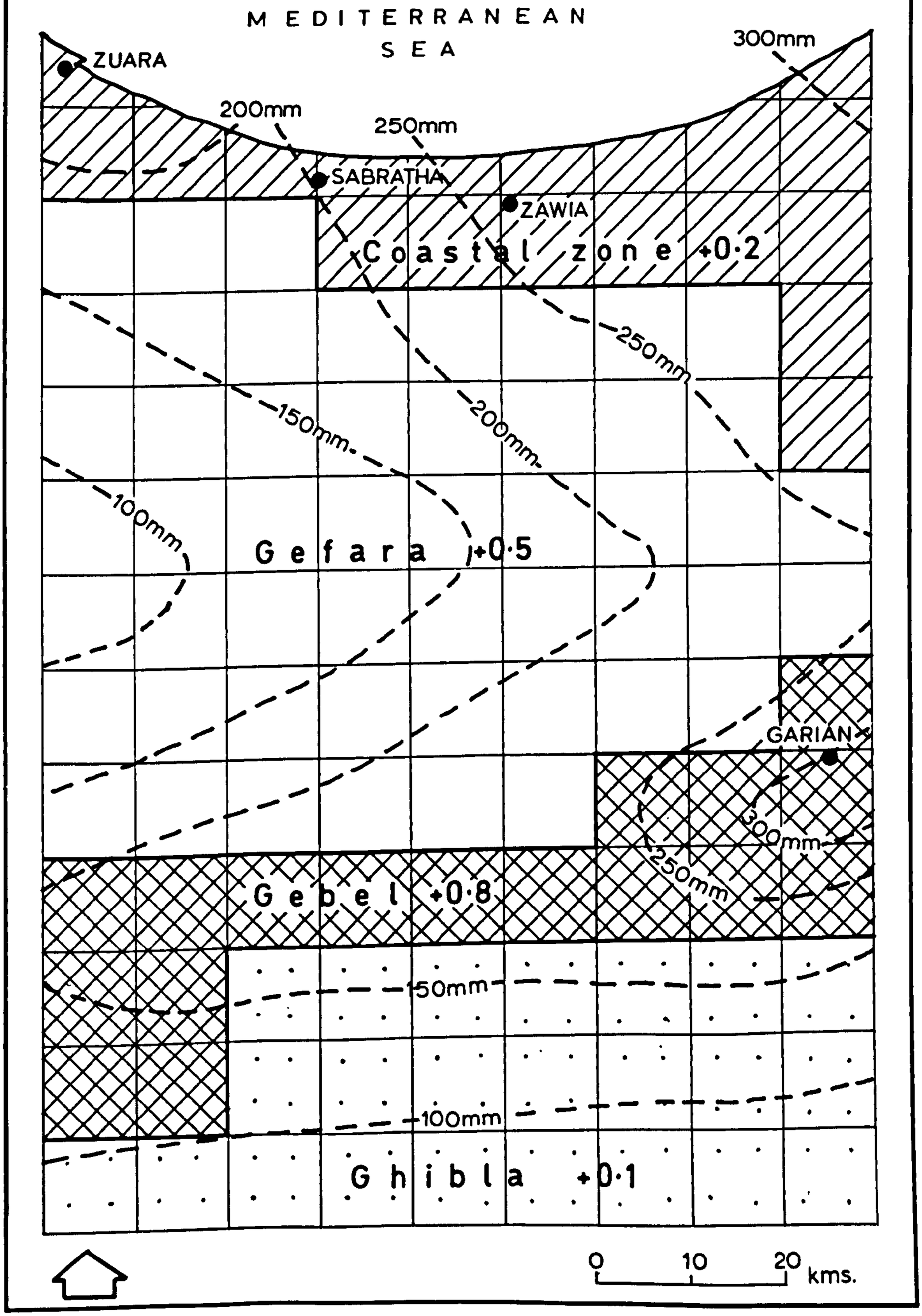


Figure 3.21

population densities within each rainfall zone and emphasize the importance of other physical influences on the distribution of population.

The average correlation for the sample area indicated a slight positive relationship between increasing population density and increasing rainfall. However, subdivision of the sample area into six rainfall zones indicated progressively significant correlations with increasing rainfall (Table 3.6).

Table 3.6 Results of the Population-Rainfall Correlations*

1.	Average for the sample area	+ 0.47
2.	Average for rainfall belts:-	
	(a) 0 to 50 mm	+ 0.25
	(b) 50 to 100 mm.	+ 0.23
	(c) 100 to 150 mm.	+ 0.13
	(d) 150 to 200 mm.	+ 0.43
	(e) 200 to 250 mm.	+ 0.56
	(f) over 250 mm.	+ 0.77
3.	Average for geographical regions:-	
	(a) Coastal belt (10 kms. from coast)	+ 0.17
	(b) Agricultural belt (20 kms. from coast)	+ 0.16
	(c) Gefara	+ 0.52
	(d) Gebel	+ 0.81
	(e) Interior plain (Ghibla)	+ 0.13
4.	Correlation of population distribution and number of wells	+ 0.70

*T-tests indicated that correlation co-efficients were accurate at 90% - 95% probability levels.

The low absolute amount of rainfall below 150 mm. per annum, combined with the high evaporation loss (estimated by Stewart as 90 per cent of the total rainfall in interior regions), dictated the lack of association between the two variables. Variability of rainfall in time and space, together with the sparse vegetation, support the view that population distribution in this zone is associated with the availability of other water supplies. In regions receiving more than 150 mm. rainfall per annum there is an increasingly significant association; + 0.43 in the zone 150 mm. to 200 mm., to +0.77 in the zone receiving over 250 mm. rainfall. The fact that only 12 per cent of the total cultivated land area is irrigated,[15] confined basically to the coastal zone, suggests the dependence on dry-farming techniques in the rest of the agricultural zone. In this area efficient utilization of available surface water and soil moisture ultimately dictates crop yields.

In order to cross check these correlations the sample area was again subdivided; this time on a physiographic basis (Fig. 3.21). The interior plain (Ghibla) corresponding with the rainfall zone below 150 mm. indicated little association. The Gebel ridge, however, showed the most significant correlation (+ 0.81) indicating that in the dry-farming areas, with little accessible underground water, agriculture and hence population distribution are determined primarily by the availability of rainfall. The Gefara, or inland plain between the coast and Gebel, showed a slight association between rainfall and population. This supports the principle that shifting cultivation depends partly on variability of rainfall, particularly in the 150-250 mm. rainfall zone. Suprisingly, the coastal belt, determined both as 10 km. and 20 km. from the sea, showed no correlation. The predominance of other factors would seem to be associated with the coastal concentration of population.

3.6.3 Distribution of Groundwater

The action of groundwater on the distribution of Tripolitania's rural population has a twofold influence. Within the agricultural zone, determined

as the area receiving more than 150 mm. rainfall per annum, groundwater dictates local variations in the intensity of production and also determines the potential for agricultural expansion. Secondly, the supply of groundwater is the critical factor in determining population distribution outside the agricultural zone.

About 105,000 hectares of land are irrigated in northern Tripolitania representing about 13 per cent of the provincial cultivated land area (about four-fifths of the national total) and supporting about 100,000 rural population in 1958. Like population density in the rainfall zones, the population supported on each hectare of irrigated land decrease in each rainfall zone, though not at the same rate (Table 3.7). The bulk of the irrigated land is

Table 3.7 Distribution of Irrigated Land by Rainfall Zones in Northern Tripolitania, 1958

Rainfall Zone (annual average)	Irrigated Land (hectares)	Population Supported	Density persons/ha. irrigated land	Non-irrigated land
over 350 mm.	2,000	2,500	1.3)	98
300 - 350 mm.	19,000	25,000	1.3)	
250 - 300 mm.	44,000	50,000	1.1	38
200 - 250 mm.	20,000	20,000	1.0	16
150 - 200 mm.	5,000	5,000	1.0*	6
	90,000	102,500	1.1	

Source:- Stewart, J. H. Land and Water Resources of Tripolitania, U.S. Operation Mission to Libya, (1958), p.26.

situated in the Gefara which, because of its Tertiary and Quaternary sediments, is the main area of percolation and accumulation of underground water. This occurs in two main aquifers.[16]

The first, or Phreatic, water-table has a south to north gradient, steep in the east of the Gefara plain and shallow in the west. A littoral extension occurs between Homs and Misurata. However, the most accessible non-brackish water occurs in the area south of Tripoli (Fig. 3.19). The fact that this was the only water-table used prior to the arrival of the Italians in the 1920's is a reflection of its accessibility by traditional "dalu" (leather bucket) irrigation techniques. Recently installed electric pumps have enabled greater exploitation of existing areas and an extension southwards to tap the deeper aquifer. Over two-thirds of the Tripolitanian irrigated area is fed by pumped water. However, the high density of wells in the Arab garden oases (saniya) has resulted in decreasing yields and salinity in coastal areas due to sea water infiltration. The accessibility of the first water-table decreases eastwards with increasing depth, and westwards with increasing evaporation and consequent salinity. Shifting sand from the Gefara has caused blockage of wells in the Tripoli area. However, exploitation of this water table has allowed population densities of 4 persons per hectare to be concentrated in saniya gardens along the coast (Fig. 3.19).

The second, or deep Quaternary aquifer, is confined to an area within thirty miles of Tripoli, but is important because of the high yields and good quality of the water. Being 20-25 metres below the first aquifer, it was inaccessible to the Arabs using traditional techniques. The introduction of the diesel, and recently electric, pumps enabled the Italian Demographic and Concession farms to expand southwards into previously unoccupied territory in the Gefara. Exploitation of deeper artesian water supported population densities of one person per hectare on large-scale

commercial farming enterprises geared to supply growing urban needs. This concentration of accessible water resources around the Tripoli population complex has tended to reinforce the inertia of population growth in the centre of the Tripolitanian coastal plain.

In the vast pre-desert and desert areas of Tripolitania receiving less than 150 mm. rainfall per annum, there are numerous pockets of agriculture and population concentration. These scattered areas, limited in extent, depend essentially on two types of irrigation; controlled perennial irrigation from wells and springs, and uncontrolled flood-irrigation, defined by Stewart as "wadi culture".[17] The extent of the water available and the methods of utilization form distinct patterns of population distribution, composing approximately 100,000 persons.

Controlled perennial irrigation dependent on well and spring water in the pre-desert and desert zone is concentrated chiefly in scattered oases. The largestis Tauorgha situated south of Misurata. It is nourished by a huge spring, though situated in "sebkha" (salt flats). The small populated areas totalling about 5,000 inhabitants are scattered over an area of about 100 sq. kms. The largest concentrated oasis is at Ghadames in south-west Tripolitania where nearly 3,000 inhabitants share an area of little more than four square kilometres. Smaller oases trend in an east-west direction, parallel to the Gebel, though at the foot of the southern dip slope. Other less important settlements occur along the northern spring line of the Gebel; for instance at Tiji and Giosc. The total population of the oases in 1964 was estimated at 10,000, remaining relatively stable since 1954.

The flood-irrigated areas, or the "wadi culture zone", support about 60,000 to 70,000 persons, mainly on the southern slopes of the Gebel and in the 100 to 150 mm. per annum rainfall zone. Flood flows occur in the watercourses of the large wadis on average 15 times in ten years. Frequency

and reliability of wadi flooding increase with average annual rainfall. Most of the wadis exceed 100 metres in width and contain deep accumulation of alluvial soil (known as "gattis") brought down by the floodwaters. Particular physical conditions necessary for irrigation limit the distribution of population to an area of approximately 23,000 sq. kms., although actual wadi cultivation and settlement cover no more than 500 sq. kms. (Fig.3.19). The terrain yields considerable run-off from rainstorms of only moderate intensity, the location occurs in rainfall zones receiving at least one flood per annum, and local topographical conditions favour slight gradients and broad wadis.

The most spectacular example occurs around Beni Ulid in the central Ghibla. Efficient run-off and delivery of water, from the surrounding better-watered Gebel, converge at a point where the wadi is wide and flat. Flood-waters deposit silt allowing the water to penetrate the deep soil that has accumulated over centuries. Roman remains of rock dykes and dams further check the velocity of the bi-annual floodwater. At Beni Ulid five square kilometres support about 7,000 people and in addition 10,000 olive trees and date palms and several hundred hectares of mixed barley and bermuda grass. Thus, while the Wadis Tareglat, Mimum, Uestata, Merdum and Sofegin comprise the main productive areas, they depend on the water catchment of the whole Gebel dip-slope.

Other areas adjacent to the Gebel have less favourable conditions. Most of the Gebel scarp has wadi gradients too steep and floodflow velocities too high for the development of cultivation in the wadis. To the west of Tripoli none of the northward flowing wadis reaches the sea, while those along the east coast support only minor population concentrations on narrow alluvial wadi patches. The effect of the wadis as local indicators of population distribution within the agricultural zone is indicated by Wadi Megenin situated south-west of Tripoli City. The fertility of this Wadi is empha-

sized by the intense development of vegetables and citrus fruits despite sporadic damage by flooding.[18]

The combination of well-water, flood-runoff and seasonal rainfall also forms the basis of pastoralism and shifting cultivation supporting about 200,000 Tripolitanians*. Shifting cultivation of barley, wheat and fodder crops on "tinn" lands (heavy alluvial soils) in the Gefara is supplemented by grazing lands in the Gefara and Ghibla. Tribal ownership of territory and wells, together with seasonal employment in the coastal saniya oases, dictate specific lines of population movements, though disputes over water rights still remain a source of tribal conflict. Primitive methods of farming are paralleled by ignorance of range management techniques; the consequent overgrazing hinders maximum utilization of scarce resources.[19] For these reasons population densities, ranging from 20-60 ha. per person, still cause excessive pressure on the land.

3.6.4 Other Physical Determinants of Population Distribution

Apart from the major determinants of precipitation and underground water there are a variety of subsidiary physical influences. The peculiar topographical conditions of wadi culture, the rôle of alluvial soils and the dangers of shifting sand have been mentioned. The association of soil formation with climate, vegetation and landforms has resulted in three broad soil zones, corresponding with the three physiographic zones of the coast, Gefara and Gebel.[20]

The soils of the cultivated coastal belt are mainly brown pedocalic regosols. They are loose, friable and permeable, but are susceptible to wind erosion if no vegetation cover exists. The availability of plant

---

* defined as "nomads" and "semi-nomads" in 1964 Population Census.

nutrients and soil moisture are the controlling factors for crop production and yields. The increasing maturity and depth of soil profiles therefore tend to increase in the higher rainfall zones, or in areas where irrigation is commonly practised. Some soils also act as a deterrent to agricultural development. Accumulation and subsequent evaporation of saline water in depressions behind coastal dunes, combined with capillarity of shallow water-tables, result in the formation of solonchaks and saline soils. Occurrence of these soils around Tauorgha, in the east, and Zuara, in the west, tends to limit the coastal extension of agriculture.[21]

Similar soils are also found in the Gefara, though with a higher sand content than coastal areas. Brown pedocals and "tinn lands" form the basis for cultivation in the favoured patches, while coastal soils, characteristic of the arid western Gefara, limit cultivation and grazing. The third zone of the Gebel ridge marks the beginning of the immature and shallow soils typical of semi-desert regions, punctuated by the alluvial soils in the Ghibla wadis.

3.7 Non-Physical Factors influencing Tripolitania's Rural Population Distribution

The Tripolitanian rural population is particularly difficult to describe by settlement sizes because of the nature of the traditional agriculture. Outside the urban centre of Tripoli, the large rural settlements of Sukel Giuma, Misurata, Zawi, Homs and Zanzur are set in a matrix of densely populated agricultural land. The urban functions of the settlements merge with the agricultural holdings without a precise physical division either in terms of geographical situation or population density. The distribution and density of the rural population are more clearly differentiated by type of agriculture.

Within the agricultural zone defined by rainfall and irrigation potential, different types of agricultural settlement occur supporting different population densities. Basically, there are two distinct patterns of occupance

set on a similar background of physical conditions; one related to a traditional system of agriculture reflecting a "natural" response to the physical environment, with a haphazard evolution and stagnant technology; the other related to a planned and predetermined agricultural organization, superimposed on the traditional agricultural system (Fig. 3.19 and Table 3.8).

Table 3.8 Land Use Zones and Rural Population Densities in Northern Tripolitania, 1954.*

Land Use Zones	Area in 000's ha.	Rural Population in 000's	Density (ha./person)
1. Saniya farms	50	140	0.4
2. Ex-Italian Concession Farms	127	110	1.2
3. Ex-Italian Demographic Farms	103	80	1.3
4. Dryland cultivation	120	94	1.3
5. Shifting cultivation	1,460	85	17.2
6. Wadi cultivation	50	25	2.0
7. Arid Grazing	7,240	44	165.0
	9,150	578	15.8
Urban population (Tripoli City)	-	130	-
Rest of province	15,850	30	-
Tripolitania	25,000	738	3.0

* Area relates to Figure 3.6

Sources:- (a) Rowland, F. and Robb, E. Survey of Land Resources in Tripolitania, British Military Administration, Tripoli, (1945).
(b) Stewart, J.H. Land and Water Resources of Tripolitania, U.S. Operations Mission to Libya, (1960).
(c) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959).

3.7.1 Traditional Libyan Farms

Although many farms situated on the coast contain land in the Gefara, economic viability is determined primarily by the size and location of irrigated patches in the coastal saniya. Physical, economic and social factors have combined to produce small (usually about 2 hectares) and fragmented holdings. The patchiness of the sandy-loam to clay soils, and the accessibility of the first-water table by traditional "dalū" techniques have limited the extent of the saniya oases. Traditional methods of inheritance aggravate the segmentation of land in the irrigated patches, which usually form only a quarter of the holdings' hectarage. The average density of occupance for the 150,000 Tripolitanians involved in this type of agriculture varies from 3 to 10 persons per hectare, depending on the fragmentation of holdings. This high population density reflects not only the inherent fertility of the coastal areas, but also the subsistence nature of the traditional agricultural system.

Constraints on the expansion of irrigation in the coastal saniya are both physical and human. Insecurity of ownership, lack of initiative and, until recently, lack of capital have concentrated the population in existing areas. However, the first water-table has already been over-exploited. The average two wells per farm only irrigate an area of one hectare, and increasing salinity is common in coastal areas, particularly between Homs and Misurata. A sample survey in the 1950's indicated the subsistence nature of most farms; 40 per cent of the total value of crops were consumed by the families, and four-fifths of the gross earnings of each farm was less than £L 200 per annum.[22]

3.7.2 Ex-Italian Settlements

In contrast to the traditional farms there are two types of modern commercial undertakings; private Concessions and so-called Demographic settlements. These were implemented by the Italians in the 1930's, although

many were farmed by Libyans after independence in 1951, particularly in Cyrenaica.

The Concession farms originated as grants of land by the Italian Government to private individuals. As private commercial enterprises these farms were developed on some of the best remaining land, chiefly in the western coastal plain between the indigenous oases and, to a lesser extent, in the eastern Gefara and Gebel. Practically all the farms were located within the rainfall zones receiving more than 200 mm. rainfall per annum. Dry land tree cultivation of olives and almonds formed the basis of the farm economies, the plantations being suited to the undulating and lighter soils adjacent to the more fertile indigenous oases. Irrigated field crops of winter cereals and summer groundnuts developed with the exploitation of the second water-table. Stewart estimated that the Concessions covered 127,000 ha. in 1958, giving a population density of about one person per hectare: at least four times smaller than the density in the saniya oases. As only 17,000 Italian farmers remained on these farms in 1953,[23] it is likely that Libyan farmers formed the main settlers in 1964.

The second type of modern commercial undertaking is the ex-Italian Demographic holding, initiated after 1935. In large measure, these settlements were an experiment undertaken for political reasons without thought of strict financial return in the short run. Situated on slightly marginal land in the steppe zone of the eastern Gefara and Gebel, the holdings attempted to reclaim land primarily by sand-dune fixation. The Demographic farms were smaller in size than the Concession holdings, and with a larger area under irrigation the Demographic farms were aimed at self-sufficiency. The cropping pattern conformed with available water supplies, so that the olive became the dominant crop on the non-irrigated Gebel farms. Intercropping of varied tree and ground crops was common in the better watered coastal areas. About 90,000 Libyans occupied the 103,000 ha. in 1958, giving a density of occupance similar to the Concession farms.

In contrast to the traditional saniya farms, the ex-Italian settlements are more regular and compact. Modernization is reflected in the lack of fragmentation of holdings and more efficient use of water resources. With the aid of diesel and electric pumps, for example,a single well irrigates twelve times the equivalent area on saniya farms. Specialization in groundnuts and olives, together with numerous by-products, made the farms commercially orientated, (only 9 per cent of the produce being locally consumed/in the sample of ex-Italian farms).[24] Although financial returns on ex-Italian farms are greater than on traditional farms, higher capital investment and paid labour offset excessive profit differentials.

Assuming that the area of ex-Italian farms was similar in 1940 and 1958, a marked re-distribution of rural population appears to have occurred within the higher rainfall zones. Estimates from various sources (Table 3.8) indicate that about 190,000 Libyans were settled on ex-Italian farms in 1954. This would have constituted a fourfold increase in the density of occupance since the 1930's. The Libyan settlers may have been composed of farmers previously occupying the saniya farms, thereby relieving some pressure of population and continuing a process of hired farm labour on ex-Italian farms.[25] It is also likely that Libyans returning from abroad were encouraged to settle on these settlements.[26] However, crude density comparisons between 1940-54 are not strictly accurate and actual rural population changes may not be so dramatic. Many of the 50,000 Italian farmers in 1940 were concentrated on only a small proportion of the total concession land because the olive plantations took about fifteen years to mature. Evidence from the Ministry of Housing Research Section suggests that nearly 23,000 farmsteads were operational on ex-Italian lands, supporting a Libyan population of about 130,000 in 1967.[27] This redistribution of Tripolitania's rural population, whether from local or foreign sources, has two implications. First, the erosion of the traditional agricultural system appears to have occurred through migration

rather than through a change in type of farming practices and organization. Secondly, the local redistribution of population within the higher rainfall zone in part reflects a move towards land with a higher productive capacity. However, the type of land tenure, the state of agricultural technologies, the number of workers and dependents, and other non-physical determinants, have also influenced both the scale and direction of recent rural population redistributions.

3.8 Cyrenaica's Rural Population Distribution

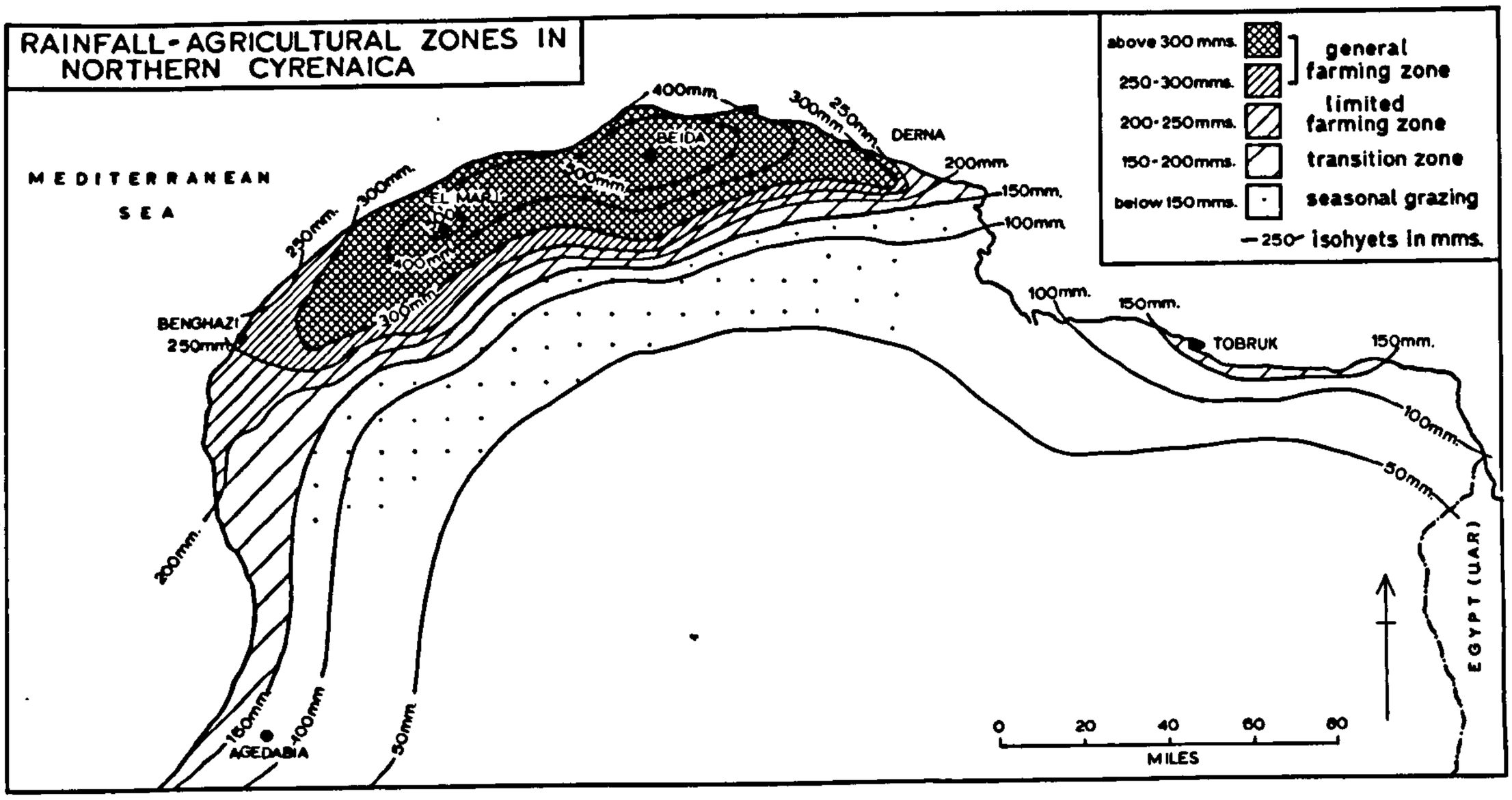
3.8.1 Physical Determinants

Cyrenaica displays the same three physiographic elements that influence Tripolitania's rural population distribution, though with differences in scale, location and structure. The abutment of the Gebel Akhdar against the northern coast wedges a coastal plain around Benghazi in the west, but only a thin coastal strip in the north and east. From the coast the Gebel rises in two tiers to a crest of 800 metres near Beida. The two scarp faces form a regular arcuate boundary to the dissected limestone massif, though an intervening terrace between the two tiers occurs near Marj in the western Gebel.

Westerly and north-westerly winds bring comparatively high winter rains to most of the Gebel Akhdar. The area receiving more than 300 mm. annual rainfall is about five times that in Tripolitania, while some of the central Gebel plateaus receive up to 600 mm. Like the relief, however, rainfall drops off on all sides of the Gebel and only a small portion of the coastal plain receives more than 200 mm. Most of the semi-desert and desert zones south of the Gebel receive less than 150 mm. rainfall per annum (Fig. 3.22).

In contrast to the Tripolitanian tendency for rural population density to increase in a geometric progression with increasing rainfall, Cyrenaica

Figure 3.22



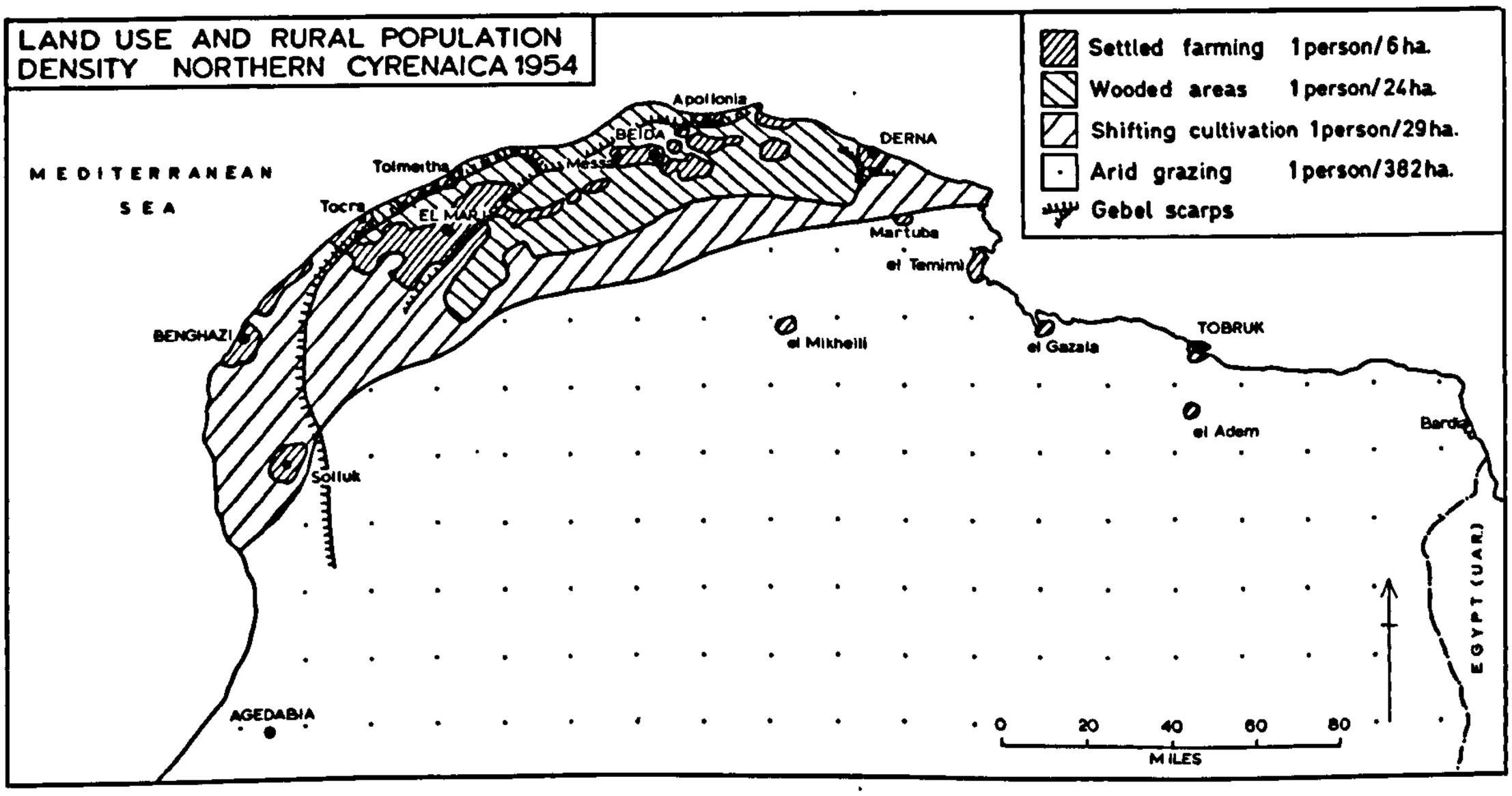


Figure 3.23

has more regular population densities in each rainfall zone (Fig. 3.20 and Table 3.9). Part of the reason lies in the smaller total population and larger area of rainfall zones, and part in the structure of the Gebel. Thus, nearly half of Cyrenaica's rural population lives in rainfall zones receiving more than 300 mm., almost twice the proportion that occurs in Tripolitania. Yet the rainfall zone is almost four times as large, resulting in lower total densities of occupance in each rainfall zone compared with the western province.

Table 3.9 Rainfall Zones and Rural Population Density in Northern Cyrenaica, 1954*

Rainfall Zone	Rural Population 1954		Area		Density
	No. persons	% total pop.	sq. kms.	% total	pers./sq.km.
500 mm. +	17,000	11.3	1,400	1.5	12.1
450 - 500	12,600	8.4	1,000	1.1	12.6
400 - 450	10,000	6.7	1,100	1.2	9.1
350 - 400	14,000	9.3	1,700	1.9	8.2
300 - 350	16,600	11.1	1,700	1.9	9.8
(300 mm.+)	(70,200)	(46.8)	(6,900)	(7.6)	(10.2)
250 - 300	16,600	11.1	1,900	2.1	8.7
200 - 250	12,000	8.0	2,200	2.4	5.5
150 - 200	18,200	12.1	3,800	4.2	4.8
100 - 150	11,200	7.5	6,000	6.6	1.9
100	22,400	14.5	70,200	77.1	0.3
	150,000	100	91,000	100	1.6

* location of region in Figure 3.8

Sources: (a) Department of Regional Geography, Warsaw. 1954 Population Map of Libya, 1:1 million, Warsaw, (1964).
(b) I.B.R.D. The Economic Development of Libya, Johns Hopkins Press, Baltimore, (1960), p.104.

The structure of the Gebel indirectly acts as a deterrent to high population densities. The limestone Gebel encourages rapid percolation of rainwater, whilst the dissection of the high Gebel limits animal movements across the region. The contradiction of high relief and high rainfall, with few perennial rivers (only five major wadis radiating from the Gebel crest reach the sea) has discouraged concentration of the rural population. From a water divide near the Gebel crest groundwater moves north and north-west towards the Mediterranean and south towards the Ghibla. Faulting and fracturing, which characterizes the karst topography of the Gebel, in part account for spring water along the bases of the scarp and dip slopes. Even so, the total estimated flow of Gebel springs would provide sufficient irrigation supply for only 4000 ha. of land, or partial irrigation for 10,000 ha. However, it is doubtful whether half the potential supply could be utilized for agriculture.[28]

Two areas contain the necessary physical conditions for irrigation. On the first escarpment in the western Gebel a wide, flat,saucer-shaped plain surrounds the town of Marj. This area of settled agriculture covers 28,000 ha. on land with a heavy terra rossa soil. Most of the 300-500 mm. annual rainfall is trapped on the plain, some of which percolates to a few perched water-tables first noted by the Italians in the 1930's.[29] While water for urban needs is accessible, lack of efficient recharge can cause overexploitation. Springs also offer potential irrigation water along the foot of the northern scarps, particularly when combined with the alluvial outwash soils on the coastal plain. However, between Tolmeitha and Benghazi and Apollonia and Derna overexploitation and poor recharge of spring water has led to salt water intrusion and brackish water. As such, there are only about 2,000 ha. of irrigated land in Cyrenaica; less than one per cent of the total area of settled agriculture (Table 3.10).

Table 3.10 Land Use Zones and Rural Population Densities in Northern Cyrenaica, 1954*

Land Use Zones	Area in ha.	1954 Rural Pop. (000's)	Density ha/person
1. Static Farming.	240,000	40	6.0
2. Shifting cultivation	2,140,000	73	29.3
3. Forested areas	480,000	20	24.0
4. Arid grazing	6,500,000	17	382.4
	9,360,000*	150	62.4
Urban population	-	116	-
Rest of province	76,100,000	30	-
Cyrenaica	85,500,000	296	0.3

* Area relates to Figure 3.9

Sources:- (a) I.B.R.D. The Economic Development of Libya, Johns Hopkins Press, Baltimore, (1960), p.104.

(b) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959).

(c) Department of Regional Geography, Warsaw. 1954 Population Map of Libya, 1:1 million, Warsaw, (1964).

While perennial wadi flows are distinctly limited in the high Gebel, silting of courses does give rise to irregular flows. Wadis from the first escarpment emerge on to the coastal plain about three times each year despositing alluvium along the scarp foot. However, the combination of watercourse permeability, fast run-off and lack of capital works in the

form of wadi dams, have precluded extensive spring line settlement, at least in the Benghazi Plain.

The fact that a quarter of Cyrenaica's rural population lives on land receiving less than 150 mm. rainfall per annum indicates the economic dependency on pastoralism. Much of this land occurring on the southern slopes of the Gebel Akhdar dip-slope wadis provides patches for seasonal grazing and harvesting, though not on the same scale as in Tripolitania. Perennial river flows are non-existent, catchment areas are small, and run-off velocity unfavourable for the growth of a wadi culture. Interior oases at Jaghbub, Aujila and Kufra are only partly related to patterns of seasonal grazing on the Cyrenaican Ghibla.[30]

3.8.2 Non-Physical Determinants

While comparisons with Tripolitania's land use and population densities are difficult because of different classifications, it is apparent that Cyrenaica's densities of occupance are lower for each equivalent area (Tables 3.9 and 3.10). Settled, or static, farming in northern Cyrenaica is concentrated in the Barce Plain around the towns of Marj and Beida. Western coastal areas around Benghazi, Tolmeitha and Apollonia also support agriculture and settled farming (Fig. 3.23).

Despite the dissection of the high Gebel and the high annual rainfall, Cyrenaica has been geared to pastoralism with a subsidiary emphasis on shifting cultivation. Traditionally the Bedouin have been pastoralists first and cultivators second. For centuries the nomadic way of life has prevailed over most of the country except for the coastal towns, and it has been argued that pastoralism is well adapted to the physical environment.[31] While the Bedouin society has shown a great capacity for survival, neither its organization nor its values equip it to take advantage of the opportunities for economic advance opened up by the oil wealth.

The Italian colonization of Cyrenaica in the 1930's further offset the geometrical increase of population density in rainfall zones identified in Tripolitania. On the basis of an Anglo-Jewish commission in Cyrenaica in 1908 it was estimated that 300,000 colonists could be settled in addition to the existing indigenous population.[32] By 1940 the Italians had acquired about 120,000 ha. land, although only half was actually developed to support about 50,000 settlers. The bulk of the 2,000 Italian families were situated around Marj and Beida. These areas still remain the major settled parts, though with slightly lower densities of occupance than the Italians had originally planned. In the Mutassarrifia of Marj, for instance, four-fifths of the sedentary agricultural holdings are composed of ex-Italian farms.[33]

The evacuation of the Italian colony in 1942 left an agricultural infrastructure, but also social disruption. Eviction of Bedouin tribes during acquisition of potential colonization land has caused conflicts concerning re-settlement. Attempts have been made by the government to deal with this problem. In 1952 the ex-Italian Demographic and Concession farms reverted to state ownership. More recently the National Agricultural Settlement Authority (NASA), established in 1964, attempted to mitigate the clash between evicted Bedouin groups. However, re-settlement schemes will not radically alter the present pattern of population distribution.

The Italian colonization weakened the tribal structure, but at present there is a reversion to mixed farming of shifting cultivation and pastoralism. By 1960, a third of the farm holdings and one-half of the total agricultural area was under tribal ownership. This land use manifests many of the weaknesses inherent in communual ownership; overgrazing, little grassland improvement, afforestation or soil conservation, resulting in poor yields and low population densities. Thus, large tracts of land in the higher rainfall zones well suited to the cultivation of crops are being downgraded.

Physical determinants still influence Cyrenaica's distribution of population, but density of occupance is not necessarily correlated with water resource location. Two human elements have cut across the tendency for population to concentrate in the higher rainfall zones. Pastoralism, associated with the Bedouin tribes, has thrived in areas outside the dissected and thickly wooded high Gebel plateaus. Inevitably this form of land use has supported population densities lower than the potential of the land. The growth of planned settlement, thought of initially by the Jews, partially implemented by the Italians, and developed by the Libyans, is also cutting across "the grains" imposed by the physical environment. Economic development may also weaken these physical determinants. For instance, the development of a water pipeline from springs in the eastern Gebel to settled farming areas on the central plateaus will tend to preserve the existing population distribution. The achievements of the Romans serve as an indication of what might still be done in this respect. By an energetic application of capital works - the construction of numerous cisterns, dykes, dams and aquaducts - the Romans were able to establish a thriving agricultural society which supported a population two or three times the size of the present population.[34] Moreover, there is no conclusive evidence that the rainfall in the coastal zone was any heavier in those days than now, nor was the population distribution concentrated in high rainfall zones.

3.9 Population Distribution in the Fezzan

The Fezzan is the least densely populated of Libya's three provinces, containing an estimated 86,000 persons in 1966 in an area of about one million square kilometres. Extremes of climate have set distinct limits to human habitation; average rainfall over a five year period at Sebha being 68 mm., though many areas receive no rain over several consecutive years. Consequently, irrigation water is the main determinant of agriculture and hence population distribution, for pastoralism is of small importance in the province.

Until recently, agriculture was limited to oases where water tables lay near the surface. Thus, the three parallel wadis of El Shati, Ajal and Hofra developed as the main population concentrations. The extent of population distribution depended on the traditional techniques of irrigation, while density of occupance was influenced by the scale of land fragmentation. New techniques of exploiting deeper artesian water, particularly in Wadi Hofra, have only partly extended the Fezzanese œcumene. On the other hand, difficult drainage, high water-tables, over exploitation and intense evaporation have caused much potentially fertile land in the oases to become saline. The net balance of extension and contraction of agricultural land probably showed a deficit between 1936-66.

The Fezzan economy has always been predominantly a subsistence one. In past centuries its population used to derive a subsidiary income from the caravan trade, and when this declined in the 19th century foreign garrisons moved in and provided the oases with a new source of income and employment. The withdrawal of the foreign garrisons has been replaced by external aid and oil revenues. The impact of this wealth has not been as marked as in the two northern provinces, but a measure of economic duality is now apparent. The population of Sebha, the provincial capital under the Federal government, rose from about 2,000 in the 1930's to 17,000 in 1966. New employment opportunities in the service sector and the urban economy, particularly government administration, have attracted people from other parts of Libya.

The urban growth of Sebha, in part a response to the completion of the Fezzan road to the Tripoli-Benghazi highway, has brought about changes in the socio-economic system of the province. The traditional feudal system is being undermined. An acute shortage of agricultural labour has resulted in large tracts of land going out of cultivation./ It has been estimated for instance, that the area under cultivation has been reduced by fifty per

cent since 1900.[35] With greater ease of communication to Tripoli and Benghazi, an increasing proportion of food is imported, further retarding agricultural developments.

3.10 Summary and Conclusion

Basically, the coastal concentration, provincial proportions and physiographic influences upon the population distribution have remained significant and stable since the Italian colonization of the 1930's. Yet within well defined limits set by the physical environment the fine balance between determining factors and population distribution has been disturbed, though not in equal degrees in the three provinces. Occupation by foreigners and economic wealth from oil revenues have strengthened the influences of the non-physical environment. The sum of these forces, or controls, has been to produce two tendencies. One is the inertia of the present population distribution, itself a product of physical and human determinants interacting in a complex temporal framework. The other tendency is the growth of population around urban nuclei. Numerically, the Libyan towns are achieving a dominance and primacy out of proportion to the size of the country's total population. Chapter IV elaborates and analyses this urban growth.

References

1. Zelinsky, W. Prologue to Population Geography, Prentice-Hall, (1966), p.26.
2. Spengler, J.J. "Economics and Demography", in P.M. Hauser and O.D. Duncan. The Study of Population, University of Chicago, (1959), pp.803-7.
3. Whiting Associates International. Fezzan Inventory Report, Tripoli, (1967).
4. Department of Regional Georgraphy, Warsaw. 1954 Population Map of Libya, 1:1 million, Warsaw, (1964)
5. Wright, J.K. "Some measures of population distribution", Annals Assoc. Am. Geog., Vol.27, (1937), p.177; also Duncan O.D. "The measurement of population distribution", Population Studies, Vol. 2, (1957-8), p.29.
6. Department of Regional Geography, Warsaw, op.cit.
7. Stewart, J.H. Land and Water Resources of Tripolitania, U.S. Operation Mission to Libya, (1958), p.27.
8. Stewart, J.Q. "Empirical mathematical rules concerning the distribution and equilibrium of populations", in J.J. Spengler and O.D. Duncan, Demographic Analysis, The Free Press of Glencoe, (1956), p.344.
9. United Nations. Determinants and Consequences of Population Trends, New York, (1953), p.164
10. Doxiadis Associates. Housing in Libya, Vol. 1, (1964), pp.12-24.
11. Stewart, J.H. op.cit., p.39-40
12. ibid. p.5-6
13. Taylor, A. R. "Regional Variations in Olive Cultivation in Northern Tripolitania", in S. G. Willimott and J.I. Clarke (eds.) Field Studies in Libya, University of Durham, (1960), p.88.
14. Stewart, J.H. op.cit., 46
15. Lalevic, D. A Study of Libyan Agriculture and Its Present Situation Ministry of Planning and Development, Tripoli, (1967), p.48
16. Hill, R. W. Agriculture and Irrigation on the Tripolitanian Jefara, unpublished Ph.D. thesis, University of Durham, (1960), p.10.

17. Stewart, J. H. op. cit., p.10

18. Stewart, J. H. A Study of Wadi Megenin Floods, U.S. Operations Mission to Libya, Tripoli, (1956).

19. Bottomley, A. "Economic Growth in a semi-nomadic herding community", Economia Internazionale, Vol.17, No. 2, Genoa, (1964).

20. Lalevic, D. op. cit., pp.14-18.

21. Willimott, S. G. "Soils of the Jefara", in S. G. Willimott and J. I. Clarke, op. cit., p. 35

22. Theodorou, N. T. Indigenous and Italian Farm Enterprises in the Zavia Area, F.A.O., Report No. 259, Rome, (1954), p. 80.

23. Fisher, W.B. "Problems of Modern Libya", Geographical Journal, Vol.114, (June 1953), p.192.

24. Theodorou, N. T. op. cit., p. 66

25. ibid. p. 61

26. National Agricultural Settlement Authority. Present Land Settlement Policy and Projects in Libya, F.A.O., Tripoli, (1965), p. 6

27. Ministry of Housing Research File, Libya. Agricultural Lands in Libya, Tripoli, (1967), p. 8.

28. International Bank for Reconstruction and Development (I.B.R.D.) The Economic Development of Libya, Johns Hopkins Press, Baltimore, (1960), p. III.

29. Marchetti, M. Idrologia Cirenaica, Biblioteca Agraria Coloniale, Florence, (1938), p.85.

30. Toni, Y.T. A Study of the Social Geography of Cyrenaica, unpublished Ph.D. thesis, King's College, Newcastle, University of Durham, (1956).

31. Evans-Pritchard, E. E. The Sanusi of Cyrenaica, Clarendon Press Oxford, (1949), pp. 34-39.

32. Gregory, J. W. Report on the work of the Commission sent out by the Jewish Territorial Organisation... for the purpose of a Jewish Settlement in Cyrenaica, London, (1909), pp. 12-14

33. Buru, M. El Marj Plain: a Geographical Study, unpublished Ph.D. thesis, University of Durham, (1965), p. 215.

34. I.B.R.D. op. cit., p.100

35. Whiting Associates International, op. cit.

CHAPTER IV

URBANIZATION AND POPULATION DISTRIBUTION

Libya is now the eighth most urbanized country in the Middle East containing over one-fifth of its total population in cities with over 100,000 inhabitants. Its level of urbanization is similar to the neighbouring countries of Egypt (U.A.R.) and Tunisia (Table 4.1) The pace of Libyan urbanization shows no sign of slackening and the major towns are beginning to dominate most forms of political and economic life. Between 1954 and 1966 the percentage of the population living in settlements of more than 20,000 inhabitants increased from 18 to 25 per cent. Four-fifths of the increase in total urban population occurred in the two major cities of Tripoli and Benghazi. In 1966, both cities accounted for nearly two-thirds of the total urban population, officially defined as agglomerations of more than 2,000 persons. About one-half of the total population lived in settlements containing more than 500 inhabitants. Yet the total number of settlements above this size showed remarkably little increase between 1954 and 1966. Thus, while the overall pace of urbanization has increased rapidly, the process of settlement multiplication has gained little momentum (Table 6, Appendix C).

Some of the implications of these phenomena have already been hinted at; the urban-rural gradient was identified as the most important element differentiating Libyan regions; the major towns in all three provinces are exerting an increasing dominance over all aspects of the population (Chapter II); and the towns were probably the main lines of penetration of a modern economic sector into a traditional socio-economic system (Chapter I).

Table 4.1 Level of Urbanization in Selected Middle East Countries, 1960's

Country	Date	Total population in 000's persons	Total population in cities over 100,000 persons	Percent. of pop. in cities over 100,000 persons
Kuwait	1965	467	299	64.0
Iraq	1965	8,261	3,603	43.6
Bahrain	1965	182	79	43.4
Israel	1964	2,476	883	35.6
Lebanon	1963	2,230	615	27.5
Syria	1964	5,200	1,424	27.3
U.A.R.	1962	27,244	7,124	26.1
Libya	1964	1,564	351	22.4
Tunisia	1966	4,785	1,014	21.1
Iran	1966	25,781	5,090	19.7

Sources:- (a) Fullard, H. The Geographical Digest 1968, George Philip and Son Ltd., London, (1968).

(b) United Nations. Demographic Yearbook 1965, New York, (1966).

It is hypothesized in this chapter that Libya's settlement-size distributions are not determined by the level of economic development or the degree of urbanization; rather, the distribution is determined by the nature of the development processes operating in the country. Thus, the marked duality of socio-economic conditions pertaining in Libya, reflect the nature and type of economic development. The simplicity and strength of the forces which determine this economic development are reflected in the urban structure. The peculiarities of Libya's settlement-size distributions are, marked concentration in two cities, a regular ranking of small towns, and distinct provincial sub-systems of settlements.

In order to explain the grafting of Libya's provincial "primate" cities on to log-normal distributions of smaller settlements two theories of settlement-size distributions must be mentioned - the index of primacy and rank-sizes of Libyan settlements. By identifying Libya's deviations from theoretical and empirical evidence, and noting the settlement spacings and patterns, it is possible to note some of the prime determinants influencing Libya's patterns of urbanization.

4,1: Population Clusters; the Size Continuum

Although it is convenient to regard Libya's population as distributed in a series of discrete and isolated clusters, it must be realized that this settlement concept is artificial. In Cyrenaica, and the Fezzan, settlements are distinct and well-defined, but in Tripolitania dense rural settlement along the coast precludes accurate sub-division of urban units.[1] Despite the arbitrary definition and classification of Libyan settlements, forty of the largest settlements were identified in 1966,[2] (Table 7, Appendix C).

Examination of the available information on Libyan settlement sizes suggests a regularity, similar to a linear pattern on a double logarithmic graph (Fig. 4.1). The Libyan pattern in 1966 was similar to that in Britain in 1961, though at a lower absolute level of population and with a more uneven distribution. It is, in fact, the degree of regularity in the relationship between the size and rank of towns (expressed formally as the "rank-size rule"*) which helps to generalize about Libya's population distribution. The distribution of Libyan settlement seems to follow Zipf's theory that rank-size distributions conform more closely to a theoretical S-shape than to a linear log-normal distribution.[3]

---

* $Pn = P_1 (n)^{-1}$ where Pn is the population of the n^{th} town in the series 1, 2, 3....n in which all towns in a region are arranged in descending order by population, and P_1 is the population of the largest town (i.e. the primate town).

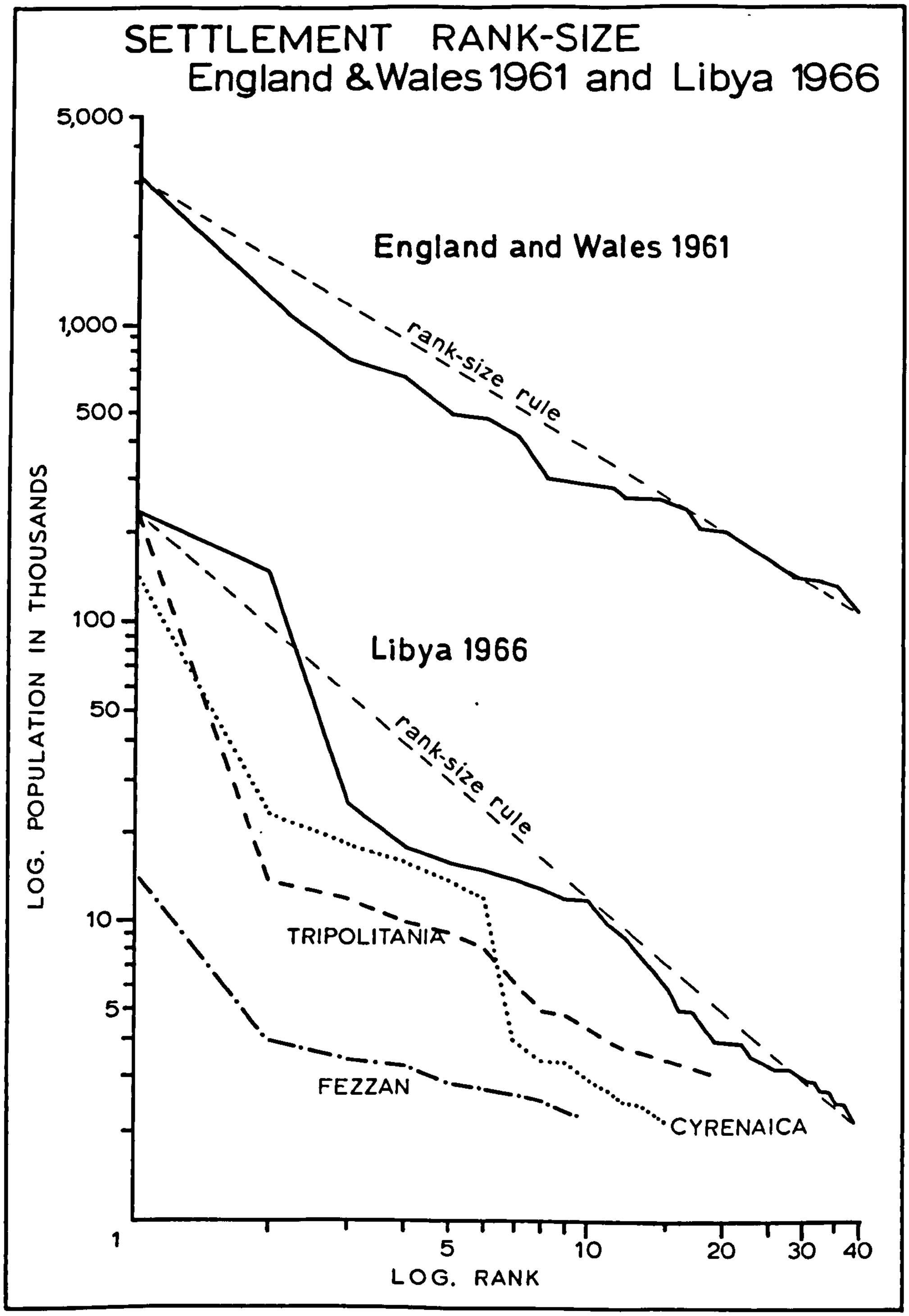

SETTLEMENT RANK-SIZE
England & Wales 1961 and Libya 1966
5,000
1,000
500
100
50
10
5
1
LOG. POPULATION IN THOUSANDS
England and Wales 1961
rank-size rule
Libya 1966
rank-size rule
TRIPOLITANIA
FEZZAN
CYRENAICA
1
5
10
20
30
40
LOG. RANK

Figure 4.1

However, Berry has interpreted these irregularities empirically by studying a selection of 38 city-size distributions.[4] The Libyan pattern appears similar to the primate settlement-size distributions of Ceylon; log-normally-distributed lesser settlement sizes are followed by a gap because settlements of intermediate size are absent, and then by a rapid cumulation to a dual "primate" peak. Libya, for example, has log-normally-distributed settlements up to a settlement population of 15,000, and then a considerable gap followed by the two cities of Tripoli and Benghazi. On a provincial basis primacy dominates the settlement-size distributions, particularly in Tripolitania and Cyrenaica, though also, significantly in the Fezzan. In both the northern provinces a gap in towns of 9,000 to 20,000 inhabitants is apparent.

Data for the higher levels of the urban hierarchy are more readily available and attention has been concentrated on the application of the rank-size rule for large cities. Stewart[5] examined the relationship between the primate city (P_1) and the second largest city (P_2) in a cross-section of seventy-two countries. Libyan evidence of the changing proportion between Tripoli and Benghazi supports Stewart's main finding that the larger countries tended to have high primate/secondary settlement ratios, but that internal provincial settlement patterns showed a strong dominance by large urban centres. Changes in the Libyan ratios between 1917 and 1966 indicated that the two largest cities most closely resembled the theoretical rank-size ratio of 2.0 in 1917 (2.1) and 1954 (1.9). Since post-war reconstruction, federation, and Cyrenaican oilfinds, Benghazi has grown to rival Tripoli as a major urban centre (1966, 1.6).

Median town rank-sizes in Libya tend to confirm other empirical evidence that a slightly concave settlement distribution is common below the primate city. Table 4.2 expresses the median sizes of the eight largest settlements in Libya between 1917 and 1966, expressed as a fraction of the largest settlement. Libya appears to have been closest to

the theoretical rank-size conditions in 1954, although conditions have remained similar over 50 years, despite population changes in the country.

Table 4.2 Median Sizes of Libya's Eight Largest Settlements as a Fraction of Tripoli, 1917 to 1966

Libya	1st	2nd	3rd	4th	5th	6th	7th	8th
1917	1	0.47	0.13	0.09	0.08	0.07	0.06	0.05
1954	1	0.54	0.14	0.12	0.11	0.09	0.08	0.08
1966	1	0.64	0.10	0.08	0.07	0.06	0.06	0.05
72 countries*	1	0.32	0.20	0.14	0.12	-	-	-
Rank-size rule	1	0.50	0.33	0.25	0.20	0.17	0.14	0.13

* Stewart, C. T. "The size and spacing of cities", Geographical Review, Vol. 48, (1958), p. 228.

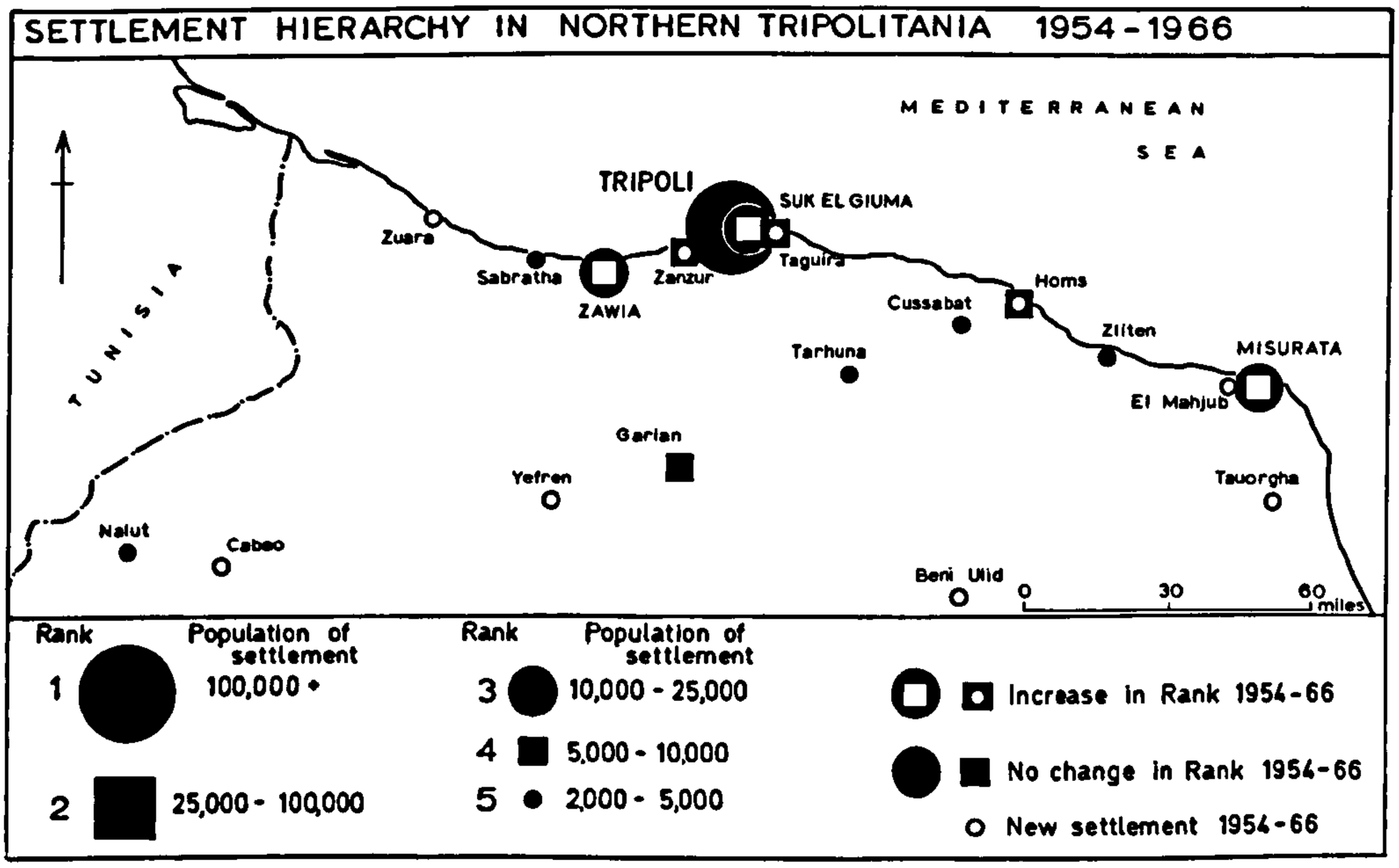
Libya's rank-size settlement hierarchy is therefore characterized by (a) dual "primacy" (b) a lack of middle ranking towns, and (c) rank-sized small towns (Fig. 4.1). While the growth of two large cities developed between 1954-1964, the pattern has remained essentially the same since 1917. The stability of the Libyan rank-size settlement distributions over space and time suggests that it might be viewed as a steady-state phenomeno Simon[6] has defined this condition as one of "entropy" in which the distribution is affected by a myriad of small random forces. However, Berry[7] has produced empirical evidence indicating that entropy is associated with log-normal city-size distributions, and not with well developed primacy. Neither theoretical nor empirical evidence would appear to explain Libya's peculiar condition.

Two groups of hypothesis are suggested to explain settlement size-number patterns.[8] The first group of hypotheses contain ideas which seem logical in the abstract, but are not confirmed by empirical observation. It has been hypothesized that settlement-size distributions are related to the degree of urbanization. Between 1917 and 1966, for example, the proportion of the total Libyan population living in towns over 20,000 persons rose from about 10 to 25 per cent, yet the settlement-size distribution remained relatively stable. This lack of cross-relation between degree of urbanization and settlement-size distribution was also emphasized by Berry's sample survey.[9]

Nor does level of economic development appear highly correlated with size-number forms of settlements on a world-wide basis. Settlement pattern was related to the degree of economic development as measured on a scale derived by Berry from forty-three proposed indices of economic development. The pattern was essentially random, primate and log-normal countries being irregularly arranged with no preferential grouping at any point in the development spectrum.

The second group of hypotheses suggest that primate patterns are the products of city developments in countries which are (a) smaller than average, (b) have a short history of urbanization, and (c) are economically or politically simple. Libya would seem to fulfil these conditions. The settled area supporting about four-fifths of the population is small (about 50,000 sq. km.). Rapid urbanization is essentially a post-independence phenomenon. Finally, the impact of a few strong forces has been indicated in Chapter I, particularly the superimposition of a commercial export sector on a peasant agricultural system. While the type and degree of this duality has changed between 1917 and 1966, essentially the towns have remained orientated outside Libya. As such, the grafting of Libyan "primate" cities on top of a lower log-normal distribution of settlements

Figure 4.2



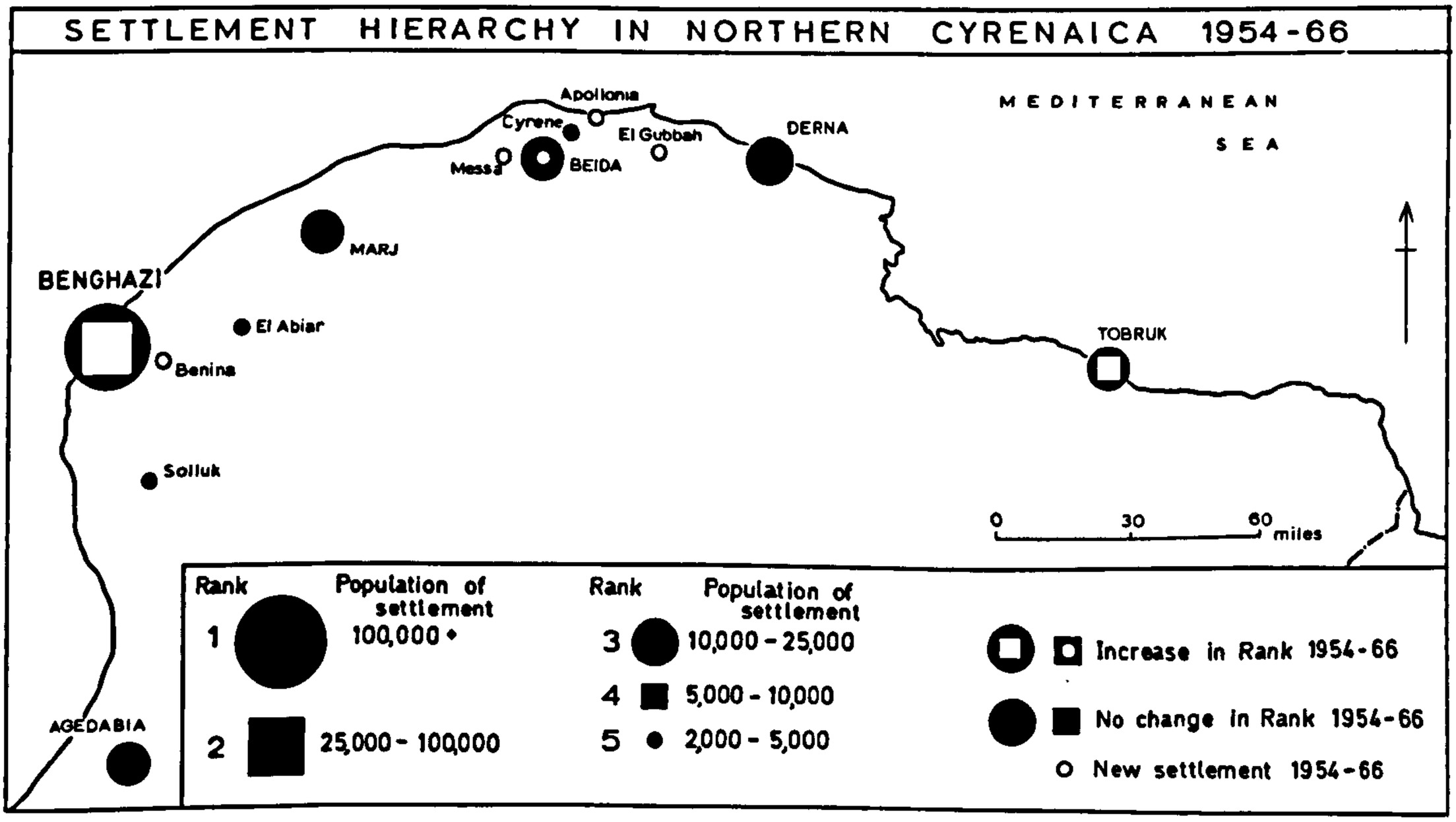


Figure 4.3

emphasizes the nature, rather than the level, of the country's economic development.

4.2 Size and Spacing of Settlements

If the rank-size rule, uncomplicated by the primacy of the largest cities, were to operate, then the spacing of settlements should be largely governed by their size. Large settlements would be widely spaced, smaller settlements more closely spaced. Different levels of regional urban dominance, together with a complex of physical and human influences, have determined contrasting patterns of settlement size and spacing throughout Libya.

The distribution of urban centres in Tripolitania is similar to the distribution of rural population (Fig. 4.2). Tripoli City dominates the central coast and is flanked by medium sized towns. While the greatest amount of urban growth has taken place in and around Tripoli, the six new settlements since 1954 have evolved independently of the established pattern. Cyrenaica, in contrast, has a more regular pattern, the larger towns being evenly spaced along the coast and Gebel Akhdar (Fig. 4.3). There is also less gradation in settlement sizes than Tripolitania. New settlements since 1954 tended to cluster around Beida, the new capital, and Benghazi, situated off-centre in relation to other settlements.

Nearest neighbour analysis of similar sized settlements tended to conform to a log-normal distribution in both northern Tripolitania and Cyrenaica (Fig. 4.4). Tripolitania's rank 5 settlements (2,000 to 5,000 inhabitants) are slightly more widely spaced than those in Cyrenaica, while rank 3 settlements (10,000 to 25,000 inhabitants) are more clustered. Cyrenaica has no settlements containing populations between 5,000 and 10,000 (Table 4.3). In Tripolitania, settlements of all ranks are slightly nearer their neighbours in the densely populated coastal area compared with the inland Gebel (12 miles and 20 miles respectively). In contrast, Cyrenaican coastal towns have an average nearest neighbour of 48 miles,

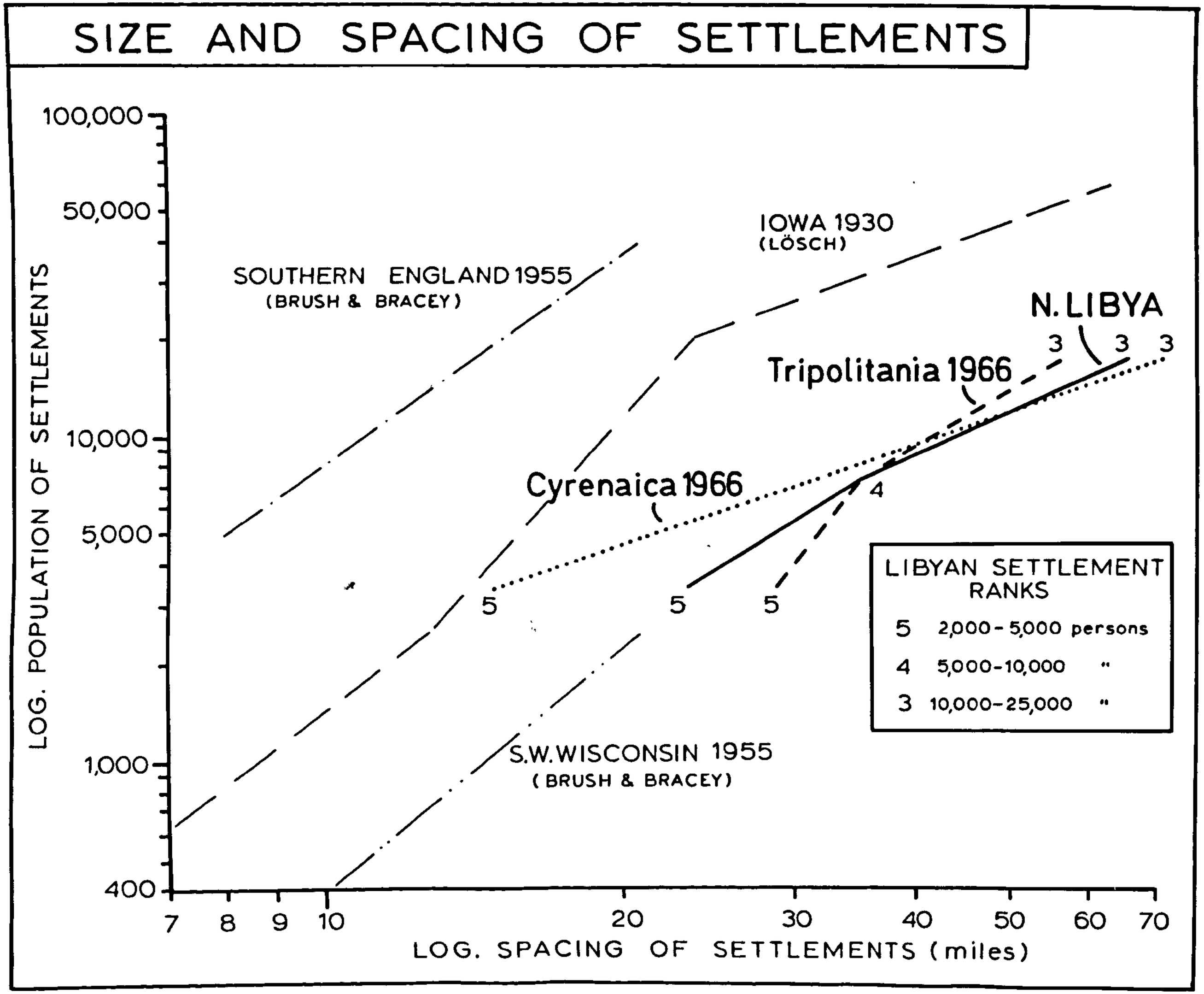

SIZE AND SPACING OF SETTLEMENTS
LOG. POPULATION OF SETTLEMENTS
100,000
50,000
10,000
5,000
1,000
400
SOUTHERN ENGLAND 1955
(BRUSH & BRACEY)
IOWA 1930
(LÖSCH)
N. LIBYA
Tripolitania 1966
Cyrenaica 1966
3
3
3
4
5
5
5
LIBYAN SETTLEMENT RANKS
5 2,000-5,000 persons
4 5,000-10,000 "
3 10,000-25,000 "
S.W.WISCONSIN 1955
(BRUSH & BRACEY)
7
8
9
10
20
30
40
50
60
70
LOG. SPACING OF SETTLEMENTS (miles)

Figure 4.4

while the Gebel settlements are located only 16 miles apart. In both provinces the densest agricultural areas have settlements more closely spaced than areas with extensive shifting cultivation. While Libyan evidence is too scanty to weigh for or against theoretical models of settlement spacing, other empirical evidence suggests that Libya's pattern may not be atypical.

Lösch's evidence for Iowa[10] and Brush and Bracey's data for Wisconsin and Southern England[11] both confirm the tendency of increasing distance between larger settlements. Plotting the same data, Libyan information indicates that lowest-order Libyan settlements are spaced similar to the high-order Wisconsin and southern England towns, both being similar sized settlements. While this information relates to widely differing areas with varied population densities, certain tentative conclusions can be drawn. Firstly, settlements in both northern Tripolitania and Cyrenaica are generally more dispersed per size group than than examples in Britain and America. This is probably determined in part by the physical environment. On the one hand, the agriculturally favoured areas on the Tripolitanian coast both encourage and enable large concentrations of population to be supported. In contrast, local-

Table 4.3 Settlement Spacing by Three Size Groupings, Libya 1966

Rank	Settlement Size	Distance between settlements of similar size		
		Tripolitania	Cyrenaica	Northern Libya
5	2,000 - 5,000	29 miles	15 miles	24 miles
4	5,000 -10,000	35 miles	-	35 miles
3	10,000 -25,000	57 miles	72 miles	66 miles

Source: Figures 4.2 and 4.3

ization of water and soil resources outside the agricultural zones determine the situation of the settlement. The physical conditions discussed in Chapter III, explain why Cyrenaican settlements are on average 23 miles from their nearest neighbour, compared with only 15 miles in Tripolitania.

Secondly, as Brush and Bracey noted in southern England and Wisconsin the settlement pattern shows a tendency to perpetuate itself; the pattern was well established 150 years ago when the basic distance factor was the time and effort required to get to any trade centre by foot or on cart. Agostini[12] suggested that the settlement pattern in Libya was established at least 50 years ago, while Roman remains indicate that the basic structure may have operated 1,800 years ago.[13]

Thirdly, the location of the primary cities in each province appears to have influenced surrounding settlements. Figure 4.5 shows the size and spacing of settlements containing between 2,000 and 25,000 inhabitants around Tripoli and Benghazi in 1954 and 1966. The rank 5 settlements (2,000 to 5,000 inhabitants) show a gradation between 40 to 150 miles from Tripoli, while those in Cyrenaica have two distinct groupings, one near Benghazi, the other near Beida. It is the higher order settlements which account for the higher urban densities near Tripoli; four rank 3 and 4 settlements are located within 50 miles of Tripoli, contrasting with none near Benghazi. Instead, Cyrenaica has two large settlements (10,000 - 25,000 inhabitants) more than 150 miles from Benghazi. The resultant graphs of total urban populations in the two provinces indicate (a) the greater concentration of urban population nearer Tripoli, (b) the higher proportion Tripoli City has of its total provincial population, and (c) the decrease in primate concentration around Tripoli and the increase around Benghazi between 1954 and 1964. This may indicate a levelling-off of the influence of primacy in Tripolitania and the more youthful stage of urban development in Cyrenaica.

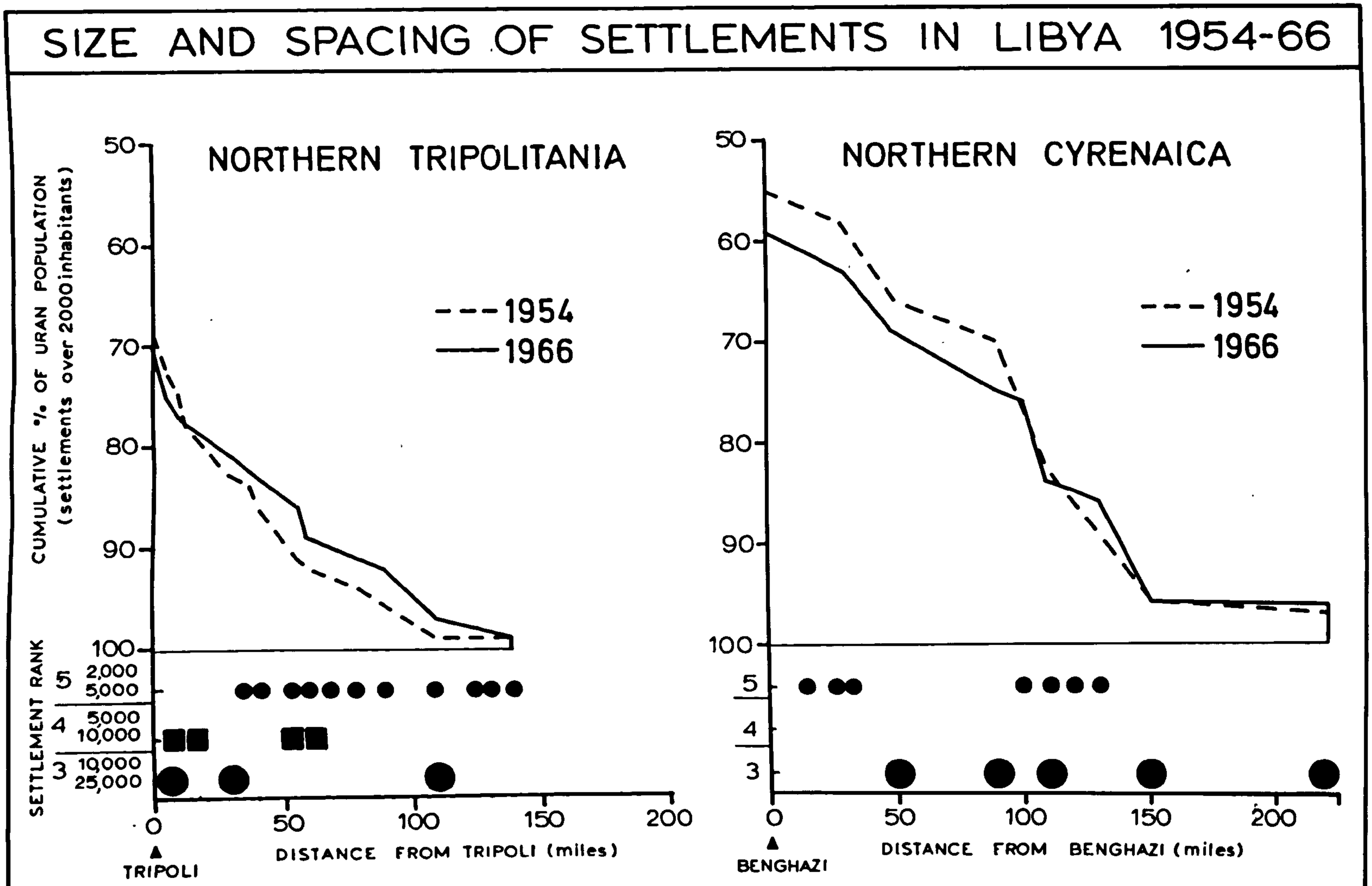

SIZE AND SPACING OF SETTLEMENTS IN LIBYA 1954-66
NORTHERN TRIPOLITANIA
NORTHERN CYRENAICA
---1954
——1966
CUMULATIVE % OF URAN POPULATION
(settlements over 2000 inhabitants)
50
60
70
80
90
100
SETTLEMENT RANK
5 2,000 5,000
4 5,000 10,000
3 10,000 25,000
0
50
100
150
200
TRIPOLI
DISTANCE FROM TRIPOLI (miles)
BENGHAZI
DISTANCE FROM BENGHAZI (miles)

Figure 4.5

4.3 Determinants of Settlement Size and Spacing

Stewart[14] maintains that the more urban the functions, the closer are the spacings of settlements, but that the size of the settlement is incidental to its function. Libyan evidence indicated the opposite.

The economic activities most closely related to positive values on factor 1, the urban end of the gradieht (Chapter II), were transport, commerce, construction and manufacturing. The proportion of economically active males in these four activities were calculated for a sample of sixteen Libyan towns of different sizes (Table 4.4). Spacing between settlements was calculated on the basis of number of settlements within a radius of twenty miles of each town. Correlation between urban functions and settlement spacing indicated an association of +0.325 for the sample of sixteen towns. It would seem, therefore, that degree of urban functions (by this definition at least) did not necessarily indicate greater settlement cluster.

Also contrasting with Stewart's findings was the positive association between settlement size and function. A correlation co-efficient between the size of settlements and the proportion of economically active males in urban functions (Table 4.4) revealed a positive association (+0.671) Although the two elements did not necessarily have a causal relationship, the larger the size of Libyan settlements, the more likelihood there was that urban functions would dominate the economic structure. Conversely, settlements with significant agricultural functions showed a high negative correlation with settlement size (-0.874).

Two processes may have operated. Firstly, there would appear to have been a transfer of processing and manufacturing activities from household and village handicrafts to the larger settlements. Secondly, the introduction of new economic activities associated with the recent economic expansion diversified the urban functions of large settlements.

Table 4.4 Economic Activities in Libyan Settlements, 1964

(Percentage of economically active male citizens aged 6 years and over by economic activities)

		Settlement Sizes (number of inhabitants)				
	A	B	C	D	E	
	Economic Activity	over 25,000	20,000 to 25,000	10,000 to 20,000	5,000 to 10,000	2,000 to 5,000
0	Agriculture	3.2	5.3	13.4	44.7	34.8
1	Mining	4.8	1.3	3.1	1.7	2.6
2-3	Manufacturing	11.3	6.4	7.4	3.3	1.5
4	Construction	10.6	12.7	11.6	9.3	3.7
5	Electricity, water and gas	3.4	4.0	2.4	1.2	1.8
6	Commerce	12.3	11.0	8.4	5.2	4.7
7	Transport	12.1	10.8	7.3	5.0	4.8
8	Services	34.0	41.5	32.4	17.7	34.6
9	Others	8.2	7.2	12.9	13.0	10.0
	Urban Functions (2, 3, 4, 6, 7)	49.7	44.9	37.1	24.0	16.5

Settlements: A - Tripoli, Benghazi; B - Derna; C - Agedabia, Beida, Sebha, Marj, Misurata, Suk el Giuma, Tobruk, Zawia; D - Homs, Nalut, Cussabat; E - Benina, Cyrene.

Source: Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

Table 4.4 indicates certain distinct changes in economic activities associated with size of settlement. Measured as more than ten per cent of the economically active male citizens, agriculture ceased to be a "significant" activity in settlements with more than 20,000 inhabitants. Manufacturing, commerce and transport activities were predominantly large town functions, although towns over 10,000 inhabitants had similar functions, though at a lower level of significance. Mining activities had no association with size of settlement, while construction functions were of small proportions only in settlements with under 5,000 inhabitants. Services remained the dominant activities in all settlements, except those with 5,000 to 10,000 inhabitants.

The location of the settlements (Figs. 4.2 and 4.3) appeared to be as important as size in determining the nature and importance of different economic activities. Suk el Giuma had a variety of functions, despite its rural orientation; a structure similar to that of Tripoli. All middle-sized Tripolitanian towns had distinct rural service sectors with a large number of agricultural workers. This may be attributed to the poor definition of the urban areas, and also to their location in intensively cultivated and settled agricultural areas. In contrast, Cyrenaican towns were more specialized. Tobruk, as an isolated settlement, had a small agricultural sector, but a variety of urban functions. Beida, the new capital, showed a large proportion of the economically active males in construction, while Agedabia, one of the main oilfield settlements, had a significant number of persons engaged in mining activities. However, it was the number of "significant' functions which tended to characterize the larger settlements. The largest settlements had more than five functions containing more than ten per cent of the economically active male citizens (not including "other" economic activities), while small settlements had only two. Specialization appeared to be a middle-size settlement characteristic.

4.4 Conclusion

In general terms, Libya's "primate" urban structure appears to conform to other empirical evidence. Urban structure does not appear to be a function of the level of economic development, industrialization or urbanization. To some extent, Libya's urban structure was similar to other countries which are smaller than average (in terms of oecumene), have a short history of urbanization, and are economically or politically simple.[15] Thus, the "primate" structure grafted onto a lognormal distribution of smaller settlements is indicative of Libya's type of urban growth.

The spacing of Libyan settlements also tends to form a pattern that is empirically valid, though at a different level to other countries (Fig. 4.4) Evidence of the spacing of 200 American towns emphasizes some of the possible reasons for settlement density in Libya.[16] Thus, towns of a given size are likely to be more widely spaced where (a) rural population density is low, (b) farming is extensive, (c) agricultural production is low, (d) where the overall population density is low, and (e) where the town itself has a low proportion of workers in manufacturing. The wider spacing of Cyrenaican settlements vis-à-vis Tripolitanian settlements, is certainly partly attributed to the nature of the region's agriculture.

However, two elements are particularly relevant to Libya's settlement spacing and nature of agriculture. Firstly, regression analysis of the American sample towns[17] showed that while all five features were slightly more valuable than town size in predicting spacing, only one, overall population density, could explain more than 10 per cent of variation. Indeed, all six hypotheses working together could only explain one-quarter of the variation in spacing. The question of settlement spacing is therefore complex in its causal roots.

Secondly, in general, the Libyan example is particularly difficult to analyse because of the contact between modern and traditional economies. In 1965, for instance, £L 15 million of food was imported, mainly through Tripoli and Benghazi. In contrast, only £L 25 million of food was produced in the country itself. Consequently, the equilibrium of functional dependency between towns and villages has become disturbed. In effect, the largest urban centres have become source areas for agricultural produce thereby usurping the functions of the small settlements.

The relationship between size and economic function of Libyan settlements appeared to differ from empirical evidence produced by Stewart.[18] The range of urban functions, whether specialized, dual or varied, was more closely associated with the location, than with the particular size, of settlements. However, the fact that specialization and dual economic functions predominated in Cyrenaican and Tripolitanian middle-sized towns respectively, indicated the particular stage of urban growth which Libyan regions are experiencing. Stewart[19] maintained that "in pre-industrial subsistence economies villages are orientated to the countryside and the agricultural population; the towns face one another only". In contrast, increasing contact between urban and rural areas appeared to be taking place in Libya. Thus, in Tripolitanian towns at least, the process of erosion of the traditional Libyan economy was reflected in the dual economic functions of their urban structures.

Two contrasting processes appear to influence Libya's urban structure. First, the pattern, and possibly the hierarchy, of settlements is being preserved. Historical inertia and water supply have dictated the coastal and Gebel concentration in both Tripolitania and Cyrenaica, although local determinants have influenced particular distributions. For instance, an old but recently revived water pipeline from Ain Marra,

near Derna, to Beida and Marj, in the Gebel Akhdar, will maintain the settlement structure of the western Gebel despite lack of adequate ground water. On a national scale, it would seem that some limit must exist to the number of settlements and towns that a population of one and a half million inhabitants can support. Notably, few new settlements have been created between 1954 and 1966, and this would seem to suggest that Libya has reached an optimum. Continued government expenditure on schools, hospitals and houses on the basis of the present distribution of population will tend to preserve the existing settlement pattern.

While the pattern of settlement spacing has remained relatively stable, the sizes of settlements have been more susceptible to change. Governmental expenditure has itself disturbed the pattern delimeted by physical and historical factors. A fourth regional capital, Beida, has been established in a hitherto lightly urbanized area. Sebha, the Fezzan urban centre, has grown rapidly since the construction of the 700 mile Fezzan Road. The extension of the transport network will inevitably influence patterns of supply and demand, while the nature of Libya's economic growth will influence the economic functions of the urban centres.

It is this relationship between the urban economic structure and the demographic responses which has determined past changes in the distribution of population in both urban and rural areas. Of the three dynamic elements of population change, migration has been the first to respond to economic changes. The identification of areas of in-and out-migration, together with a study of two primary demographic responses to the changes in population redistribution, form the basis of Chapter V.

References

1. Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), p.IX.
2. Ministry of Planning and Development, Libya. Inventory Reports of Planning Consultants, Tripoli, (1966).
3. Zipf, G.K. Human behaviour and the principle of least effort, Cambridge, (1949).
4. Berry, B.J.L. "City Size Distributions and Economic Development", Economic Development and Cultural Change, Vol.9, (June 1961), pp.573-588.
5. Stewart, C.T., Jr. "The size and spacing of cities", Geographical Review, Vol.48, (1958), p.222.
6. Simon, H.A. "On a class of skew distribution functions", Biometrika, Vol.42, (1955), pp. 425-40.
7. Berry, B.J.L. op.cit., pp. 573-588.
8. Haggett, P. Locational Analysis in Human Geography, Edward Arnold, London, (1965), p.104-5.
9. Berry, B.J.L. op.cit., 573-588.
10. Losch, A. The Economics of Location, New Haven, (1954).
11. Brush, J. E. and Bracey, H. E. "Rural Service Centres in South-western Wisconsin and Southern England', Geographical Review, Vol.45, (Oct. 1955), pp.559-69.
12. Agostini, E di. Le popolazioni della Tripolitania, Notizie etniche e storiche, Governo della Tripolitania, Ufficio politico-militare, Parte II (Tavole), Tripoli, (1917); and La popolazione della Cirenaica, Governo della Cirenaica, Benghazi, (1922-3).
13. Goodchild, R. G. "Mapping Roman Libya", Geographical Journal, Vol. 118, (1952), pp. 142-152.
14. Stewart, C. T. op.cit., pp.222-45.
15. Berry, B.J.L. op. cit., p.587.
16. King, L.J. "A multivariate analysis of the spacing of urban settlements in the United States", Annals of the Association of American Geographers, Vol. 51, (1961), pp.222-3.

17. ibid. pp. 222-3

18. Stewart, C. T. op. cit., pp. 222-45.

19. ibid. p. 225

CHAPTER V

AGE AND SEX STRUCTURES

Economic development within Libya has affected the quantitative aspects of urban and rural population redistribution as well as patterns of population composition through a complex of social, economic and political forces. Of the many compositional features which have undergone radical change in Libya, age and sex elements are two central indices. Not only were the age and sex patterns produced by economic growth and its demographic attributes, but in themselves, age and sex characteristics are secondary variables influencing the economic and demographic growth potential in Libya. As such, an analysis of age and sex patterns indicates both the direction of past structural changes, and also suggests particular processes which are operating in the country.

The significance of age and sex variables in the Libyan demographic structure was indicated in Chapter II. High correlation co-efficients with factors 1, 2 and 3 suggested that both age and sex aspects were of primary importance in differentiating the Libyan regions. Thus, urban-rural contrasts were partly attributed to the compositional features within each region; settled agriculture and nomadism were associated with specific age and sex structures; and accessibility to urban areas reflected a change in the proportions of different age groups.

However, while the association between the three principal components and age and sex structures can be measured with statistical accuracy, dissecting causal relationships is more complex. Yet the determinants of demographic characteristics are basic in understanding the chain reaction of responses which Libya's economic development initiated. The identification and analysis of these processes and consequences form the crux of this section.

5.1 Elements and Patterns of Libya's Age Structure

In some respects, the difficulties of age structure analysis are a product of the information itself. Libyan census data referring to age is suspect, particularly that of 1954.[1] Apart from the general difficulties of enumeration in semi-nomadic and nomadic territories, Islamic traditions and educational backwardness favour misreportings. Libya also suffers the characteristic biases of most developing countries; underestimation of childrens' ages up to about 10 years; underreporting of numbers in the age group 10-19 years; preference for central reproductive ages 20-39 years; overestimating the ages of the old; and heaping of ages around particular digits.[2] It was estimated in Egypt, for instance, that under-enumeration in the 0-4 years age group was about 10 per cent, while over-enumeration in the 5-9 years age group was about 6 per cent.[3] Libyan data from both the 1954 and 1964 population censuses correspond with other empirical evidence for interrelations between decimal age groups appear to fit simple regression lines identified by Vielrose.[4] Thus, the larger proportion of infants and children under 5 years, the larger also are the proportion of young age groups aged 5-15 years, and the smaller are the proportions of adult and old-age groups. The theoretical and empirical relationships between these age groups validates the general accuracy of the two censuses.

In an attempt to identify regularities in the age structure of various countries, Vielrose[5] maintains that distinctive characteristics apply only to individual countries. However, the existence of certain broad regularities can be safely assumed, if only because amongst the great variety of structures there exist some types which have their equivalence in characteristic shapes of the age pyramid. On such a basis Libya exhibits a progressive age structure, displaying a cone-shaped age pyramid starting on a broad base and rapidly tapering towards the top (Fig. 5.1A). Infancy and childhood cohorts are the most numerous age groups, while old age cohorts

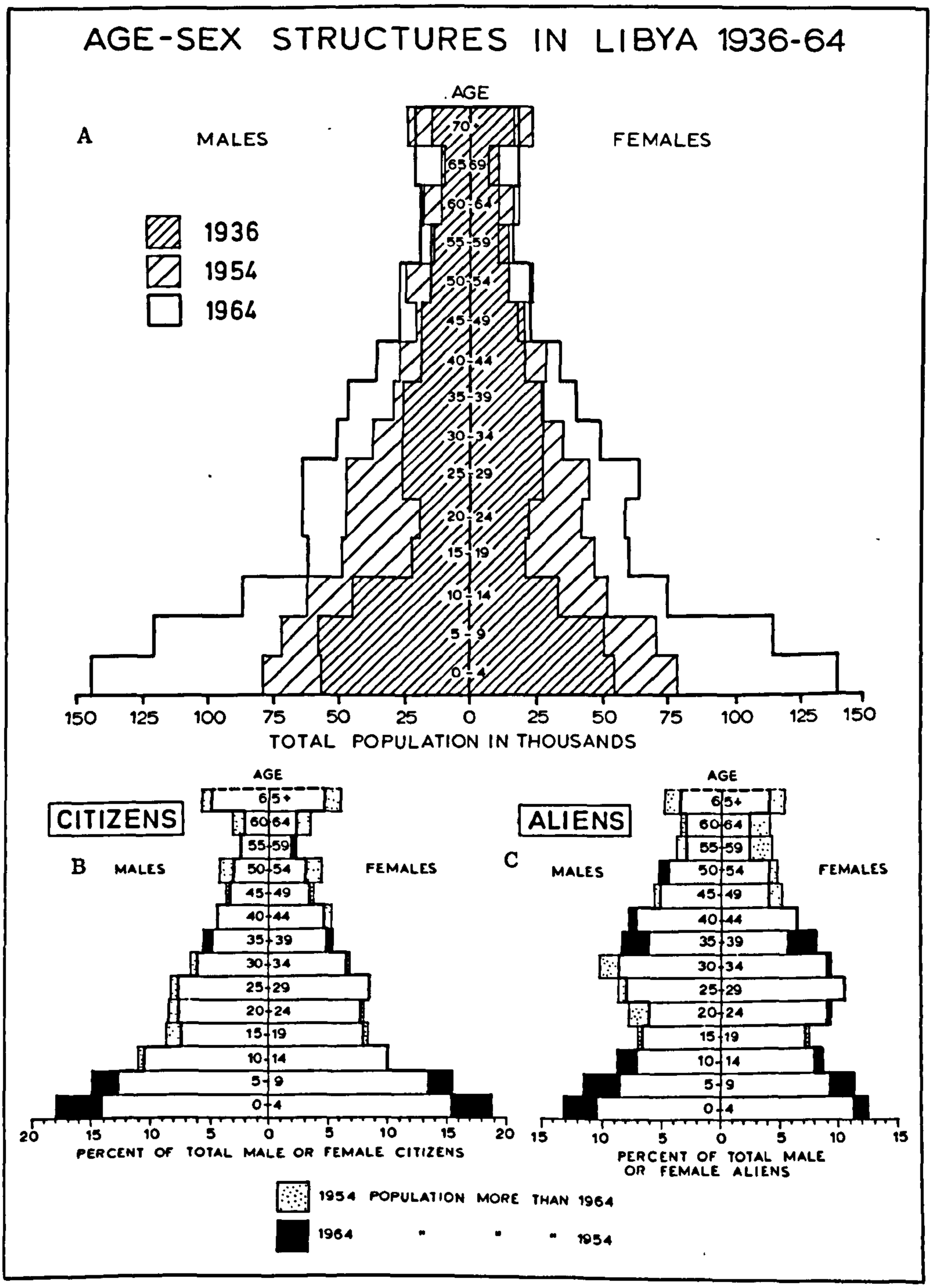

AGE
A
MALES
FEMALES
1936
1954
1964
70+
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
150 125 100 75 50 25 0 25 50 75 100 125 150
TOTAL POPULATION IN THOUSANDS
CITIZENS
B
MALES
FEMALES
20 15 10 5 0 5 10 15 20
PERCENT OF TOTAL MALE OR FEMALE CITIZENS
ALIENS
C
MALES
FEMALES
15 10 5 0 5 10 15
PERCENT OF TOTAL MALE OR FEMALE ALIENS
1954 POPULATION MORE THAN 1964
1964 " " " 1954

Figure 5.1

reveal a reverse interrelation; it is an age structure with a large potential for growth. In Libya, the proportion of the total population under 15 years of age increased from 38 per cent to nearly 44 per cent between 1954 and 1964. This increasing youthfulness of the population is reflected in the decreasing median age from 23 years in 1936 to 21 years in 1954, to 18 years in 1964.

This phenomenon contrasts with the aging process in many developed countries. The median age in the U.S.A., for example, increased from 16 to 30 years between 1800 and 1960.

On the basis of three major age groups and median ages Libya would seem to be following conditions operating in other Middle Eastern countries. Apart from Israel and Kuwait, most Arab countries displayed a progressive age structure with not less than 40 per cent of their populations under 15 years of age in the 1960's (Table 5.1). Moreover, this youthfulness appeared to have increased during 1950-60. In sharp contrast, Western European and North American countries indicated median ages nearly two times as large as Middle Eastern countries, with less than one-quarter of their populations below 15 years of age.

5.1.1 Age Structure of the Alien Population*

While international comparisons of age structures may reveal broad similarities, contrasts within Libya are reflected in the age characteristics of both alien and civilian populations. (Fig. 5.1). The bell-shaped pyramid of the alien population indicated a stationary or stable age-structure, though with a tendency to be progressive below 15 years of age. Despite the small absolute size of the alien population (49,000 or about 3 per cent of the 1964 total population) it had a significant effect on regional population structures. Over three-quarters of the aliens were concentrated in Tripoli and Benghazi, 70 per cent being in Tripoli itself, thereby differentiating the urban areas from the rest of the country.

---

* see Table 8, Appendix C.

Table 5.1 Age Structures in Selected North African and Middle East Countries.

(Percentage Distribution of Total Population (male and female) in 3 age Groups)

Country	Year	Median Age (years)	Under 15	15 - 59	60 and over
Libya	1936	23	40.0	51.2	8.8
	1954	21	38.0	52.4	9.5
	1964	18	43.6	49.3	7.1
Tunisia	1956	19	41.8	52.6	5.6
UAR (Egypt)	1947		38.0	55.7	6.3
	1960	18	42.8	51.2	6.0
Sudan	1956		46.6	49.9	3.5
	1964	16	46.7	49.7	3.6
Morocco	1951-2		40.6	52.2	6.9
	1960	17 (1963)	44.2	48.8	7.0
Algeria	1954	-	41.0	54.0	5.0
	1961	-	44.0	49.2	6.8
Kuwait	1957	-	31.7	66.1	2.2
	1961	20 (1965)	34.7	61.9	3.4
Jordan	1961	-	45.2	47.8	7.0
Israel	1952	-	31.3	61.8	6.9
	1961	25 (1963)	36.1	55.4	8.5
U.K.	1960	35 (1963)	23.2	60.1	16.7
U.S.A.	1960	30	31.1	55.6	13.2

Sources:
(a) U.N. Demographic Yearbooks 1962-65 New York, (1963-66).
(b) "Resident Native Population 1936." Pan, C.L. "The Population of Libya", Population Studies, Vol.3, (June 1949), p.121.
(c) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959).
(d) Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

The concentration of both male and female aliens in the working age groups between 20-40 years is a reflection of the nature of the recent immigration. An influx of foreign Arabs (now the second largest foreign community) shows a male excess in the working age groups. British and American aliens increased nine times between 1954 and 1964. Initially, technical assistance experts formed the main body of immigrants; but they were superceded by oil company employees in the late 1950's. The oil exploration and technical assistance stage of development was reflected in the male predominance of American aliens in 1954. Expansion of the tertiary economic sector has increased the demand for female secretaries, while encouraging the immigration of married women and families. This tendency, combined with the resident Italian community (still the largest group of foreigners), has been responsible for the progressive age structure under 15 years. However, despite the importance of children in the Italian community (in 1964 nearly half of the alien children under 15 years were Italians), both the structure and change of the alien population is more a product of immigration than natural increase.

5.1.2 Age Structure of the Citizen Population*

More complicated in its structure and determinants is the citizen population. Containing about 97 per cent of the total population the citizen population displays a progressive structure. However, past conditions of epidemics, wars and economic depressions have led to indentations and protuberances in the age pyramid (Fig. 5.1). In order to establish the existence of regular patterns in the Libyan age structure both the irregularities in the age pyramid and the limitations of the data must be taken into account.

Conclusions reached by Vielrose are generally valid for the change in the Libyan citizen age structure between 1954 and 1964. Thus, as the

---

* see Table 8, Appendix C.

proportion of the youngest age group (0-9 years) changes (in the Libyan example it increased markedly), a noticeable change in the same direction takes place in the proportion of the adjacent age group (10-19 years). The 20-29 years of age group remains practically unchanged (valid in Libya), but subsequent age groups undergo changes in the reverse direction to those in the youngest age groups.. From the 55-59 age group onwards, the changes grow smaller in absolute value. The Libyan example also corrobérates empirical evidence from 44 countries[6] that any change in the age structure has its greatest variation in the extreme age groups and the smallest in the 20-29 years age group. The general conclusion is that in a normally developing population certain proportions must be maintained, automatically imposed by the very nature of events; never could the Libyan population be composed predominantly of children or predominantly of old people. Children must have parents, and old people must leave progeny. The Libyan example and the theoretical models constructed by Vielrose are useful in three ways. First, the conclusions help to validate the Libyan population censuses of 1954 and 1964. Second, the models indicate that changes in age structures are eventually reflected in repercussions in the age pyramids. Third, the variations from the expected norm highlight the impact of past events upon the present age structure.

Five distinct sections can be distinguished in the 1964 citizen age structure (Fig. 5.2).

(a) The earliest age group (0-9 years) displays a marked progressive character. This undoubtedly reflects the nature of the economic development which occurred during 1954-64, and which in turn influenced social conditions. Initially, increased national revenues were brought to bear on diseases associated with infant mortality. Attitudes concerning family size, however, are deeply ingrained in Libya, requiring a long period of adjustment. It is likely, therefore, that birth rates remained high, while

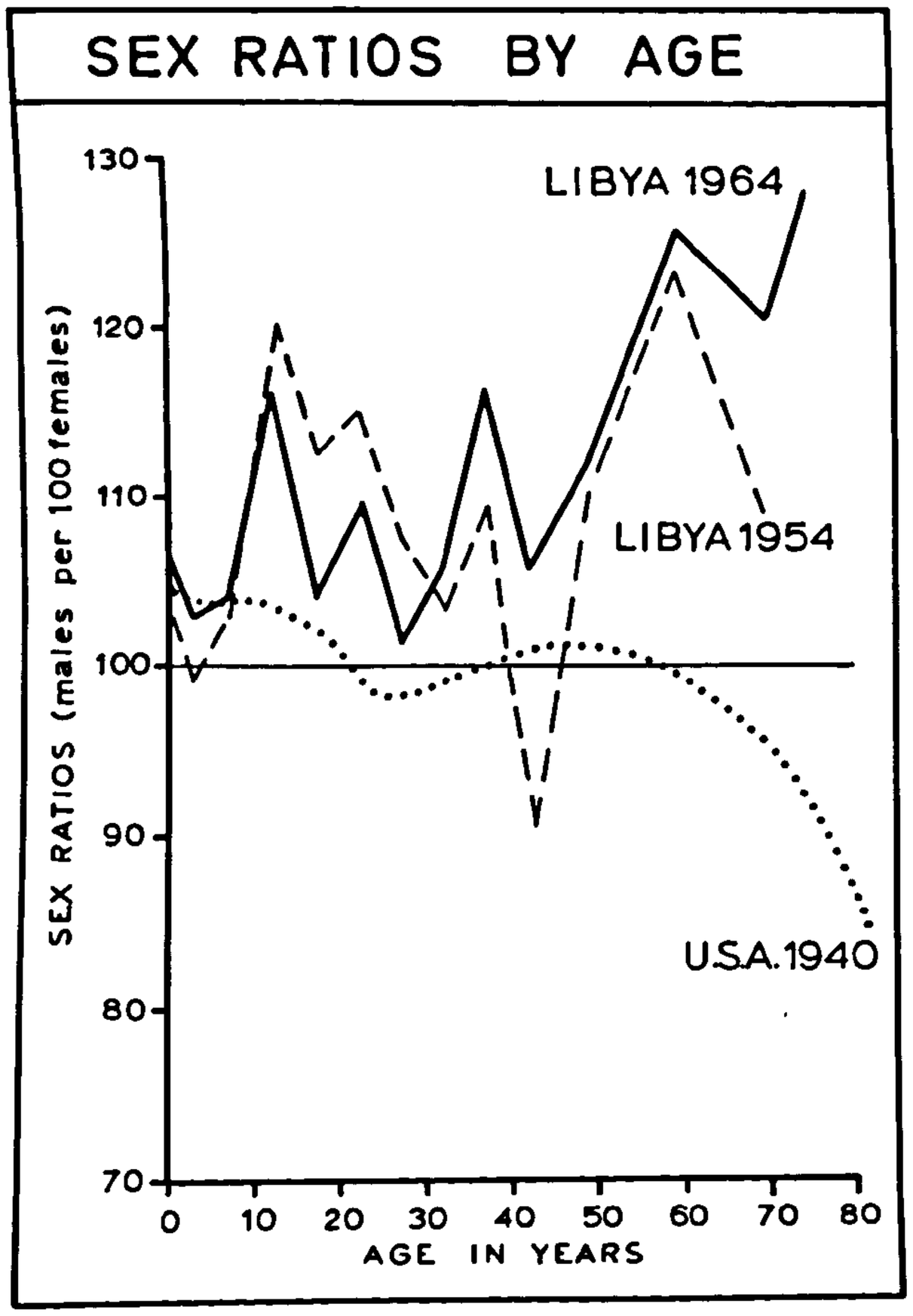


Figure 5.5

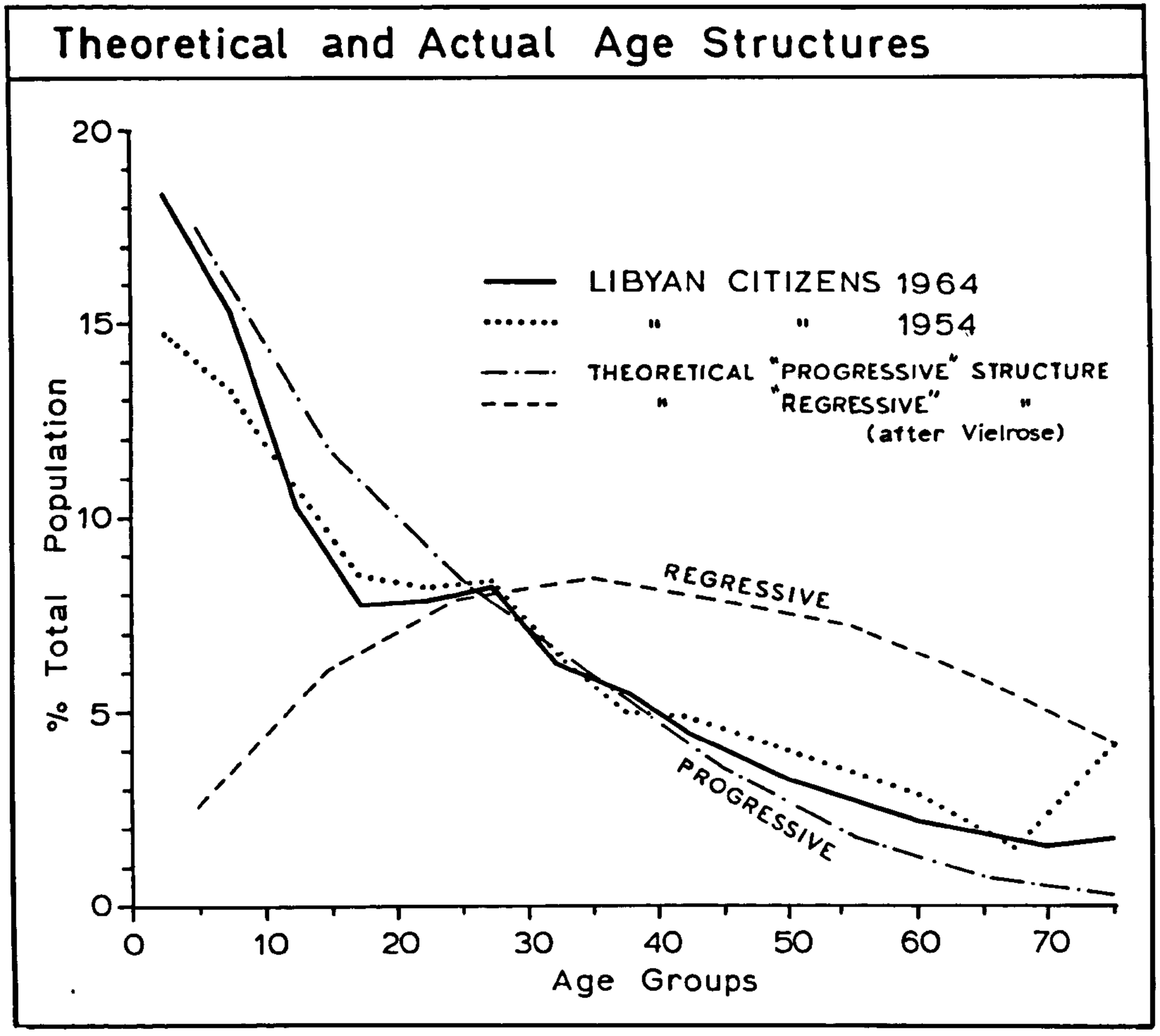


Figure 5.2

mortality was the main variable in Libya's natural increases. Immigration, the dominant variable in the alien age structure, did not radically influence this age group between 1954 and 1964.

(b) The age group 10-20 years indicates a stable to regressive age structure, below the norm expected in a progressively structured country. War losses during the 1940's, and post-war poverty may account for the small proportion of children surviving from the 1944-54 period.

(c) The "natural" tendency for the 20-29 years age group to remain stable in Libya may have been reinforced by the return of Libyans who fled the Italian occupation of the late 1930's.

(d) A progressive age structure is apparent in the 30-40 year age group. Considering the social and economic upheaval in Libya during the Sanusi - Italian wars during 1924-34, this is particularly suprising. As with group (c), the heavy out-migration from Libya during this period must have been balanced by a subsequent in-migration since 1934.

(e) There is a tendency towards a stable population in the age groups over 40 years. The increase in absolute numbers and relative proportions of the aged differs slightly from the expected decline associated with a youthful progressive structure. While enumeration of the aged may have improved between 1954 and 1964, it is probable that more Libyans are living to older ages.

5.1.3 Processes influencing changing Age Structures

While superficially progressive the Libyan age structure reveals the impact of past events and demographic processes. Isolating these processes, however, is a more difficult task. The marked progressive character of the young age groups and the increase of the aged in the intercensal period 1954-64 can be attributed to the decline in mortality and improvements in census enumeration. A detailed study of the national and regional mortality patterns is undertaken in Chapter VIII. However, the following elements of Libya's modernization process influenced the decline in mortality;

(i) increases in food supply through imports and improvements in its distribution which avoided localized or seasonal nutritional deficiencies (Once subsistence became secture, however, little additional mortality reduction was likely to be attributable to this source); (ii) sanitary improvements, such as the installation of waterworks and sewers; (iii) application of chemicals and vaccines on a large scale which controlled malaria and reduced smallpox; (iv) increases in the amount of medicinal treatment available to families; and (v) improvements in family practice of hygiene and health care.

Despite an increase in the proportion of young age groups, initiated mainly by a decline in mortality, it would seem that Libya still awaits the dramatic age structure changes associated with a decline in fertility. The lack of marked aging in the Libyan population tends to emphasize the importance of declining mortality in recent years; not a decline in fertility. "Declining mortality or - which is the equivalent - increasing expectation of life, accelerates population growth with respect to all age groups and not merely with respect to the segment of advanced ages. (This would seem to be the case in Libya which has experienced a rapid growth of the population under 10 years of age, while tending towards a stable structure in old age).* A relative slowing down of population growth in the younger age groups, however, results from a decline in the birth rate. Birth rates, and not death rates, are the major determining factors of population structure" Attitudes concerning willingness to pay in resources and inconvenience to achieve birth control do not appear to have existed in Libya. High birth rates have been maintained despite increased education and increasing crowding of families with infant mortality reductions. The continued importance of Islamic traditions, sustaining early marriage and large families, together with generous government allowances for families, may perpetuate the stable high birth rates in Libya.

---

* Author's parenthesis

Past migrations have influenced the present age structure in Libya, particularly the alien population. Generally, international migration is selective of young people. Consequently, during the emigration from Libya during the 1930's, aging of the resident population was probably accelerated. The return of many of these, and other, migrants particularly in the last ten years, has tended to retard the aging of the Libyan population.

5.1.4 Economic Development and Age Structure

The precise chain reaction of monetary gains and structural changes in the population are difficult to identify in Libya. It would seem, however, that increased financial resources have been brought to bear effectively and quickly on the reduction of mortality, through improved medical facilities. In contrast, ingrained social traditions have so far withstood the decline of fertility usually associated with economic advances. However, economic conditions have influenced the age structure in Libyan regions most radically through rural to urban migration. Differential allocation of national resources has concentrated economic growth in the urban areas, which have indirectly attracted selective migration. (This aspect is elaborated in sections 5.1.5 and 6.2.5).

Libyan age structures have also indirectly influenced a variety of economic characteristics. Of particular significance are the high dependency ratios;[8] comparing the proportion of the population in the unproductive ages with those of working ages. Changes in age structure, other conditions being given, are usually associated with changes in per capita net national product and national income, per capita amount of income producing wealth, and annual volume of savings; each tends to be positively correlated with output per head, which in turn tends to vary with the ratio of the labour force to the total population.[9]

The economically active age groups in Libya is mainly between 15 and 59 years. The number of persons under 15 years combined with those

Table 5.2 Dependency Ratios in Selected Middle Eastern Countries

Libya	1936	953
Libya	1954	908
Libya	1964	1028
Tripolitania	1954	880
Tripolitania	1964	1080
Cyrenaica	1954	960
Cyrenaica	1964	990
Fezzan	1954	910
Fezzan	1964	1020
Sudan	1956	1004
Sudan	1964	1012
Morocco	1951-2	905
Morocco	1960	1049
Algeria	1954	852
Algeria	1961	1053
UAR (Egypt)	1947	795
UAR (Egypt)	1960	953
UK	1960	664
USA	1960	799

$$\text{Dependency ratios} = \frac{\text{children under 15 years + aged over 60 years}}{\text{adults aged 15 - 59 years}}$$

Sources: UN. Demographic Yearbooks 1954-65, New York, (1955-66).

over 60 years expressed as a ratio of adults aged 15-59 years provides an index of age-induced economic drain on manpower resources. Between 1954 and 1964 Libya displayed an increasing dependency ratio from 908 to 1028, the greatest change occurring in Tripolitania, the least in Cyrenaica.

This tendency towards larger dependency ratios was typical of most North African countries during the early 1960's, which, because of their high proportions of children, are significantly higher than more developed countries (Table 5.2).

While economic growth may indirectly have created the increase in dependency ratios, particularly through reduced infant mortality, continued economic expansion in Libya may be curtailed. An increase in young dependents has required a larger allocation of savings for purposes of "social investment". For instance, public expenditure on education rose in both absolute terms and also relative to total public expenditure. Thus, between 1952 and 1967 expenditure on education rose fifty times while the proportion to total expenditure doubled during the period. Moreover, the investment in the rearing and education of the young has been achieved only at the expense, in some measure, of decreased savings allocated to "productive investment", i.e. investment designed specifically to increase product per head. These financial implications may be of decreasing significance in Libya with its new sources of revenue, but the increasing numbers of people in full-time education is reducing the actual workforce. The combined effects of increased dependency ratios and economic growth are discussed in more detail in Chapter VII. Suffice to quote Hauser,[10] ".... apart from raising the ratio of dependents to workers, increased dependency, all other things being equal, operates in other ways to reduce product per head and therefore to affect level of living adversely".

5.1.5 Regional Variations in Libyan Age Structures.

Differences in the nature of economic development of Libya's three provinces, elaborated in the first four chapters, were not reflected in the age structure changes between 1954 and 1964. Triangular graphs of the three major age groups, 0-14 years, 15-59 years, and 60 years and over,

indicate that internal differences in the three provinces followed similar trends (Fig. 5.3). Starting from different age structures in 1954, there was a general trend towards an increasing proportion of children and a decreasing proportion of aged to the total population - a typical progressive structure.

In Tripolitania, Tripoli City differed markedly from the coastal Gebel and interior regions (classified and defined in Table 2, Appendix C). The large amount of change between 1954 and 1964 was mainly a product of the increasing proportion of children under 15 years of age, from 33 per cent to 45 per cent. The coastal, Gebel and interior regions had basically similar structures in 1964, having changed a similar amount and direction during the ten year period.

Cyrenaica showed a similar trend and structure. Benghazi City, despite its different urban functions from Tripoli City, displayed a similar rapid increase in the proportion of children, from 35-43 per cent during 1954-64. The other Cyrenaican regions suffered less change than their Tripolitanian equivalents, though they remained more dissimilar to each other. The major age structure difference of Cyrenaican regions to Benghazi City was the large proportion of aged in the non-urban regions.

The data for the Fezzan were only differentiated by Sebha town and the rest of the province. There was less difference between Sebha and its surrounding regions than occurred in the northern provinces, and these differences tended to narrow between 1954 and 1964. Sebha town's change in age structure was less than for Tripoli or Benghazi, although levels of the three age groups were similar in 1964. The other Fezzanese regions indicated a level and direction of change experienced by the interior Tripolitanian regions.

While the triangular graphs shown in figure 5.3 highlights the broad structural changes in the three provinces and geographical regions, neither

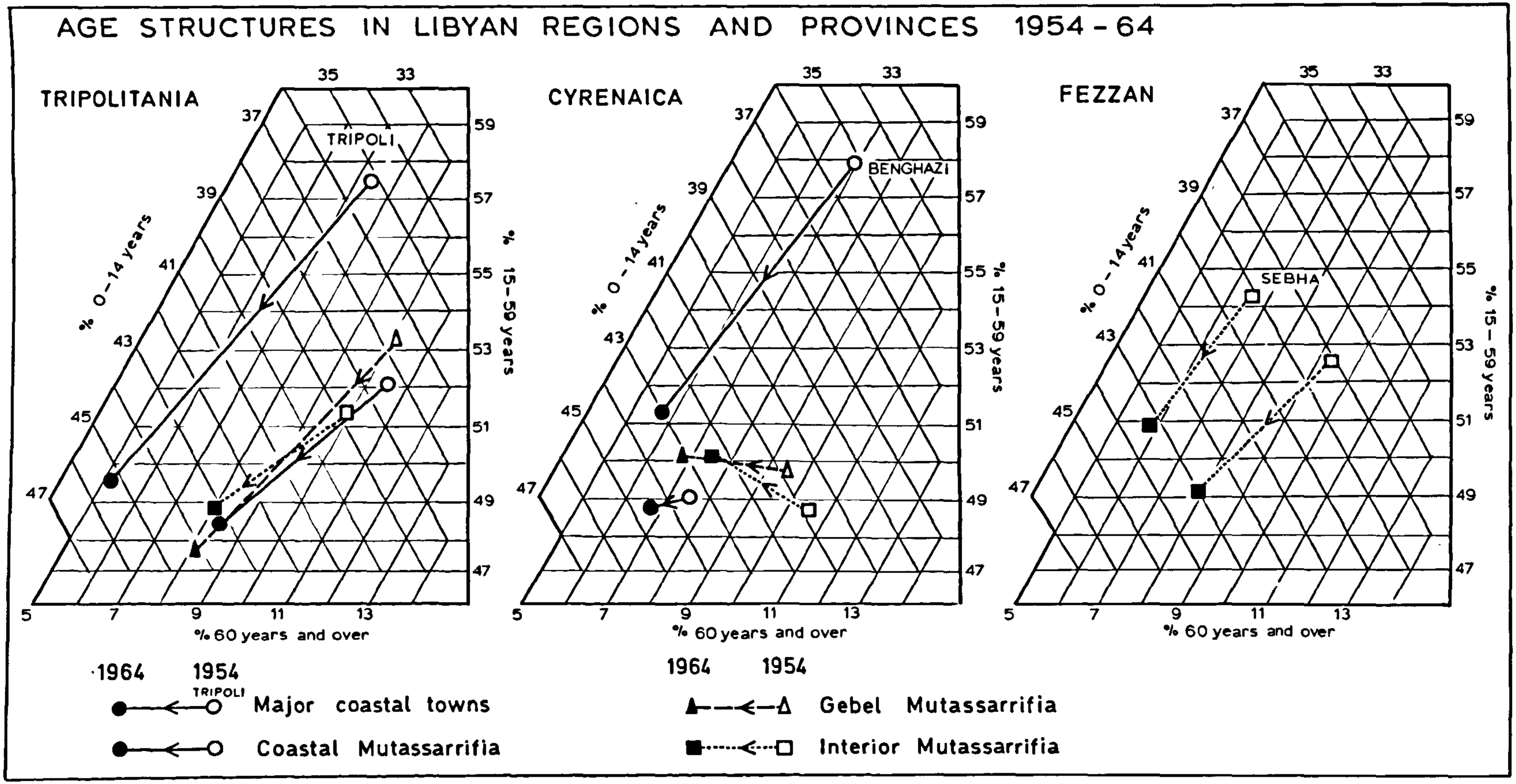

AGE STRUCTURES IN LIBYAN REGIONS AND PROVINCES 1954 - 64
TRIPOLITANIA
CYRENAICA
FEZZAN
TRIPOLI
BENGHAZI
SEBHA
35
33
37
39
41
43
45
47
59
57
55
53
51
49
47
5
7
9
11
13
% 0 - 14 years
% 15 - 59 years
% 60 years and over
1964
1954
Major coastal towns
Coastal Mutassarrifia
Gebel Mutassarrifia
Interior Mutassarrifia

Figure 5.3

the variations from the national average nor the detailed variations by age are emphasized. However, if the proportion in the national age group 0-5 years is represented by 100, and the proportions in the various regions aged 0-5 years are expressed as indices of the national proportion, and so on for each 5 year age group, then the divergence of the urban and rural age structures from the national pattern can be expressed, if a little exaggerately.[11] Figure 5.4 expresses Libyan regional differences by this method. The line 100 represents the national age structure; where the curve for the particular community lies above the line, it represents a relative excess of population for those age groups. Conversely, where the curve lies below the 100 line it means there is a relative deficit for these age groups.

The resultant contrasts within and between the eight groups of northern regions in Libya emphasize (a) an urban-rural contrast in both Tripolitania and Cyrenaica, and (b) a contrast between the coastal, Gebel and interior regions of the two northern provinces. The similar structure of Tripolitanian regions outside Tripoli City indicates a below average proportion of the under 30 years age group, and above average proportions over 30 years. The interior regions displayed a marked deficiency of age groups of working ages. The basic structure was maintained between 1954 and 1964, although there was a decrease in the proportion of children under 10 years from above the national average in 1954 to below the national average in 1964. Also, there was an increasing proportion of older age groups above the national average.

In Cyrenaica the extremes above and below the national average for coastal, Gebel and interior regions were more marked than in Tripolitania. All three groups of regions showed below average values for age groups 25-40 years, and above average values for age groups 10-25 years and 40-65 years. Essentially, these were similar conditions to those in Tripolitania, although in an exaggerated form. Except for the decrease in

PERCENTAGE DEVIATIONS OF QUINQUENNIAL AGE GROUPS IN LIBYAN REGIONS FROM THE NATIONAL AVERAGE IN 1954 AND 1964

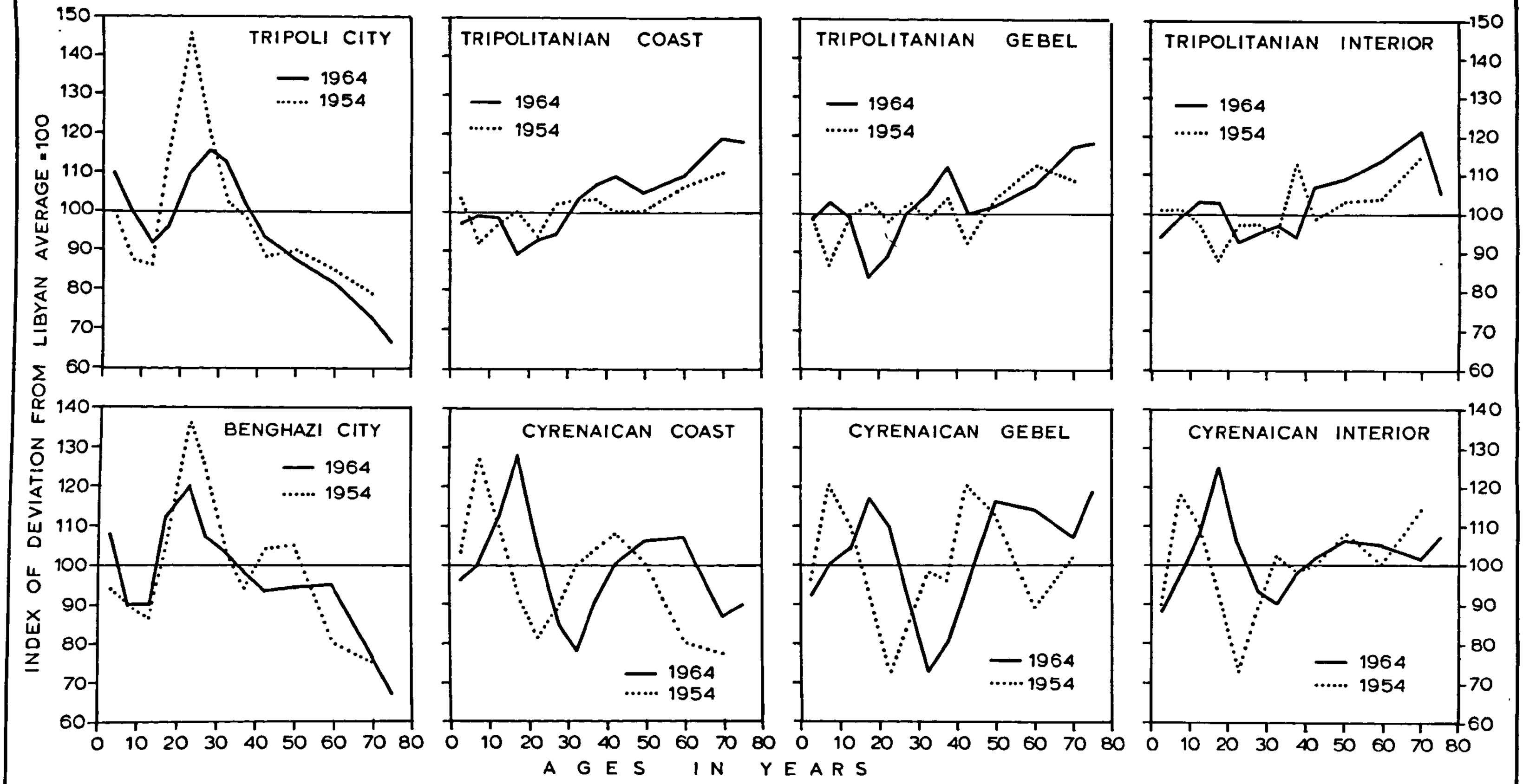


Figure 5.4

children under 10 years to a level below the national average, 1954 conditions were mirrored in the 1964 Cyrenaican age structure.

In marked contrast to these regions, the two urban centres of Tripoli and Benghazi showed distinct characteristics; relatively few children and aged, and high proportions of those in the productive ages 15-40 years. This was true of both censuses, although there was a tendency in 1964 for both cities to lose some of their exceptional excesses of working age groups above the national average. While the proportion of aged tended to decrease in both Tripoli and Benghazi, the children under 10 years showed a marked increase above the national level during 1954-64.

To a large extent, the distinctive features of the 1964 age structure are the direct result of the operation of the following factors during the decade 1954-64; a rise in the birth rate of the urban population, associated possibly with an influx of married persons; a decrease in infant mortality which influenced urban areas particularly; and a marked migration of young adults from the non-urban areas. The present evidence indicates that the urban growth may be due less exclusively to the influx of young, single males, than to natural increase. Moreover, the urban populations of Tripoli and Benghazi are beginning to form a major portion of the total population (24 per cent in 1966). Consequently, the influx of young adults from rural areas, which leaves such a void in their age structures, will have a decreasing effect upon the future urban age structures. As a result of these processes and distribution of age groups throughout Libyan regions, the urban population should gradually come to be more similar to that of the total population. This may help to explain the relative decrease in working age groups in Tripoli and Benghazi between 1954 and 1964. This tendency may be further emphasized when (a) infant mortality decreases in rural areas, and (b) aged Libyans begin to retire in the urban centres and not in the rural regions, as would seem to be indicated.

5.2 Elements and Patterns of Libya's Sex Structure

There would appear to be a striking and persistent inconsistency in the sex classification of Libyans. In all three censuses since 1936 there were reported a larger number of males than females in the citizen population. For instance, in 1954 there were 39,129 males in excess of females, and this had increased to 61,813 by 1964. Even the sex ratio of the total population increased during 1954-64, from 1076 to 1083 males per 1000 females. Moreover, this surplus of males occurred in all the age groups in both the 1954 and 1964 censuses, except for years 3, 4, 6 and 40-44 in 1954.

This trend is not consistent with either theoretical or empirical evidence. In a "closed" population, i.e. one that is not affected by international migration, the following age-sex structure should occur; the curve representing sex-ratios by age normally takes the form of a long drawn-out S, as in the 1940 United States structure (Fig. 5.5). The sex ratio begins at approximately 105 and declines steadily for the first fifteen years, reflecting initial higher mortality of females at birth, and then the greater rise in male mortality with increasing age. This physiological phenomenon is slightly disrupted by the tendency of women to misreport ages in both young and old adulthood.[12] Empirical evidence from both USA and Morocco indicates that this pattern occurs in both developed and underdeveloped countries (Table 10, Appendix C). However, not only do Libyan sex ratios indicate an increasing male excess with age, i.e. exactly the opposite to the expected curve, but the situation remained constant between 1954 and 1964. Three elements may be partly responsible for this exceptional situation.

Firstly, international migration is generally sex selective.[13] Information relating to the influx of aliens into Libya indicates an excess of male Arab migrants, although British and American migrants have

recently dispalyed more balanced sex ratios (5.1.1). Assuming that Libyan international migration is male biased, then females should have shown a preponderance during the 1930's considering the nature of the migrations induced by the Italian occupation. Although the national sex ratio indicated a male excess in 1936 (107.5), the census does show a female excess in the 20-50 years age group. The likely loss of Libyan males in the Ethiopian and Italian wars was also reflected 20 years later in the age group 40-44 years in the 1954 census*. According to published statistics there was a net increase of about 14,000 migrants into Libya between 1957 and 1964. Even assuming that all immigrants were males this figure only accounts for one-quarter of the excess of males measured in 1964. Moreover, the increase in citizen male excess between 1954 and 1964 was not revealed markedly in the working ages 15-44 years in 1954 or 1964. Consequently, large male in-migration to Libya cannot account for more than a small proportion of the excessive surplus of males in the country.

Secondly, the variables influencing population dynamics may dictate Libya's male excess. According to Smith,[14] if the birth and death rates of a country are high, so as to produce a heavy concentration of population in the younger age groups, the sex ratio will be comparatively high; roughly equal numbers of males and females. The higher mortality of child-bearing women may also be reflected in the small proportion of women in the age group 15-55 years. This may be particularly true of the 45-55 years age group, where excessive child-bearing of older women, inadequate medical facilities and dietary habits, and manual labour of women in rural areas, may cause increased female mortality. The large

---

* The 1964 population census fails to reveal this feature because of the age breakdown 45-54 years.

number of still-births, reflected in the sex ratios under 1, may also contribute to the preponderance of males in this age group (Table 10, Appendix C). Therefore, it is feasible that the Libyan death rate for females does increase with age, similar to that of India in 1961.

Finally, particular social conditions existing in Libya may have influenced the sex structure shown by the censuses. To a minor degree there is a tendency for Moslems to be reticent about their women, and this may have resulted in omissions of females from the census enumerations. The fact that most North African countries, and the Moslem states of West Africa, had sex ratios greater than 100 would tend to support this theory (Table 5.3).

Table 5.3 Sex Ratios of North African Countries and Moslem West Africa

Country	Year	Sex Ratio (total population)
Libya	1936	107.5
	1954	107.8
	1964	108.1
Tunisia	1946	103.6
	1956	107.2
Spanish possesions in North Africa:-		
Mililla	1940	113.4
	1950	106.1
Ceuta	1940	146.9
	1950	104.9
Sudan	1956	102.2
	1964	
Algeria	1954	101.6
UAR	1947	98.1
	1960	101.3
Morocco	1960	100.1
	1963	
Upper Volta	1960-1	101.8

Source: United Nations, Demographic Yearbooks, 1962, 63 and 64, New York, (1963, 64 and 65).

Moreover, the fluctuations in the sex ratio curve for 1954 are closely paralleled by those for 1964. Neither the peaks nor the dips move to the right from one census to another, as would be the case if they represented an actual situation. Instead, it would appear that there was a constant error in the enumeration of certain ages. Also possibly associated with Moslem countries, is the completion of families on achievement of male children.

Various reasons may therefore be postulated to explain the anomolous situation in Libya. The constant error of misreporting, high female mortality and predominantly male migrations may together account for the marked excess of Libyan males in both 1954 and 1964. Other evidence relating to national conditions would suggest that some benefit occurred in the decade 1954-64 of medical aid to child-bearing women. The sex ratios of citizen women aged 15-55 years decreased from 1094 in 1954 to 1080 in 1964.

5.2.1 Association of Sex Ratios with other variables

The importance of sex ratios as indicators of demographic and economic variations within Libya was shown in Chapter II. Generally the sex ratios of the potential migrant group aged 15-44 years showed more significant correlations with other variables than sex ratios reflecting the total population. As they are probably less prone to misreporting, the sex ratios of the age group 15-44 years have been used as a measure of association with other demographic and economic features.

Five groups of data showed significant associations with an excess of males in the 15-44 years age group (Table 11 Appendix C).

(a) Distribution and Density of population. The larger the proportion of total population in 1954 and 1964 that each Mutassarrifia region contained the larger the excess of males. Moreover, the higher density of occupance

the higher the male excess, particularly in urban areas. This was corroborated by the correlation with increasing distance from urban areas. A significant association also occurred with the rate of population increase between 1954 and 1964, hinting that as male migrants formed a significant proportion of total migrants, so migrations were an important element of population growth within Libya.

(b) Migration. This data confirms these implications. Excess of males was positively correlated with the amount of net migration in absolute numbers, although decreasing slightly during 1954-64. Therefore, though male migrants still formed a preponderance of the total migrants, their predominance had declined. It is likely that more females, particularly married women, were involved in internal migrations by 1964. This question is analysed in more detail in Chapter VI. The importance of male migrants was also indicated by the place of birth and present residence statistics. There was a tendency for citizens born outside the area of present residence, particularly from Tripolitania and abroad, to show a male excess. This contrasted with conditions in Cyrenaica and the Fezzan.

(c) Age Groups. While an excess of males aged 15-44 years was significantly correlated with a large proportion of the population in working age groups in 1954, there was little association in 1964. The more old people in a region the less likelihood there was of excess of males. The fact that there was a low and decreasing association with dependency ratios between 1954 and 1964 supports the theory that internal migrations were increasingly on a family scale.

(d) Education. It appeared that male migrants had an increasing degree of basic education, particularly at elementary and preparatory levels. The lack of significant association with secondary school education (in both 1954 and 1964) implied both a lack of both high-school facilities in rural areas, and secondary education of migrants.

(e) Occupation. The fact that male excesses were associated with urban economic functions was emphasized by the significant correlations with the distribution of employees and establishment in 1956, and with transport and clerical activities in 1964.

5.2.2 Regional Variations in Libyan Sex Structures

Statistical analysis of the sex ratios in the 15-44 years age group in Libyan Mutassarrifia regions in 1954 and 1964, indicates that 1100 and 1000 delineate the upper and lower quartiles of the range of values. These significant breaks in the distribution of regional sex ratios describe 13 out of the 34 Mutassarrifia in 1964 (Table 5.4 and Table 12, Appendix C).

Table 5.4 Sex Ratios of Citizen Population aged 15-44 years significantly above and below the national average, 1954 and 1964. (males per 1000 females)

Province	Mutassarrifia	1954 Greater than 1100	1954 Lower than 1000	1964 Greater than 1100	1964 Lower than 1100
Tripolitania	(Tripoli City	1202		1133	
	(Nalut	1138		-	
	(Zliten		991		988
	(Mizdah		-		975
	(Sirte		-		949
Cyrenaica	(Benghazi City	1139		1202	
	(Tobruk Town	1327		1175	
	(Beida Town			1145	
	(Benghazi Dist.		1021		-
	(Tobruk District.		971		-
	(Agedabia		997		970
	(Kufra		791		969
Fezzan	(Sebha	1127		1108	
	(El Jufra	1104		-	
	(Murzuk		791		916
	(Ghat		941		-
	(El Shati		-		962

Source: Ministry of National Economy, Libya. General Population Census 1954 (1964), Tripoli, (1959 and 1966 respectively).

In 1954 there was an approximate sub-division of the significantly above average sex ratios in each of the three provinces. Urban areas predominated, Benghazi, Tripoli and Tobruk containing high excesses of males. Sebha also showed a preponderance of males, while the Berber area of Nalut in the western Gebel Nefousa also showed an excess. El Jufra, in the Fezzan displayed a surprising male excess considering its isolation in relation to other Fezzanese oases. Of those regions with well below average sex ratios, Cyrenaica contained the majority. They appeared to be in the south of the Benghazi plain, in areas surrounding isolated towns, and in the southern oases of Kufra. Situated between the urban centres of Tripoli and Misurata, Zliten showed an excess of females. In the Fezzan, only Ghat and Murzuk indicated a predominance of women 15-44 years.

While the basic urban excess of males was maintained in 1964, the new urban centre of Beida was added. Nalut and El Jufra did not show distinct male excesses in 1964. Of those areas with a female excess, Tripolitanian and the Fezzan regions were prominent. Zliten remained and was joined by Sirte and Mizdah, situated on the Gebel dip-slope. El Shati and Murzuk, the two major oases adjacent to Sebha, and Agedabia and Kufra in Cyrenaica, continued to show a deficit of males of working ages.

The explanation of regional patterns of sex ratios are difficult to determine, partly because of the possibilities of wide variations within the Mutassarrifia. It would appear, however, that the regional patterns of sex ratios relating to all ages display a different pattern to those of working ages 15-44 years. Of particular significance is the masking of urban-rural contrasts by use of total age groups, and the emphasis of the accessibility gradient identified as Factor 3 in Chapter II (Table 5.5). Sex ratios of Mudiriah (smaller administrative units) indicate that there is less variation in Tripolitanian Mutassarrifia than in either Cyrenaica or the Fezzan.

Table 5.5 Correlation Co-efficients of Sex Ratios with Factors 1, 2 and 3.

(Factors relate to the Principal Components identified in Chapter II. Sex ratios are males per 1000 females)

	Factor 1	Factor 2	Factor 3
Sex Ratios	1954 + 0.74	- 0.11	- 0.28
15-44 years	1964 + 0.75	- 0.20	- 0.34
Sex Ratios	1954 + 0.56	- 0.20	- 0.53
all ages	1964 + 0.34	- 0.10	- 0.74

This may imply that migration in Tripolitania is either directed to the principal city of Tripoli or else outside the province. In contrast, extremes of sex ratios in the 15-44 age groups within Cyrenaican and the Fezzan Mutassarrifia, may indicate possible migrations within the regions.

5.3 Summary and Conclusion

A number of tentative conclusions can be drawn from this study of age and sex structural changes in Libya. First, the general accuracy of the 1954 and 1964 population censuses were empirically tested and validated.* The age structural changes in Libya appear to follow conditions pertaining in other North African countries. The peculiar situation of male excesses in Libya were explained as a combination of demographic processes operating in a Muslim country.

Secondly, while there is little association between age groups and sex ratios in Libyan Mutassarrifia regions, both reflect independently different socio-economic characteristics and patterns in the country. Sex ratios of the age group 15-44 years are indicative of urban-rural contrasts, while sex ratios of all ages are associated with accessibility to urban areas.

* Detailed assessment of the inadequacies of the census data is undertaken in Chapter VIII

Thirdly, age and sex patterns suggest two levels of migration, assuming that urban-rural contrasts are a product of migration (validated in Chapter II), and that migrants are largely males aged 15-44 years. The first level is a provincial difference in the sex ratios of migrants born in Tripolitania, Cyrenaica and the Fezzan. While patterns of sex ratios bear some relationship to the physiographic regions of the coast, Gebel and interior, the major contrasts remain urban-rural. The second type of migration appearsto be within Mutassarrifia regions. A possible stepped-migration within Cyrenaican and Fezzanese regions is apparently not paralleled in Tripolitania. These pointers are elaborated and tested in Chapter VI.

References

1. Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), p.VII.

2. Lorimer, F., Brass, W., and van de Walle, E. "Demography" in A.R. Lystad (Ed.). The African World: A Survey of Social Research, Pall Mall Press for African Studies Assoc., (1965), pp. 286-7.

3. El-Badry, M.A. "Trends in the Components of Population Growth in the Arab Countries of the Middle East: a Survey of Present Information", Demography, Vol. 2,(1965),pp. 142-3.

4. Vielrose, E. Elements of the Natural Movement of Population, Pergamon Press, (1965), pp. 35-9.

5. ibid. p.47.

6. ibid. p.36-37.

7. United Nations. "The causes of the Aging Population: Declining Mortality or Declining Fertility?" Population Bulletin of the United Nations, Vol. 4, (Dec.1954), p.30.

8. Durand, J.D. "Population Structure as a Factor in Manpower and Dependency Problems of Under-Developed Countries", in U.N. Population Bulleting of the United Nations, New York, Vol. 3, (Oct. 1953), pp. 1-16.

9. Spengler, J. J. "Economics and Demography", in P. M. Hauser and O. D. Duncan, The Study of Population, The University of Chicago, (1959), p.810-11.

10. Hauser, P.M. Population Perspectives, Rutgers University Press, New Brunswick, (1960), p.73.

11. Franklin, S. H. "The Age Structure of New Zealand's North Island Communities", Economic Geography, Vol. 34, (1958), p.64; and Smith, T. L. Fundamentals of Population Study, New York, (1960), pp. 162-175.

12. Smith, T. L. op.cit., pp. 185-6.

13. Thomas, B. "International Migration", in P. M. Hauser and O. D. Duncan, op.cit., p.524.

14. Smith, T. L. op.cit., p.189.

CHAPTER VI

MIGRATION TRENDS IN LIBYA

Libyan population movements are characterized by their considerable size and variability. In 1964, over 600,000 persons in Libya, nearly 40 per cent of the total population, had changed residence during their lifetime. Over half of this group was composed of nomads and semi-nomads involved in some form of seasonal movement and shifting cultivation. A further 175,000 persons, about 12 per cent of the total citizen population born in Libya, were enumerated in a Muqataa region other than their region of birth; over half were enumerated in the urban regions of Tripoli and Benghazi. Of the remainder, 37,000 were Libyan citizens born abroad, and 49,000 foreigners now living in Libya; two-thirds of this group were also resident in the two major urban centres.

However, there is no method of measuring and analysing these migration patterns that is both theoretically satisfactory and administratively feasible in Libya at the present time. Classification of population movements is in itself arbitrary. The different migrations mentioned above have varied in duration, distance and organization. The 350,000 nomadic and semi-nomadic persons, for instance, experience a rhythmic migratory existence closely attuned to seasonal climatic changes. The areal extent of the movements is controlled by the environmental conditions governing available pastures, and by traditional tribal boundaries. Their numbers have remained relatively stable since the 1920's, although their proportion of the total population declined from 33 to 22 per cent between 1922 and 1964.

Against this background of human adaptation to direct and pervasive influences by geographical factors, were superimposed different political, social and economic environments. The Italian occupation during the 1920's and 1930's provoked internal and international migration responses which differed markedly from the established seasonal movements. However, some of these migration trends changed in the post-independence period.

Emigration initiated by the Italians has been reversed and many Libyans have returned from Tunisia and other Arab countries. The influx of Italian settlers in the 1930's has been replaced by European and American immigration since Libyan independence. The rural-urban migrations have been intensified and the destination of both internal and international migrants is increasingly associated with urban centres. Thus, areal variations in the movement of Libyans were paralleled by historical changes in the nature of migrations.

The scale of international migrations were particularly significant in Libya, in view of its small population of one and a half millions, during the Italian occupation of Libya when 140,000 settlers formed about 15 per cent of the total population in 1940.[1] Since then, however, the proportion of foreigners to total population declined to about 3 per cent in 1964. Consequently, less than one per cent of Libya's population growth between 1954 and 1964 was formed by net immigration. This figure may slightly underestimate the importance of international migration to Libya's population growth, for illegal migration over the 2,600 mile land frontier probably occurs, particularly along the southern boundary.

Internal migration has a profound influence upon differential population growth rates. Between 1954 and 1964 regional increases of population varied from 7 per cent to under 0.1 per cent per annum (in Benghazi City and Beni Ulid Mutassarrifia respectively). Despite the poor evidence from vital registration in Libya, these extremes cannot be explained purely in terms of natural increase. The importance of internal migration has already been hinted at in preceding chapters. Chapter II for instance, established a statistical association between migration and the urban-rural gradient - identified as the most significant element in the present demographic structure. Chapters III and IV indicated quantitatively the implications of migration on the redistribution of the population, while Chapter V

suggested two levels of internal Libyan migrations on the basis of age and sex patterns.

The aim of this section is to draw together these indications, within the limitations imposed by the data. Theoretical and empirical evidence from a wide variety of sources and countries suggest that migrations are sensitively symptomatic of economic and demographic changes.[2] It is hypothesized in this section that during 1954-64 migration was the significant mechanism of demographic change which responded to Libya's economic development; in turn, the migration changes stimulated reactions in other demographic and economic conditions. It is further maintained that migration was a necessary element of normal population adjustment to a new economic equilibrium. Despite the disruptive forces and regional inequalities which it initially provoked, Libyan migration was an instrument of cultural diffusion and social integration.

Rather than adhere to any one classification of migrations, those population movements stimulated by recent economic changes will be analysed as a whole. From a theoretical viewpoint, the ideal is a complete system of population accounting through accurate registration. But ignorance and suspicion, lack of legal enforcement of registration, combined with physical problems of scale of coverage and disputed administrative boundaries, make, the Libyan material unreliable. Census data, particularly the results of the successive 1954 and 1964 censuses, provide the simplest approach to the measurement of recent migrations. Yet, some of the major migration patterns of the post-oil exploitation period were instigated during the "precondition phase" identified in Chapter I. Their elaboration form an essential prerequisite to the understanding of recent migration trends.

6.1 Historical Phases of Migration

6.1.1 Turkish Administration

In the second half of the 19th century three events led to an increase and re-orientation of Libyan migration: the growth of private ownership, Turkish conscription and tax reforms, and French colonization in Tunisia, Under Turkish control of the coastal fringe of Libya, there was a growth in private ownership of land and the rights of usufruct. Land passed from the tribe to the family, and the poor were forced to live off less land while the wealthy amassed large holdings.[3] Communal ownership began to disappear and with it tribal security against drought and sickness. The tribes most harshly affected were those dependent on land marginal for grazing, for ownership of land also meant control of key watering points. Combined with the lack of governmental security in areas distant from coastal towns, Tripolitanian farmers suffered from the exactions and depredations of hostile nomads. In Cyrenaica, the Turks had little control outside the coastal towns and the nomadic tribes settled their own disputes.

After the Ottoman Empire had been strengthened by reforms following the Young Turk movement, the power of the state grew within Libya, particularly in Tripolitania. The Turks wanted manpower for their armies and money to pay for them, and therefore introduced conscription and new taxes. Nor did the new administrative demands bring urban employment opportunities for the Arabs. The influx of Cologhli, descendants of Janissaries, provided most of the required government labour and formed the backbone of the Tripolitanian urban population.

Tripolitanian migrants fleeing Turkish reforms were therefore directed to alternative employment opportunities outside the province. Many left for Cyrenaica, and especially Benghazi City. A semi-official census relating to 1917 showed that nearly 40 per cent of Benghazi's population of 22,000 persons originated in Misurata, Tripoli and Zliten.[4] Tripolitanian migrants were also directed to other Cyrenaican towns; for instance, they formed two-thirds of Derna's population in 1917. Other migrants from Tripolitania continued to flee to Tunisia and Algeria. Both

Tunis and Algiers were already "grandes villes" before the Italians captured Tripoli in 1911, and a pattern of migration, especially to Tunis from the Gebel and the Fezzan, had long been in existence.[5] The French Protectorate in Tunisia, established in 1881, stimulated new employment in agriculture and urban commerce. Moreover, many of the "Trabelsi" tribes of the Tripolitanian Gefara had ethnic and tribal links with nomadic groups in Tunisia. These links were intensified and complemented by a new wave of political refugees. By 1912, 10,000 Libyans were enumerated as resident in Tunisia.[6]

In addition to the migration patterns in the north of Libya, an important movement was taking place in the south. Propaganda of the Sanusi religious sect was diffused from the fraternities in Beida and Jaghbub through south-west Cyrenaica, southern Tripolitania and the Fezzan. The existence of strong fraternities of other sects, particularly Salamiya, among the coastal population of Tripolitania, accounts for the failure of the Sanusi Movement to spread there, a fact which perhaps had political and social effects during the subsequent Italian occupation.[7]

6.1.2 Italian Occupation

The Turkish-Italian war of 1911 and the subsequent supremacy of Italy in Libya maintained the foreign minority rule and gave a new impetus to migration. The combination of war, land acquisition and Italian settlement instigated new, and intensified existing, demographic adjustments, particularly emigration, immigration and internal migration.

The scale of Italian colonization, the existing distribution of population, and proximity to neighbouring countries dictated the direction and volume of emigration. For Tripolitanians, Tunisia provided an obvious outlet. Between 1912 and 1937 an estimated 13,000 Libyans migrated to Tunisia. In the early 1930's another wave of political refugees, numbering about 7,000, fled from Tripolitania to southern Tunisia via the Fezzan and

Algeria where they continued the same semi-nomadic existence to which they had been accustomed on the Gefara and Ghibla of the Gebel Nefousa. Despite Italian attempts to add these refugees to their nationals, accurate enumeration of these migrants remained obscure. However, the introduction of border controls, especially on the Tunisian coast, curtailed legal out-migration in the late 1930's.

Cyrenaica suffered the worst exactions of the Italians. It has been estimated that the Bedouin population was reduced by half to two-thirds by death and emigration between 1911 and 1932. 20,000 refugees are thought to have fled to Egypt, while 80,000 people were herded into guarded camps at Marsa Brega and Solluk.[9]

The total effect of emigration is difficult to measure. From available sources it would seem that at least 40,000 Libyans left the country during the Italian occupation. Cyrenaica experienced the most disruption, mainly because of the strength of the tribal opposition to the Italians. The bulk of the exodus appeared to have originated in the Gebel areas. It is thought that between 5,000 and 10,000 migrants returned from Egypt by 1940, in response to the Italian amnesty to political refugees in 1938.

At first the Italians were pleased with the vacuum they had created, for it enabled their own nationals to be absorbed into Libya. The amount of immigration remained small, however, until the 1930's partly because the war during 1911-28 was not conducive to settlement, and partly because the necessary social and economic infrastructure had not been established.

The immigration of Italian settlers produced a new regional distribution of population. In 1936 two-thirds of the Italians were located in Tripolitania, the bulk in Tripoli City; Cyrenaica's proportion of the total population increased after the initiation of mass colonization in 1938. By 1940, 738,000 ha., covering 15 per cent of the total productive land in

northern Libya, was schedules for Italian agricultural settlement. The regional impact was varied. In 1936 the highest number of Italians per 1,000 Libyan citizens occurred in northern Cyrenaica, partly because of the exodus and imprisonment of many Libyans, and partly because of the Italians intended to concentrate their mass colonization in that area. Around Benghazi there were 200-300 Italians per 1,000 Libyans, compared with 150 near Derna and Apollonia, 75 near Marj and Tobruk, and below 10 at Agedabia. Initially the coastal areas supported the largest densities although further expansion was planned for the Gebel Akhdar settlements. In Tripolitania, the densest concentration occurred around Tripoli; elsewhere, the ratio of Italians per 1,000 Libyans was below 50.[10]

Italian colonization introduced urban attractions for potential Libyan migrants such as, high wages, good working conditions, and a hitherto unknown security of employment. These elements complemented the "push" factors of rural poverty in instigating a new scale of internal migration Land acquisition and enforced conscription to the Italian army further encouraged the movement of Libyans from settled farming land and tribal grazing territory. Although skilled labour to build and operate the Italian agricultural schemes was imported from Europe, the speed and scope of the developments necessitated the recruitment of large numbers of Libyan workers. Initially this new demand was satisfied from urban sources, but as the operations gathered impetus there was an increasing tendency to call upon rural labour reserves. Falchi[11] suggested that about 23,000 Libyans were employed in the construction of Italian Concession and Demographic holdings, and in their maintenance and operation. Even so, the construction work was a temporary employment attraction, while the complete operation of many farms was delayed for about 15 years because of the immaturity of the olive plantations.

Allied to the internal movements in agricultural areas were the attractions of urban employment. By 1936, 70,000 of the "resident native

population" were engaged in non-agricultural activities, particularly manufacturing industries and public and private administration. At the same time, it is likely that many of the 28,000 Jews in Libya were involved in commercial activities, leaving about 50,000 Libyans economically active in the modern economic sector.[12]

One consequence of the change in the occupational structure was the growth of urban areas. Tripoli City doubled its Libyan population between 1914 and 1936, rising from 30,000 to 66,000.[13] The building of an Italian - styled city in Tripoli, south and east of the "Old City", the construction of the port, and work on water supply and drainage facilities, began to absorb large numbers of migrant labourers.[14] On the basis of an estimated 2 per cent per annum natural increase rate, about 23,000 net in-migrants formed the bulk of this growth. It is alleged that many exiles who left the country during 1915-30 returned between 1931 and 1936. Their return may, in part, have accounted for the rapid increase of 3 per cent per year in Tripoli.[15] Benghazi's urban growth was less dramatic. The fluctuations in the City's total population during the 1930's may be partly attributed to the questionable accuracy of the population estimates, and partly to the nature of the Italian occupation. The addition of 20,000 persons in Benghazi during 1922-36 was probably a result of Italian immigration, rather than local rural-urban migration.[16]

The nature of the Italian occupation and the response by the Libyans established regional differences which have found expression in the current social patterns. Not only were the Tripolitanians pacified quicker than their eastern compatriates, but they collaborated, rather than opposed, the Italian colonization. Like the Bedouin of Cyrenaica, the semi-nomadic peoples of the Tripolitanian steppe reacted to the Italian land acquisition by emigrating. However, the settled Tripolitanian population in rural areas, in contrast to the indigenous Cyrenaicans, experienced the benefits of occupational and geographic redistribution. The old established

antipathy between nomadic and settled population was paralleled for the first time by a provincial antipathy between Tripolitania and Cyrenaica. Major regional variations in social and economic conditions were probably reflected in an agricultural gradient identified in Chapter II. Urban-rural contrasts in Libyan regions only became the dominant demographic and economic element during the period of rapid economic growth when the modern economic sector became urban orientated.

6.2 Recent Migration Patterns

The principal components analysis (Chapter II) indicated that internal migration was one of the most significant demographic variables associated with the urban-rural gradient. The migration variables were not significantly associated with either factor 2 or 3. Moreover, the level of significance of internal migration to factor 1 increased between 1954 and 1964 (+0.674 to +0.858), suggesting that it was only after marked economic growth that migration became the important mechanism of demographic change.

Two methods have been used to identify and check in-, out-, and net migration in Libya; the "reverse survival method" projects an expected net migration from each Mutassarrifia region between 1954 and 1964; place of birth and present residence data provide empirical evidence showing the actual level of the 1964 lifetime migration.

6.2.1 Indirect Measurement ; Reverse Survival Method

The use of the 1954 and 1964 population censuses with their comparable information on age and territorial divisions, together with certain estimates of mortality, provided estimates of crude net migration during the ten year period. These indirect procedures are best suited to the analysis of Libya's internal migration, and for the sake of simplicity it was assumed that there was no external migration.

The gain or loss of population between the two censuses was first calculated for each subdivision of the country. The portion due to births

or to mortality was removed. The remaining change was attributed to migration in each Mutassarrifia, subdivision. It was the migration of a definite period (1954-64); but it represented only the net migration, and neither the origins nor the destinations of any group of migrants.

Calculations of the Libyan data are tabulated in Table 13, (Appendix C) The total citizen populations for each of the 28 Mutassarrifia in 1954 and 1964 are shown in columns B and D respectively. The effect of births during the 10 year period was removed by subtracting the population aged 0-9 years in 1964 census plus the total 1954 population from the 1964 total; i.e. D - A + B. The results are shown in column E. Unfortunately there is no accurate registration of vital events in Libya. Estimates of mortality in 1964 indicate a rate of 20 per 1000 Libyans (Chapter VIII). These are computed in column F and are added to column E, giving final crude estimates of net migration in column G.

The method of calculating the volume of internal migration indicated a national loss of 14, 781 persons between 1954 and 1964. This may be considered as a margin of error bearing in mind the level of about 20, 000 registered net immigration during the ten year period. However, the provincial and regional changes can be attributed to the minimum effect of internal migration. Tripolitania showed the largest net-loss of 24, 000 persons, while the Fezzan showed a loss of about 5, 300. In contrast, Cyrenaica gained about 15, 000 persons through net migration.

Despite Tripolitania's provincial loss, Tripoli City accounted for about 59 per cent of the provincial gain, followed by Yefren (23%), Nalut (9%), Sirte (6%) and Garian (3%). Of the net out-migration, the eastern coastal zone domiated the pattern. Homs, Zliten and Misurata accounting for over half of the provincial loss. Subsidiary areas of out-migration appeared to be the eastern Jebel (Tarhuna and Beni Ulid; 20%)

The bulk of Cyrenaica's 15,000 increase through internal migration originated in Tripolitania. Benghazi City itself accounted for nearly three-quarters of the provincial gain, with Tobruk, Agedabia and Beida accounting for the remainder. Marj had over half of the total Cyrenaican loss, while Derna accounted for much of the remainder. In the Fezzan, Sebha was the only region to show a net gain, while El Shati appeared to be the main region of out-migration.

6.2.2 Direct Measurement : Place of Birth and Present Residence

The "expected" results calculated by the reverse survival method show a striking similarity to the actual net lifetime migration measured by place of birth of the 1964 citizen population (Table 6.1). A correlation coefficient of the indirect and direct methods of internal migration assessment indicated a positive association of 0.827. This association has two implications; either Libyan migration remained similar in terms of rate and direction over the last 60 years (lifetime migration) or the bulk of the migration occurred in the period 1954-64, thereby dominating the lifetime migration pattern indicated by place of birth and present residence statistics.

In 1964, 174,486 persons, 12 per cent of the total citizen population, were enumerated as living in a Muqataa region other than their Muqataa of birth*. This meant that over four-fifths of the population either had not changed residence during their lifetime, or else had migrated only a short distance within their Muqataa of birth. While these data offer the most detailed and accurate breakdown of internal migration they show only

---

* Muqataa regions are the largest administrative units below the Libyan Provinces. Each Muqataa comprises a number of Mutassarrifia regions. Census data relating to place of birth refer to the 10 Libyan Muqataa, while data relating to place of present residence refer to the 28 Mutassarrifia regions (Table 16, Appendix C).

Table 6.1 Measurements of Net Internal Migration by Direct and Indirect Methods in Libyan Mutassarrifia, 1964

Mutassarrifia Region (c)	Indirect: Reverse Survival (a)	Direct: Place of Birth (b)	Mutassarrifia Region (c)	Indirect: Reverse Survival (a)	Direct: Place of Birth (b)
Tripoli City	+ 19,740	+ 59,992	Benghazi City	+ 20,931	
Suk el Giuma	- 618		Benghazi Dist.	- 896	+ 32,479
Zawia	- 4,089		Agedabia	+ 2,644	
Sabratha	- 1,744	+ 9,193	Kufra	886	
Zuara	- 5,869		Beida	+ 1,516	
Garian	+ 1,092		Marj	- 8,166	+ 1,090
Mizdah	- 3,901		Derna	- 4,717	- 334
Nalut	+ 2,987	- 23,759	Tobruk	+ 4,477	
Yefren	+ 7,852				
Ghadames	- 722				
Homs	- 15,099		Cyrenaica	+ 14,909	+ 33,235
Tarhuna	- 4,626	- 29,694			
Beni Ulid	- 6,450		Sebha	+ 1,568	
Misurata	- 6,697		El Shati	- 3,153	
Zliten	- 8,155	- 25,235	Murzuk	- 1,645	
Sirte	+ 1,899		El Jufra	- 1,257	
			Ghat	- 805	
Tripolitania	- 24,399	- 27,889	Fezzan	- 5,291	- 5,305

(a) Net migration 1954-64
(b) Lifetime net migration up to 1964
(c) Mutassarrifia and Muqataa regions defined in Appendix A, Table 2.

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli (1959); and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli (1966).

the end product of many possible movements, omitting the effects of natural increase of migrants themselves and the duration of their residence.

Each province displayed a distinct pattern of net migration both within and between provinces (Fig. 6.1 and Tables 14 and 15, Appendix C). Tripolitania showed a net decrease to Cyrenaica of about 31,000 persons and a net increase of about 3,000 from the Fezzan. Within the province the bulk of the net movements were from the four interior Muqataa to Tripoli, the only major region to show a net increase. Other internal movements showed net out-migrations from Gebel Gharbi and Homs to both Misurata and Zawia. Despite the overall net increase in migrants from the Fezzan, particularly to Tripoli, the Muqataa of Gebel Gharbi, Homs and Misurata showed net decreases to Sebha.

In contrast, Cyrenaica experienced a net increase of 31,000 persons from Tripolitania, and 4,000 from the Fezzan, giving an overall increase in the net migration of Gebel Akhdar Muqataa, and a slight decrease in Derna Muqataa. Benghazi had the largest growth, the bulk of the migrants coming from Tripolitania, although some internal migration occurred from Gebel Akhdar and Derna.

The Fezzan showed a net decrease in both Sebha and Ubari and in the migrations to the two northern provinces, despite some net increase from the Tripolitanian Gebel regions. However, the largest volume of migration was internal, from Ubari to Sebha Muqataa.

The rate of net lifetime migration, measured by place of birth and present residence per 1,000 citizens in 1964, showed that the highest levels were in Tripolitania and the Fezzan (Table 16, Appendix C). The Tripolitanian coastal Muqataa of Homs and Misurata experienced the highest rates of net out-migration (218 and 174 per 1000 citizens respectively), while the two urban Muqataa of Tripoli and Benghazi indicated the highest net in-migration (174 and 120 respectively). The lowest rates of net migration were in the Cyrenaican Muqataa of Derna and Gebel Akhdar (-4 and + 13

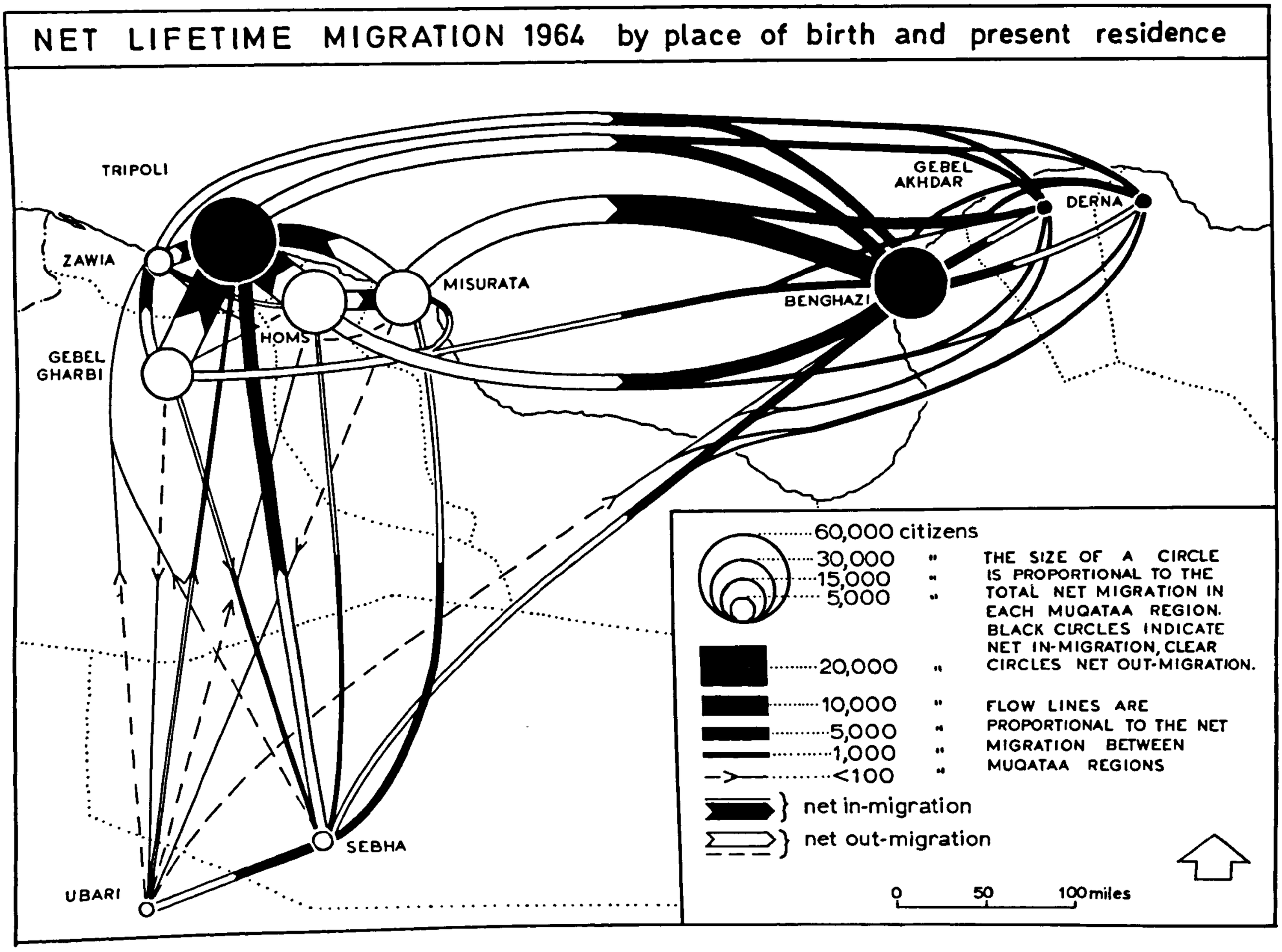

NET LIFETIME MIGRATION 1964 by place of birth and present residence
TRIPOLI
ZAWIA
GEBEL GHARBI
HOMS
MISURATA
GEBEL AKHDAR
DERNA
BENGHAZI
SEBHA
UBARI
60,000 citizens
30,000 "
15,000 "
5,000 "
THE SIZE OF A CIRCLE IS PROPORTIONAL TO THE TOTAL NET MIGRATION IN EACH MUQATAA REGION. BLACK CIRCLES INDICATE NET IN-MIGRATION, CLEAR CIRCLES NET OUT-MIGRATION.
20,000 "
10,000 "
5,000 "
1,000 "
<100 "
FLOW LINES ARE PROPORTIONAL TO THE NET MIGRATION BETWEEN MUQATAA REGIONS
net in-migration
net out-migration
0 50 100 miles

Figure 6.1

respectively).

6.2.3 Origin of Migrants

Evidence from preceding chapters concerning the distribution and age and sex characteristics of potential migrants was validated by the 1964 census data. Tripolitania dominated the areas of out-migration with three-quarters of the Libyan total (Fig. 6.2). Homs and Misurata contained both the largest number and largest proportion of migrants to their total populations, i.e. 62,000 out-migrants forming about 20 per cent of each region's 1964 population. Gebel Gharbi and Zawia provided a further 51,000 migrants, while Tripoli contributed about 21,000. Table 17, Appendix C, contains more detailed information concerning the population absent from the Mudiriah of western Tripolitania in 1966.

Numbers and proportions of out-migrants were smaller in Cyrenaica and the Fezzan. Cyrenaica accounted for about one-fifth of Libya's total out-migrants, the bulk coming from Benghazi (11,000 out-migrants). Both Gebel Akhdar and Derna had smaller numbers of migrants but larger proportions of their total regional populations. The Fezzan supplied a small number of out-migrants (10,000). Although this amount was a significant proportion of the provincial population, it appeared to be less than the expected level of the Fezzan out-migration.

While internal provincial contrasts are somewhat cloaked by information relating to the heterogeneous Muqataa regions, the urban centres of Tripoli and Benghazi appeared to have been significant areas of out migration. Although both centres supplied about one-fifth of the national total of migrants, about 32,000 persons, the proportion of their regional populations remained small (Fig. 6.2).

6.2.4 Destination of Migrants

Figure 6.3 and Table 18, Appendix C, indicate the amount and proportion of regional in-migrantions.

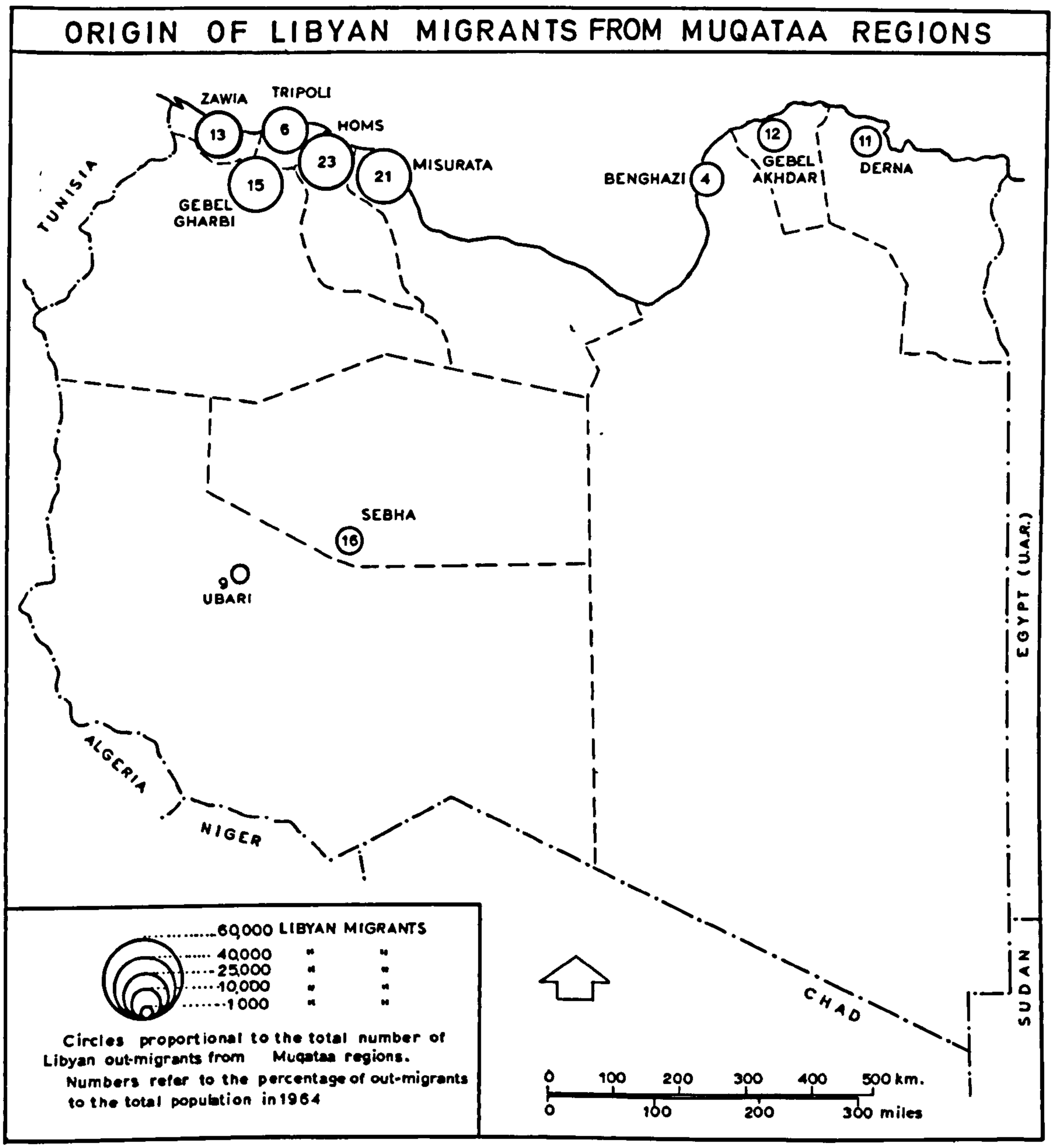

ORIGIN OF LIBYAN MIGRANTS FROM MUQATAA REGIONS
ZAWIA
TRIPOLI
HOMS
MISURATA
BENGHAZI
GEBEL AKHDAR
DERNA
GEBEL GHARBI
TUNISIA
SEBHA
UBARI
ALGERIA
NIGER
CHAD
SUDAN
EGYPT (U.A.R.)
13
6
23
21
15
4
12
11
16
9
60,000 LIBYAN MIGRANTS
40,000 " "
25,000 " "
10,000 " "
1,000 " "
Circles proportional to the total number of Libyan out-migrants from Muqataa regions.
Numbers refer to the percentage of out-migrants to the total population in 1964
0 100 200 300 400 500 km.
0 100 200 300 miles

Figure 6.2

In 1964 Tripolitania had a smaller proportion of the total number of in-migrants, compared with the proportion of out-migrants. The province contained about 62 per cent of the 209,000 Libyan migrants. Half of the provincial in-migrants were concentrated in Tripoli City. Most of these had originated in surrounding Mutassarrifia, particularly Zawia, Gebel Gharbi, Homs and Misurata. However, 10,000 migrants had been born abroad, while Benghazi and Sebha accounted for the remainder. Suk el Giuma, Tripoli's neighbouring region, showed a similar pattern of in-migration though at a lower absolute level, and with closer ties to Homs and Gebel Gharbi. Western Tripolitania gained migrants mainly from Tripoli and abroad. In contrast, the eastern Mutassarrifia gained only a few in-migrants, the only significant element being Libyans born abroad. Gebel Gharbi also had few in-migrants, although the western Mutassarrifia of Yefren and Nalut had a significant number of resident Libyans who were born in Tripoli, Zawia and abroad.

Oil exploration and exploitation in the Sirte lowlands caused an influx of outsiders to the Mutassarrifia of Sirte, Agedabia, Benghazi District and, to a smaller extent, El Jufra. Sirte had a number of migrants originating in Benghazi Muqataa while Agedabia contained a large number of persons born in Misurata Muqataa and abroad. The fact that both Muqataa regions contained sem-arid territories may indicate that a large proportion of the migrants identified in Sirte and Agedabia were semi-nomadic and nomadic persons. As Chapter VII indicates, most of the Libyans employed by the oil companies in the Sirte basin are hired in Tripoli and Benghazi cities.

Cyrenaica had a high level and rate of in-migration accounting for 36 per cent of the national total. The five Mutassarrifia containing an urban centre had the largest number and proportion of in-migrants, all containing over 15 per cent of their regional population in 1964. Benghazi City contained 42,000 migrants, over half the provincial total. The bulk came from Tripolitania, especially Misurata, although large proportions also came

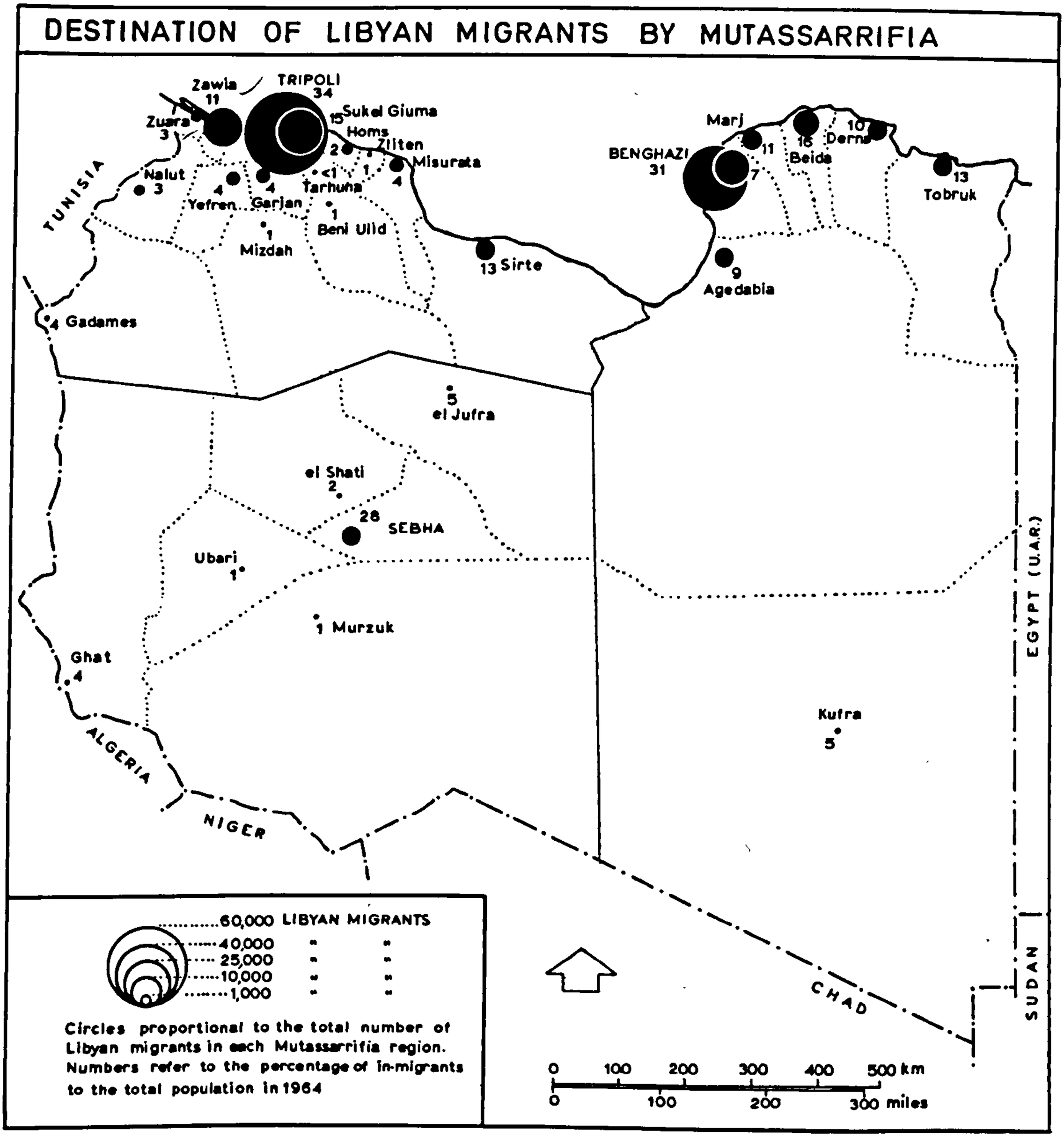

DESTINATION OF LIBYAN MIGRANTS BY MUTASSARRIFIA
Zawia 11
TRIPOLI 34
Zuara 3
15 Sukel Giuma
Homs 2
Zliten 1
Misurata 4
Nalut 3
4
4
<1 Tarhuna
Yefren
Garian
1 Beni Ulid
1 Mizdah
BENGHAZI 31
Marj 11
15 Beida
10 Derna
13 Tobruk
7
13 Sirte
9 Agedabia
4 Gadames
5 el Jufra
el Shati 2
28 SEBHA
Ubari 1
1 Murzuk
Ghat 4
Kufra 5
TUNISIA
ALGERIA
NIGER
CHAD
SUDAN
EGYPT (U.A.R.)
60,000 LIBYAN MIGRANTS
40,000 " "
25,000 " "
10,000 " "
1,000 " "
Circles proportional to the total number of Libyan migrants in each Mutassarrifia region.
Numbers refer to the percentage of in-migrants to the total population in 1964
0 100 200 300 400 500 km
0 100 200 300 miles

Figure 6.3

from the rest of the country and from abroad. In contrast, Beida Town, with about 5,000 in-migrants, received most of its intake from within the province. The towns of Tobruk, Derna and Marj contrasted with their own rural hinterlands and with the Tripolitanian towns, by receiving migrants mainly from local areas, and on a larger scale than comparable towns in the western province. However, both rural Cyrenaican regions and urban centres gained large numbers of migrants originating outside the province; no region received less than one-third of its total in-migrants from Tripolitania.

The Fezzan had much smaller numbers of in-migrants, although the proportions to total regional populations was higher than those in eastern Tripolitania (Fig. 6.3). Sebha was the only major centre of in-migration, with 4,500 migrants forming over one-quarter of the Mutassarrifia's 1964 population. 40 per cent originated in Tripolitania, mainly from Misurata, but the largest proportion was from other regions in the Southern Region (the Fezzan). The only other region which experienced significant in-migration was El Jufra, most migrants coming from Misurata and abroad. To a large extent, however, the Fezzan was an area of internal provincial migration.

A series of correlation co-efficients were devised to test the association between net Libyan migration and the variables of distance and total populations of the Mutassarrifia regions. Six levels of internal Libyan migrations were identified and correlated; (i) total Libyan migrations, (ii) internal and external Tripolitanian, (iii) internal and external Cyrenaican, (iv) internal and external Fezzanese, (v) total internal provincial, and (vi) total inter-provincial migrations.

The volume of net migration within each province showed significant negative correlations with the distance of migration streams. Thus, the shorter the distance travelled by migrants within each province, the larger was the volume of migration. This relationship between migration size and

distance was not validated by inter-provincial population movements. The large net out-migration from Tripoli and Misurata to Benghazi Muqataa invalidated this association.

The only significant association between net migration and size of population in areas of origin and destination was total internal migration within the three provinces. The dominance of one major urban centre within each province dictated the direction of most migration streams.

Thus, Zipf's[18] theory that "the amount of interchange between any two areas in directly proportional to the product of the population of the two areas and inversely proportional to the distance between them" was only valid for internal provincial migrations in Libya. The volume and direction of inter-provincial migrations occurred irrespective of distance or size of populations in regions of migrant origin and destination.

6.2.5 Sex Ratios of Migrants

Chapter V highlighted two probable levels of migration operating in Libya, on the basis of a study of sex ratios relating to the Mutassarrifia populations aged 15-44 years. One level was a possible stepped-migration between rural and urban areas within Cyrenaican Mutassarrifia; the other was an apparently direct inter-provincial migration. Both types have been identified in the preceding section. Variations in the sex ratios of migrants themselves indicated certain provincial contrasts (Tables 19 and 20, Appendix C).

First, high male excesses characterized the movements to urban centres, especially to Tripoli, Benghazi and Sebha, while migrations from these regions had more balanced sex ratios. Second, increasing excesses of males were generally associated with increasing distance. Thus, inter-provincial migrations generally had a higher male excess than internal provincial migrations. Nevertheless, this pattern was not always consistent, particularly since there was an apparent excess of females migrating from

Cyrenaica to Tripolitania. Finally, the preponderance of female in-migrations to the eastern Tripolitanian Gebel and coast from neighbouring areas may reflect a stepped migration process similar to that identified in Cyrenaica. Thus, an earlier family movement within eastern Tripolitania was probably followed by a later sex selective out-migration of males, probably on a temporary basis. The example of female biased migrations from Cyrenaica to western Tripolitania would suggest that stepped migration in Tripolitania occurred irrespective of distance.

6.3 Rural-Urban Migrations

Tripoli and Benghazi accounted for over half the total lifetime in-migration within Libya and one-fifth of the out-migration. As such, they dominated the net increase in population, on a national basis, which was due to migration.

However, owing to the lack of precise statistics (such as registration of a change in residence) it is difficult to assess the force of migration to the urban centres in individual years. Using the reverse survival method for the 1954 census, Harrison[19] calculated that between 1936 and 1954 Tripoli received a net in-migration of 5,800 persons. Apart from Zawia, this appeared to be the only region in Tripolitania which recorded an increase in population due to migration. Information relating to the reverse survival method for 1964 (Table 6.1) shows that both Tripoli and Benghazi gained about 20,000 persons between 1954 and 1964. This would suggest that annual net migration to Tripoli rose sevenfold from 1936-54 to 1954-64. Assuming that both the reverse survival method and the place of birth statistics are accurate then:

(a) Tripoli City gained 60,000 persons, and Benghazi City 30,000 persons, through net in-migration in the last 60 - 70 years.

(b) Tripoli and Benghazi each received 20,000 in-migrants between 1954-64.

(c) Between about 1900-54 approximately 40,000 migrants entered Tripoli and 10,000 entered Benghazi.

Both sets of figures in Table 6.1 emphasize the dominance of the two cities over the national migration patterns, the increasing pace of net in-migration, and the different levels of migration between Tripoli and Benghazi.

6.3.1 Volume, Nature and Origin of Urban Migrations.

Of the three provinces, Tripolitanian Muqataa had the highest proportion of out-migration (to total regional populations) who were bound for either Tripoli or Benghazi; that is, approximately four-fifths of the migrants from Tripolitania and the Fezzan, compared with three-quarters from Cyrenaica. While Tripoli and Benghazi themselves had a large volume of out-migrants only one-quarter were bound for the other major urban centre.

Generally, internal provincial migrants preferred to move to the nearest urban centre. Thus, Tripoli attracted migrants from Tripolitania, Benghazi attracted Cyrenaican migrants, while the Fezzan supplied both centres. However, as the correlation tests indicated, distance was not the sole determinant of the direction or the amount of net migration on a national scale.

The combined urban populations of Tripoli and Benghazi in 1964 totalled about 350,000. Over one-half of this population was born in the two urban centres, leaving 147,000 to be accounted for by net in-migration. A quarter of the total urban population, about 91,000 persons, were born in rural areas, particularly in Tripolitania. Foreigners made up 11 per cent of the urban population, and Libyans born in the other urban Mutassarrifia 2 per cent. Of the 26,000 out-migrants from the two urban centres, four-fifths went to rural areas, mainly to Tripolitania. The small population movement between Tripoli and Benghazi, noted in the inter-provincial migrations, contradicts Zipf's theory that interchange is greatest

between large centres of population.[20] The resultant net movement from Libya's rural areas to the urban areas of Tripoli and Benghazi was about 69,000, composing approximately one-fifth of the 1964 urban population.

While Tripoli and Benghazi together contrasted with all other Libyan regions in their migration trends, both urban centres had different scales of local migration. (Table 6.2). Of the two centres, Tripoli was the most dependent on its neighbouring regions for migrants; 56,000 persons, forming one-quarter of Tripoli City's total population in 1964, were born in other Tripolitanian Muqataa. This compared with 8,000 migrants living in Benghazi and born in the rest of Cyrenaica, forming about 6 per cent of the city's total population.

Only 3 per cent of Tripoli City's population were born in the other two provinces, compared with 20 per cent in Benghazi.

Table 6.2 Origin of Migrants living in Tripoli and Benghazi Muqataa, 1964.

Province	Muqataa of Birth	Place of Present Residence: Tripoli number	Tripoli % total pop.	Benghazi number	Benghazi % total pop.
Tripolitania	(Tripoli	-	-	4,275	10.1
	(Zawia	16,994	23.2	1,773	4.2
	(Homs	13,174	18.1	5,124	12.3
	(Misurata	9,717	13.3	12,384	29.4
	(Gebel Gharbi	15,658	21.4	1,536	3.6
Cyrenaica	(Benghazi	1,879	2.6	-	-
	(Gebel Akhdar	381	0.5	4,907	11.6
	(Derna	381	0.5	3,262	7.7
Fezzan	(Sebha	3,880	5.3	1,556	3.7
	(Ubari	323	0.4	99	0.2
	Abroad	10,724	14.7	7,240	17.2
	Total	73,111	100.0	42,156	100.0

Source: Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

The 1964 census enumerations support Harrison's sample survey estimates of 1963 in identifying three main source areas of migrants for Tripoli City; the Gebel, and the coastal oases east of Tripoli and those west of Tripoli. However, the census disproves the finding that the Gebel Nefousa was the main supply area. In fact, both the densely populated coastal areas east and west of Tripoli have provided more migrants for Tripoli than the Gebel territories, defined as Gebel Gharbi. The 1964 data also emphasizes the importance of the eastern Tripolitanian coastal areas, particularly Misurata, as the origin of many migrants now living in Benghazi.

Table 6.3 Province of Birth of Migrants living in Libya's Seven Largest Municipalities, 1964

	Province of birth of migrants				
Municipality	Tripolitania	Cyrenaica	Fezzan	Abroad	Total net in-migration
Derna	58%	30%	8%	4%	3,623
Tobruk	42%	40%	6%	12%	3,947
Agedabia	56%	11%	5%	18%	3,095
Marj	47%	48%	2%	3%	2,700
Beida	32%	58%	4%	6%	5,009
Tripoli	76%	3%	6%	15%	73,111
Benghazi	60%	19%	4%	17%	48,833

Municipality refers to the urban unit within a Mutassarrifia region.

Source: Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli,(1966).

Net migration to other towns in Libya shows similar trends to Tripoli and Benghazi although at lower absolute levels. Table 6.3 compares the places of birth of migrants in small towns with those in Tripoli and Benghazi. Beida was the only town showing a clear majority of its migrant population born in the rest of Cyrenaica; all other towns showed Tripoli-

tania to be the major supply centre.

Table 6.4 Ratio of Male and Female Single Persons aged 20-44 years to the Total Population aged 20-44 years, 1954-64

Region	Sex	Proportion of single persons to total population aged 20-44 years 1954	1964
Tripoli	Male	36.8	27.6
	Female	11.8	4.4
Benghazia	Male	41.9	31.2
	Female	5.2	3.8
Libya	Male	34.9	26.9
	Female	6.1	3.4

Sources: Ministry of National Economy (and Trade), Libya.
General Population Census 1954 (1964), Tripoli, (1959 and 1966).

The ratio of single males and females of working and productive ages to the total population aged 20-44 years reveals three points concerning recent migration to Tripoli and Benghazi. First, a change in marital status was apparent between 1954 and 1964, with fewer single males and females in 1964. There remained about eight times more single males compared with females. Second, the urban Mutassarrifia of Tripoli and Benghazi differed from the national average in having a greater proportion of single persons in working and productive ages. However, the difference from the national average decreased over the ten year period. Finally, Tripoli and Benghazi differed from each other in the marital status of their populations aged 20-44 years. Tripoli had a smaller proportion of single males compared with Benghazi, but more single women. This would imply that male migrations to Benghazi had remained stronger than to Tripoli during 1954-64.

6.3.2 Determinants of Differential Urban Migrations

While certain common trends are apparent in the nature of the net migrations to Tripoli and Benghazi, the volume and direction of the migrations have produced different scales of urban growth, identified in Chapter IV. Tripoli had three times as many in-migrants and twice as many out-migrants as Benghazi. Also, Tripoli had nearly three times as many Libyans returning from abroad and five times as many foreigners as Benghazi. Four main factors appear to have influenced these different scales of migration.

(a) Both Tripoli and Benghazi have different histories of development. Tripoli was the first capital, had a large resident Italian community, and was the early centre for oil and government administration. This has only recently changed with government administrative decentralization and the development of oil operations in Cyrenaica. In contrast to Tripoli, Benghazi suffered internal strife during the Italian occupation of the 1930's, never supported a large foreign community, and endured much wartime destruction. Post-war reconstruction, particularly of the port, was delayed by lack of capital and uncertainty concerning the future of the eastern province. Drastic changes occurred only after 1959 when Benghazi became the base for Cyrenaican oil exploration and exploitation. The location of offices, repair shops and warehouses attracted an inflow of capital and people, which stimulated consumer-orientated industries and service activities.

(b) Tripoli has a central geographical location in relation to its fertile hinterland which comprises the country's largest population concentration. Thus, Tripoli offers optimum transfer costs, and no agricultural region is able to monopolize primary production so as to create a supply-centred industry. Other factors favouring Tripoli's expansion have been the high rainfall, the accessible underground water, and a good natural harbour. Moreover, Tripoli has developed as the transport node for the whole province; in 1966, 10 or more buses per day served areas containing

at least three-quarters of Tripolitania's population. Benghazi however, has no fertile or densely populated hinterland; it is siutated on the western extremity of Cyrenaica's 1,000 Km long coastline, and the port has had to compete with the natural harbour at Tobruk.

(c) The size, function and distribution of other settlements in the two northern provinces has undoubtedly influenced the growth of the two principal cities. Chapter IV indicated that no Tripolitanian town rivalled Tripoli in size or variety of functions, while the isolated urban centres of Derna and Tobruk have remained separate and important urban units. The recent development of Beida may further offset the concentration of Cyrenaican urban population in the principal city.

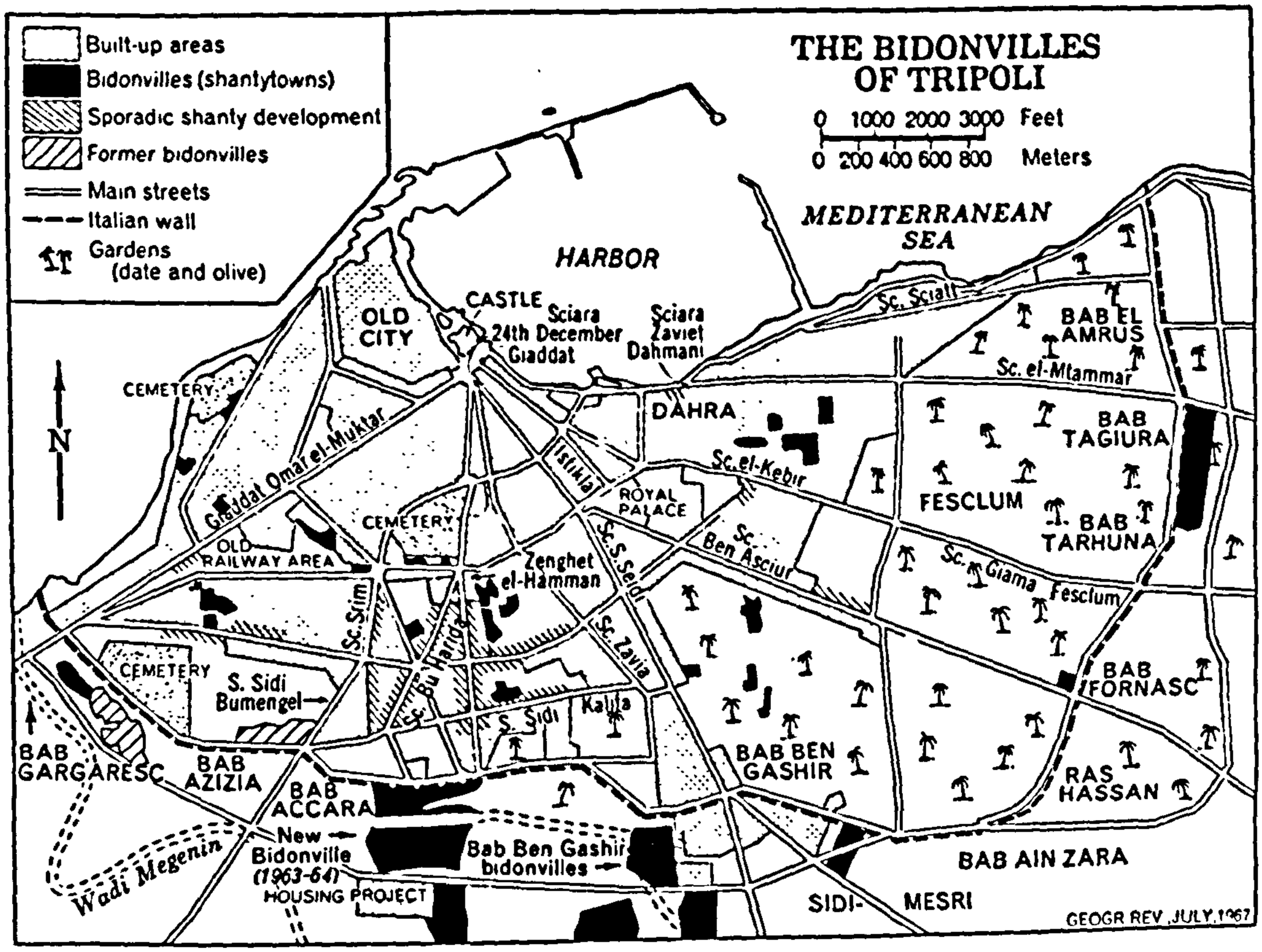
(d) Finally, the amount and type of migration to Tripoli and Benghazi is as much a product of the urban attractions as the "push" factors in the rural areas. The "snowballing" process of urbanization in Tripoli has diversified its employment opportunities, compared with more specialization in construction activities in Benghazi. Moreover, visits to Tripoli by agricultural workers and military conscripts have given the city a longer history of contact with its rural and urban hinterland than Benghazi City has with its surrounding territory. Thus, seasonal movement to the coastal oases was complemented by occasional visits to Tripoli. Military service, particularly during the Italian occupation, initiated some of the contact between rural areas and the capital. However, it was the combination of geographical and historical factors which made Tripoli the national, as well as the provincial node, essential to the country's development, especially in the incipient stages of economic growth.

6.4 Characteristics and Consequences of Urban Migrations

Not only has the volume of migration to urban areas been a significant element in the process of urbanization, but the particular grouping of migrants within the towns has influenced their present form and function.

In the Magrib, migrants in urban centres tend in general to live in

Figure 6.5



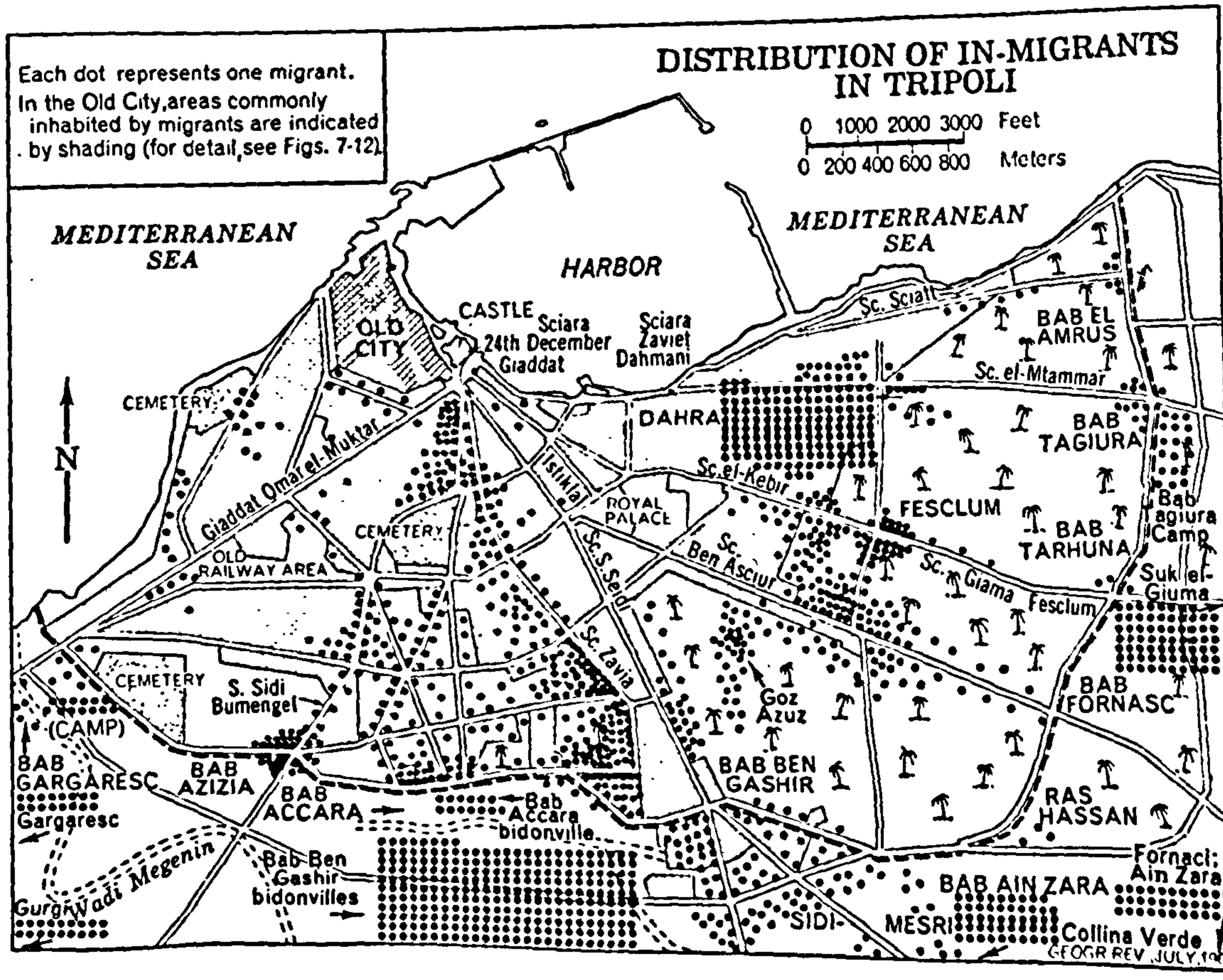


Figure 6.4

well-defined quarters. Differentiation according to region of origin is not so clear cut in either Tripoli or Benghazi. In 1917, De Agostini[21] did find families from Misurata, Nalut, Cussabat and Garian living in specific areas of Tripoli. However, this tendency was modified by the expansion of the city under the Italians. Some parts were rigorously "European", such as Garden City and Istiklal, east of the King's palace; others were "Arab", such as the Old City, the Dahra, and the zone west of Shiara Zawia (Fig. 6.4) As in-migration increased, particularly between 1954 and 1964, the "Arab" areas became the migrant quarters, although without pronounced segmentation by region of origin. Moreover, migrants began to concentrate in the "bidonvilles", or shanty-towns, that mushroomed on the outskirts of the city, particularly outside the high encircling wall built by the Italians for defence purposes in 1911 (Figure 6.5).

A sample study of 1,981 migrants to Tripoli undertaken during 1963-4[22] indicated some concentration according to place of birth. Migrants from the central and eastern Gebel lived mainly in the bidonvilles, the Dahra, and the Sciara Ben Asciur areas; particularly outstanding was the group of migrants from Tarhuna in the Goz Azuz shanty area (Fig.6.6). Migrants from the western Gebel (Nalut and Yefren) were chiefly located in the Old City (Fig. 6.7); this had also been noted by Agostini in 1917. There was a particular concentration in the Hara, or old Jewish section of the Old City, probably developing as a migrant community after the 1948 exodus of Libyan Jews.

East coast migrants (mainly from Homs and Zliten) tended to gather in the Ben Gashir bidonvilles or in the Dahra, while west coast migrants concentrated in the Old City (Figs. 6.8 and 6.9).

Benghazi displayed a similar distribution of migrants throughout the city, particular concentrations being in the central Arab area and in the outer bidonvilles. The proportion of those born in Benghazi was higher in the older centrally located districts (known as "Mahallat"), particularly

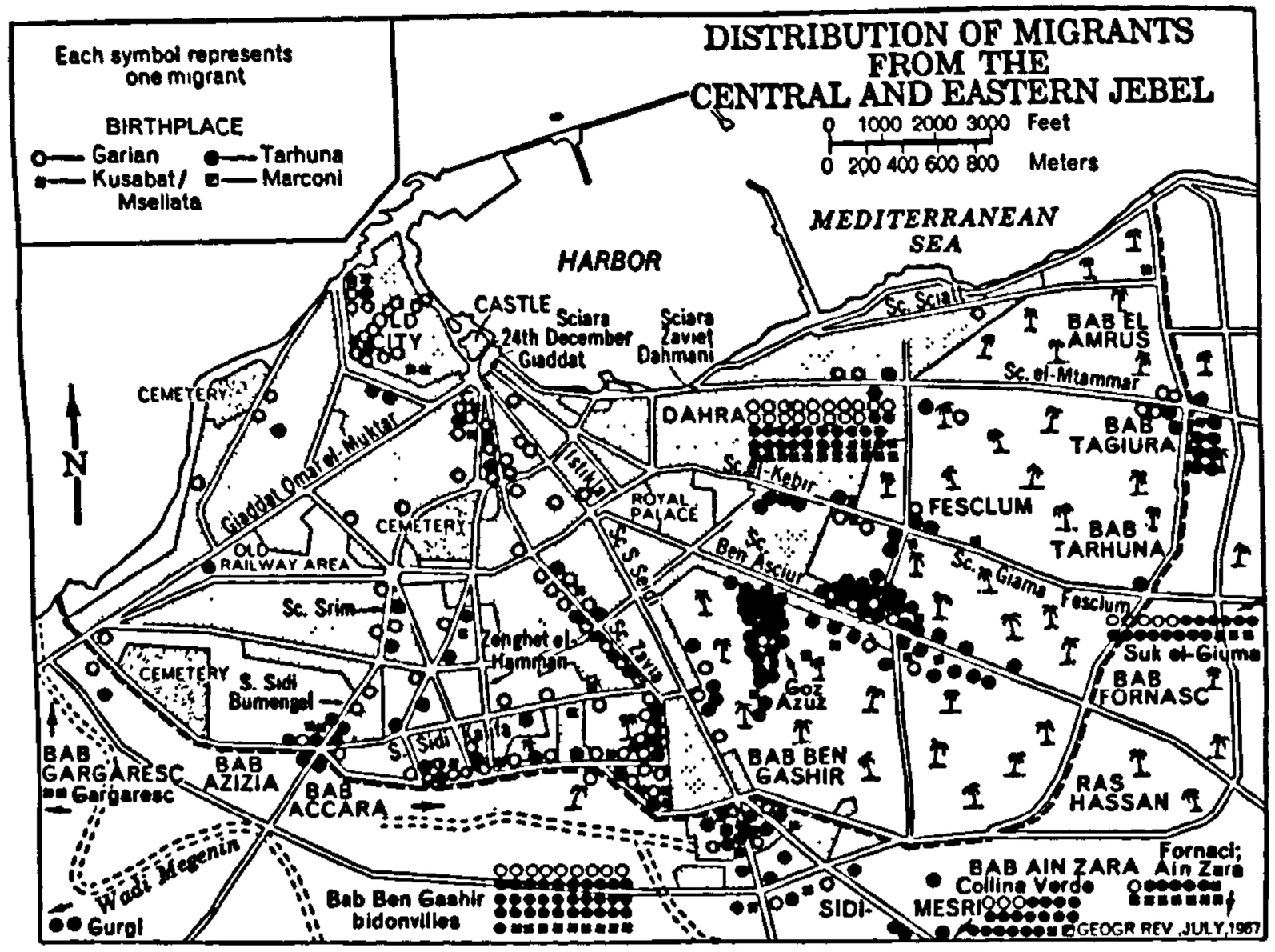


FIG 6.6

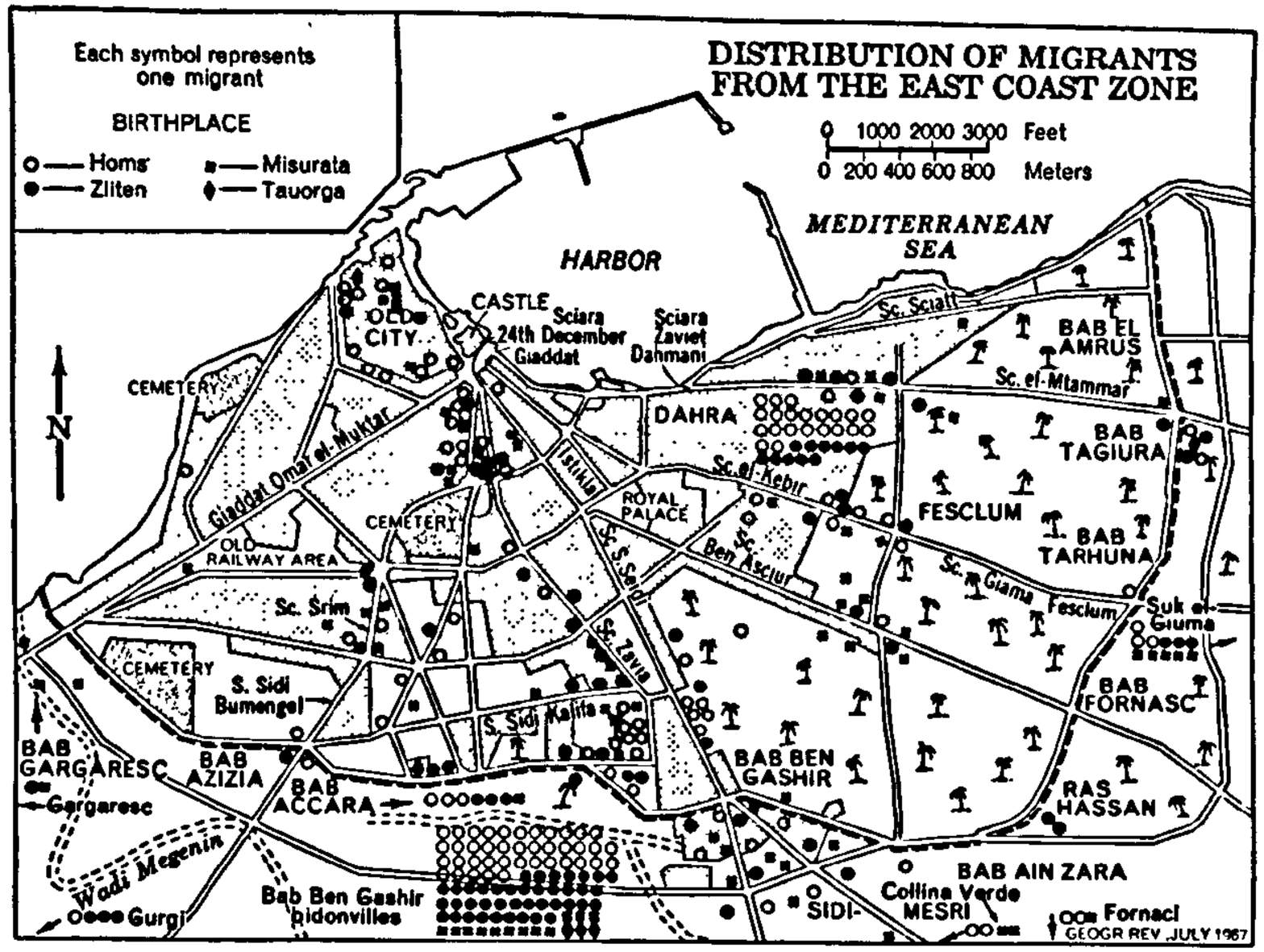


FIG 6.8

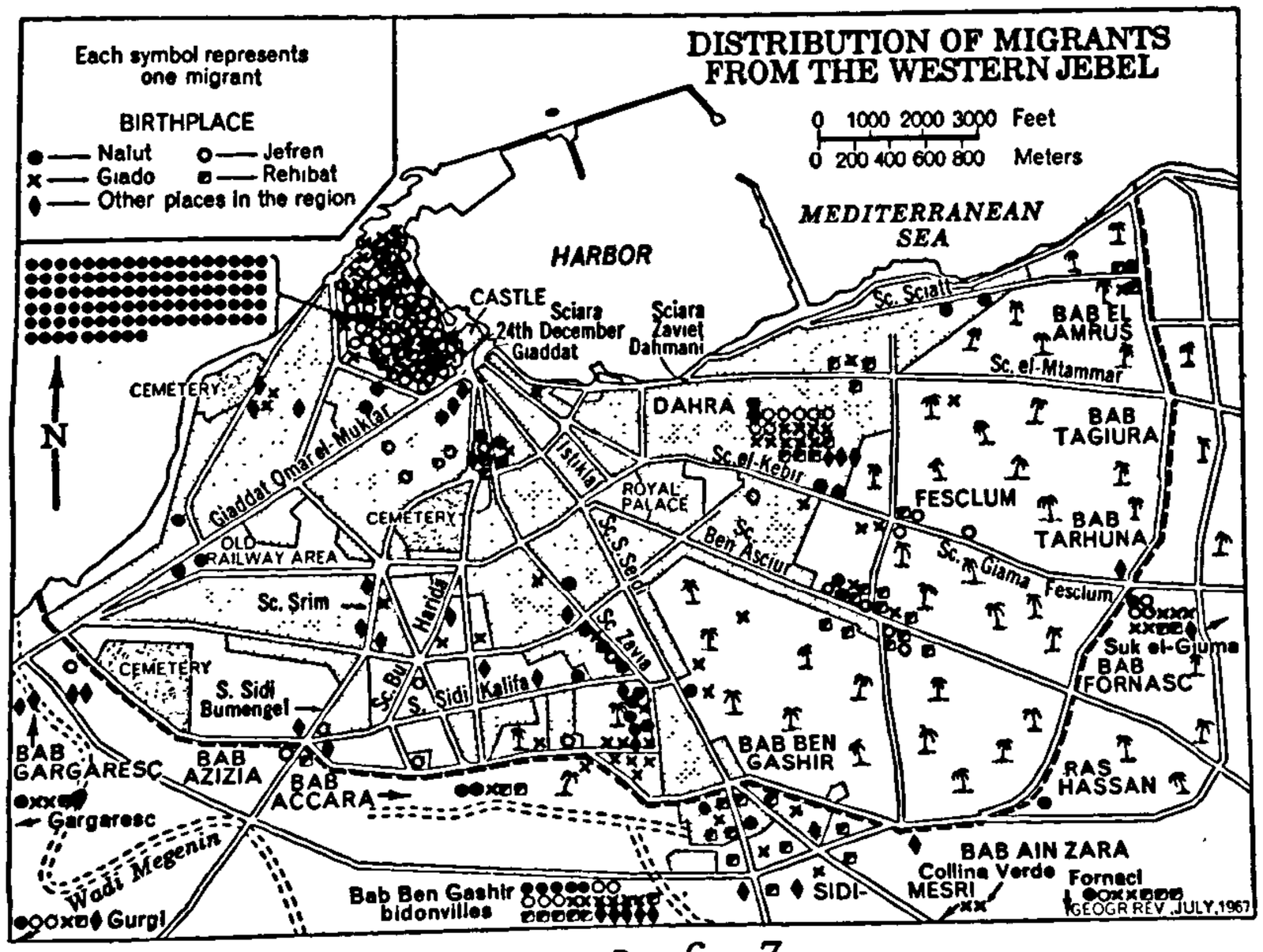


FIG. 6.7

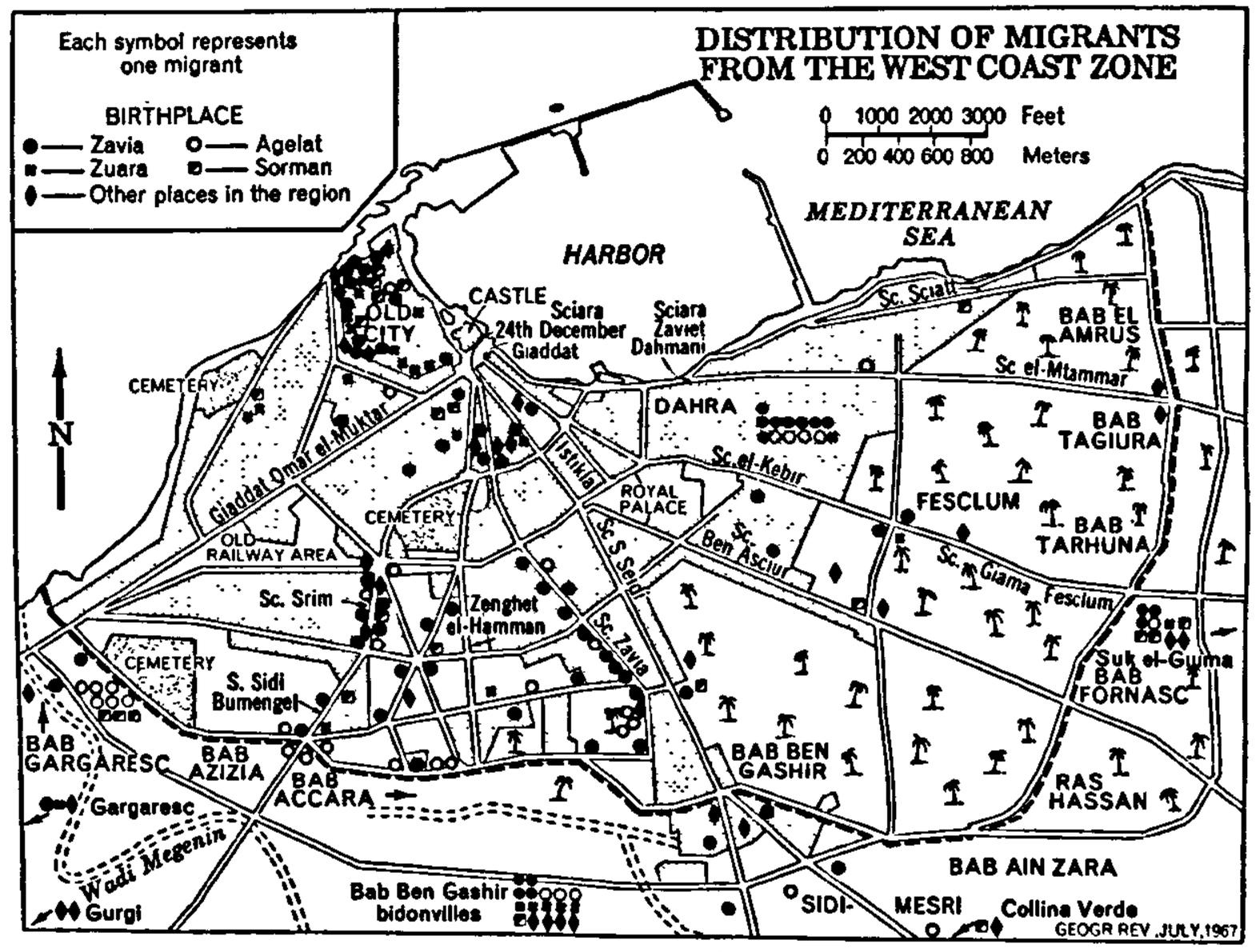


FIG. 6.9

El Sheriff, Ben Aissa, Ben Keir, Krebish and Ben Ghibli, or the downtown areas being rebuilt (Sidi Hussein and El Shebbi). The majority of the Misurata-born people were concentrated in Sidi Hussein, Sabri and Berka Ghibla (i.e. in the east and north). More than half the Derna migrants and two-thirds of those from Gebel Akhdar Muqataa were settled in Sidi Husse Berka Ghibla and Berka Gharbi in 1964. Over two-thirds of the Homs-born residents were also concentrated in these areas. Foreign-born Libyans were concentrated in the eastern part of the city, while the 7,000 foreigners were mainly in the north.

6.4.1 The Bidonvilles

The large volume of migration to Tripoli and Benghazi has produced pressure on urban resources, resulting particularly in overcrowding and the growth of shanty settlements. The growths of these slum areas in the two principal towns are not modern phenomena. In the late 19th century there were encampments of negroes and bedouin around Tripoli. However, it was in the Italian period that the present pattern was begun. Much of the Italian building was designed for Europeans, and the native population was restricted to the Old City and outside the city walls; this discrimination tended to increase the growth of shanty towns.

A striking feature of the areal distribution of the slums is their arrangement in a semi-circle about two miles from the city centre. In fact, the most extensive development occurred at the points marking the old gates in the wall; Bab Gargaresc, Bab Azizia, Bab Accara, Bab Ben Gashir, Bab Fornasc, and Bab Tagiura (Fig. 6.5). Thus, as the modern city grew beyond the semi-circle circumscribed by the line of fortifications, the old encampments under the wall of the Old City were in effect pushed outwards to new positions under the Italian wall.

Owing to official action and the increasing number of migrants the bidonvilles are constantly changing shape. The Italians built "family camps"

for Libyans serving with the Italian colonial militia or employed by the Italian army. Together with the other relief camps built by the Italians in 1935 (for instance, "campo dei beduini" near Bab Tagiura), these became the centres for post-war bidonvilles.

In 1966, it was estimated[23] that about 65,000 people were living in 13,000 shacks in squatter conditions in and around Tripoli City. Inside the present city limits there were 31,000 persons in large settlements; of these about 2,000 lived in minimum standard government buildings. However, the majority of squatters were scattered in small groups throughout the city. Outside Tripoli's municipality boundary were 9,000 squatters, the largest groups being around Collina Verde, Suani Road and the south-western limits of the city.

A Ministry of Housing Report in 1966[24] analysed the overcrowding conditions in the squatter settlements. The average number of occupants per shack was five, giving densities of 200 persons per acre. Average family incomes were low, generally about £L 150 per annum per wage earner, with a high proportion of the families subsisting on unemployment insurance benefits. Most of the land occupied by the squatters was owned by the Government or was of uncertain tenure. Bab Accara, Bab Taguira and Bab Ben Gashir have some basic amenities and utlities, but most have a restrictive physical environment. In fact, the shanty towns to the south of Tripoli concentrate around the bed of the Wadi Megenin, which rises in the Gebel and reaches the sea at Bab Gargaresc, and flood destruction sometimes occurs. In the Old City, too, there are problems of poor housing and lack of public utilities. In 1964, the population of the area numbered nearly 23,000, with an average density of 217 persons per acre.

The Benghazi bidonvilles are more recent phenomena. Two phases in the development of these shanty areas can be distinguished. In 1954,the city was less than half its present size, in area and population, and shanty dwellings represented only about 5 per cent of the total residential land.

By 1962, this proportion had risen to 7 per cent despite a substantial increase in housing and population. The relatively slow growth of slums during 1954-62 was probably due to a temporary doubling-up as well as to some increase in the supply of housing at prices that were still accessible to the low income groups.

However, by 1966 a new phase of shanty growth had begun. 17 per cent of the total housing were shanty dwellings.[25] This development occurred despite residential construction between 1962 and 1966 which was four times as great as the period 1954-62. Make-shift housing had multiplied at a rate 14 times greater than during the earlier period. This was attributed to the increased cost of construction and to the vast increase of migrants to Benghazi, estimated at 20,000 during the 10 year period (Table 6.1).

The Government is particularly conscious of the deficiencies of housing in the country. The 1963-68 Five Year Development Plan allocated £L6 Million, out of a total investment of £L 169 Million, to low cost housing. This was supplemented in 1965 by the allocation of a further £L 40 million under the Idris Housing Programme which aims at building 100,000 houses in five years. Awareness of the bidonville problems, particularly in Tripoli and Benghazi, has led to the planning of nearly 6,000 new houses in the two cities. The Collina Verde Development Scheme, for instance, is eventually expected to house about 30,000 people in the southern limits of Tripoli. In addition to the houses, community buildings, public services and transport connections are being developed.

6.5 Conclusions

Of the myriad of situations and choices facing potential migrants,[27] two would seem to be of particular relevance to Libya.

First, the contrast between the two urban areas of Tripoli and Benghazi and the rest of the country is so marked (Factor 1, Chapter II), that the choice of destinations for potential rural migrants is clear-cut. No other areas in

Libya provide a similar gamut of employment, educational and medical facilities. Thus, the direction of the dominant migrations in a rural to urban movement have developed as the significant migration patterns. Stepped migration does not appear to be of great importance in Libya, although lifetime migration statistics may cloak past movements. For instance, the net migration from Tripoli to Benghazi probably includes a number of former migrants to Tripoli City. Significantly, the stagnation of middle-sized towns (identified in Chapter IV) suggests that Tripoli and Benghazi absorb migrants from both rural and local urban areas.

Second, the choices of changing residence would still seem to depend primarily on the nature of the rural environment, The attractions of the urban centres do not appear to vary with distance. For instance, Benghazi and the other Cyrenaican towns have depended on Tripolitanian migrants for their urban growth, rather than on local migrants. Thus, the coastal zone east of Tripoli (particularly the Mutassarrifia of Homs, Zliten and Misurata) was the main source of out-migration. This evidence contradicts sample survey results suggesting thriving agricultural conditions in the area during 1959-60.[28] As distance did not appear to be a major determinant of migration size or direction on a national scale, and as the attractions of Tripoli and Benghazi appeared dominant for potential migrants throughout the country, "push" factors in rural areas would seem to be a significant determinant of Libya's migration patterns. Correlation co-efficients of demographic and economic variables in Chapter II indicated that absolute numbers of net migrants between 1954 and 1964 were significantly associated with population density on agricultural land. This may indicate that pressure of rural population on a static resource base is a major determinant of Libyan out-migration.

The characteristics of the migration streams, however, appear to have varied in time. There has been a recent growth in the proportion of young children in the major urban centres (Chapter V). This has occurred

despite the high proportion of single men in the productive age groups, particularly in Benghazi. A change in marital status may, in part, have increased the fertility of the age groups 20-44 years (a smaller proportion of single women were identified in Table 6.2). However, two other elements are likely to have been responsible: first, a decrease in urban infant mortality may have expanded the natural increase of Tripoli and Benghazi; second, migrant streams may be composed more of family groups. The growth of bidonvilles with poor sanitary and medical facilities would suggest that infant mortality has not changed radically in urban areas (Chapter VIII). Together with evidence concerning sex ratios of migrations, it would appear that Libyan migrations, particularly to urban areas, increasingly have a family structure.

The consequences of Libyan migrations to urban areas are two-fold. In the long term, migration will allow Libya's traditional economic system to be eroded, both by enlarging the modern economic sector and by removing the core labour force on which the traditional economic system depends. Moreover, increasing inter-provincial contact will inevitably weaken the provincial distinctiveness which characterized Libya, at least until independence in 1951. As such, the current migration trends will act as a force for cultural diffusion and social integration.

In the short term, however, redistribution of the economically active population has produced both social and economic disruption. Neither the migrants, nor the communities at the origins or destinations, have been able to cope with the sudden large volume of migration. In rural areas, release of pressure on meagre resources has been off-set by the lack of a youthful labour force. In urban areas the opposite has occurred; pressure on urban housing has, in part, created the bidonvilles, while the educational, medical and transport facilities have been stretched to their present limits. Yet there has been little immediate benefit from

the new source of urban labour, and there is a danger that serious urban unemployment and under-employment will increase. The causes and consequences of these labour problems form a key element in the transformation of the Libyan economic and demographic systems. Their identification and interpretation form the basis of Chapter VII.

References

1. Pan, C. L. "The Population of Libya," Population Studies, Vol. 3, No. 1, (June 1949), p. 114.
2. Bogue, D. J. "Internal Migration", in P. M. Hauser and O. D. Duncan (Eds.). The Study of Population, University of Chicago, (1959).
3. Brehony, N. A Geographical Study of the Jebel Tarhuna, Tripolitania, Ph.D. thesis, University of Durham, (1961), p. 264.
4. Agostini, E. de. La popolazione della Cirenaica, Governo della Cirenaica, Benghazi, (1922-3).
5. Despois, J. Le Djebel Nefousa (Tripolitaine) : Etude géographique, Paris, (1935), pp. 166-7; also, Géographi humaine (Institut de Recherches Sahariennes de l'Université d'Alger, Mémoires de la Mission Scientifique du Fezzan, (1944-45), Vol. 3, Paris, (1946), pp. 182-3.
6. Clarke, J. I. "Some Observations of Libyans in Tunisia", Les Cahiers de Tunisie, Sixième année, Nos. 21-22, Tunis, (1959), p. 92.
7. Evans-Pritchard, E. E. The Sanusi of Cyrenaica, Oxford, (1954), p. 191; and Europa Publications Middle East Yearbook 1967, London, (1968), p. 382.
8. Clarke, J. I. op. cit., p. 92.
9. Evans-Pritchard, E. E. op. cit., pp. 197-8.
10. Pan, C. L. op. cit., p. 115.
11. Falchi, N. "Le peuplement rural des provinces Libyques", Le Travail Agricole, Vol. 2, No. 1, Rome, (1939), p. 89.
12. Pan, C. L. op. cit., Tables 5 and 11, Appendix.
13. Harrison, R. S. "Migrants in the city of Tripoli, Libya," Geographical Review, Vol. 57, (1967), p. 406.
14. Coletti, F. La Tripolitania settentrionale e la sua vita sociale, 2nd edit., Bologna, (1923), p. 87.
15. Pan, C. L. op. cit., p. 106.
16. Bulugma, H. The Urban Geography of Benghazi, Ph.D. thesis, University of Durha, (1960), p. 284.
17. Barclay, G. W. Techniques of Population Analysis, John Wiley and Sons, Inc., New York, (1958), pp. 251-6.
18. Zipf, G. K. Human Behavior and the Principle of least Effort, Addison-Wesley Press, Inc., (Cambridge, Mass.) (1949).

19. Harrison, R. S. op. cit., p. 405.

20. Bogue, D. J. op. cit., p. 502.

21. Agostini, E. de. Le popolazione della Tripolitania : Notizie etniche e storiche, Tripoli, (1917), pp. 3 -10.

22. Harrison, R. S. op. cit., pp. 407-10.

23. Whiting Associates International. Master Plan Tripoli Urban Area, Vol. 2, Tripoli, (1966), p. 20.

24. Ministry of Housing and State Property. Squatters in the Tripoli Metropolitan Region, Tripoli, (June 1966).

25. Whiting Associates International. Benghazi Master Plan : Final Report, Benghazi, (Dec. 1966), p. 1.

26. Bank of Libya. Eighth Annual Report of the Board of Directors, Tripoli, (March 1964), p. 19.

27. Bogue, D. J. op. cit., pp. 499-501.

28. McLachlan, K. S. A Geographical Study of the Coastal Zone between Homs and Misurata, Tripolitania. A Geography of Economic Growth, Ph.D. thesis, University of Durham, (1961), p. 753-6.

CHAPTER VII

LIBYAN MANPOWER RESOURCES

The Libyan economy is confronted simultaneously with two persistent, yet seemingly diverse, manpower problems; shortage of persons with critical skills in the modernizing sector, and surplus of labour in the traditional sector. The shortage and surplus however are not separate and distinct problems; they are intimately related. Both have their roots in the changes which are inherent in the process of economic development. Both are related to the structure and distribution of the population. And, paradoxically, as Harbison[1] emphasizes, the shortage of persons with critical skills is one of the contributing causes of the surplus of people without jobs.

The importance of labour in Libya's process of economic acceleration has been vital. At any given time the resources and skills available to the country have placed a ceiling on the rate of growth of the economy. After independence in 1951, foreign aid supplemented insufficient Libyan natural resources and goods, thereby creating a larger supply of consumption and investment goods. Later, oil exports provided the foreign exchange necessary for the private and social overhead investments which increased the productive capabilities of certain sectors of the economy.

Labour, with the correct skills and attitudes, has been needed to combine the productive factors and to operate the economic system. In short, the wealth of Libya depends upon both material and human capital. It has been argued that "..... the pattern of Libya's development depends solely on the rate at which the supply of human skills can be built up."[2] The International Bank for Reconstruction and Development and the Bank of Libya also feel that labour supply problems will be the chief obstacles to Libya's future economic growth.[3]

The current labour problems are new only in degree. Before the expanded economic opportunities afforded by oil, economic development was curtailed as much by the quality of labour force as by the inadequacies of the material resources. As the tempo of modernization quickened, the problems of the labour force were aggravated. The situation of shortage of jobs and surplus of workers in the early 1950's, was replaced by a shortage of workers, in both quantity and quality, during the 1960's.

It is hypothesized that these rapid changes in manpower problems were initially stimulated by the nature of the economic development in Libya. Recently, however, the structure and pattern of the population itself has determined the type and scale of labour force growth. The actual work force is approaching the potential supply of labour, thereby setting limits to future economic growth.

7.1 The Economically Active Population

Implicit in the question of division of the population into producers and consumers is the observation that all persons are born consumers and that some ultimately become producers. The distinction between the two groups has been touched on in preceding chapters where the population was differentiated by age and sex, particularly in the section dealing with regional migrations. In economic terms the division of the population reflects the workforce, or economically active, and the unoccupied persons. In Libya, as in many developing countries, the two categories are not clear-cut. Those working in family enterprises, especially if their efforts are part-time and unpaid, are among the most difficult to classify. The family structure of the traditional Libyan economy, together with the lack of well-defined age limits to agricultural occupations, make the division of the active and inactive persons arbitrary in the Libyan context.[4]

According to the 1964 population census, the economically active population consisted of 372,606 persons, less than one-quarter of the total

population. In 1954, the number of economically active was 337, 644 persons, forming about one-third of the total population. The increase of 34, 962 economically active persons represented only 7 per cent of the total increase in population between 1954 and 1964 (Table 21, Appendix C).

The participation of aliens had little numerical significance in the occupational structure, forming about 5 per cent and 4 per cent of the total economically active in 1954 and 1964 respectively. The small numbers and proportion of total economically active is to some extent a political issue, for the immigration of foreign workers is strictly controlled. Nevertheless, the concentration of alien workers in occupations associated with the modern economic sector made the alien group a significant element in the total economically active population.

The proportion of the economically active to the total Libyan population does not differ markedly from conditions in other North African countries. In 1960, these proportions ranged from 47 per cent of the total population in the Sudan to 28 per cent in Morocco. Libyan "crude activity rates" were 33 and 26 in 1954 and 1964 respectively, similar to Egypt and Morocco at similar dates, though well below the world average in 1962 (Table 7.1). In order to explain the below average activity rates in Libya

Table 7.1 Crude Economic Activity Rates by Sex for Indigenous Populations in selected N. African Countries

Country	Year	Both sexes	Male	Female
Libya	1954 (1)	33	57	8
	1964	26	47	3
Algeria	1954	39	52	25
Egypt	1957-8	30	54	6
Sudan	1956	47	67	26
Morocco	1960	28	50	6
Tunisia	1956	36	53	20
World	1962	43	58	27

(1) Only persons reporting a remunerative occupation were classed "economically active"

Sources: (a) U.N. Economic Bulletin for Africa, (Jan. 1964), p. 68.
(b) U.N. Population Studies, No. 33, Table 5.2.

it is necessary to measure the actual and potential supply of manpower, to examine the factors determining the supply, and to note the economic demands which utilize the actual labour supply.

7.1.1 Demographic Factors Determining Labour Supply.

(a) Differences by Sex.

In Libya, as in most countries, the males are primarily responsible for economic livelihood, Crude activity rates for males were similar to other North African countries, but were generally below those of more developed countries (Table 7.1). In contrast, the crude activity rates for Libyan females were among the lowest recorded in the world. This had the overall effect of lowering the 1964 Libyan activity rates for both sexes to a level 40 per cent below the 1962 world average.

To a certain extent the census data relating to female employment can be misleading. It has been maintained that many of the respondants who answered the questions of census takers were usually men who did not state that their women worked outside their homes.[5] If, for instance, 75 per cent of the Libyan women classified as "housewives" in the 1954 census had effectively been part-time agricultural workers, the crude activity rate for females would have risen from 8 to 42 per cent. Three-quarters of the Libyan population were estimated to be in the agricultural sector in 1954, although only 12,000 Libyan women were enumerated as such in the 1954 population census. By 1960, 90,000 females were reported to be working in agriculture,[6] compared with only 3,000 in 1964. There would therefore appear to be a certain amount of underenumeration and variable classification of economically active females.

Nevertheless, there seems to have been a decline in female employment between 1954 and 1964. The decline in traditional activities where women play an important role, particularly agriculture and handicrafts, is in part attributed to the initial effects of rapid urbanization - increased

incomes, more children, and the necessity for a period of adjustment to a new setting. However, the most important factor has been the reluctance to let women work outside the family sphere, especially when earnings have increased sufficiently without women having to work. Two other elements have exaggerated this inclination. One is the inability of women to meet the requirements of urban jobs. The high percentage of aliens in urban female employment is testimony to this situation. The other contributory factor has been relatively sluggish development of activities in which women are more readily accepted, especially light manufacturing, and certain commercial and service activities.

(b) Employment and Age

The high Libyan birth rate and decreasing infant mortality rate has created a "bottom heavy" age structure with excessive numbers of children in proportion to the numbers of adults (Chapter V). The heavy load of dependants (91 and 103 dependants per 100 producers in 1954 and 1964 respectively), together with the relative and absolute deficiency of adult manpower that is inherent in such an age structure, add to the handicap of of low labour productivity and increase the difficulties of social advancement.

To some extent, Libya, like most other developing countries, has compensated for these handicaps by employing children at an early age. In 1954, children over 5 years were enumerated as potentially economically active, although this had changed to 6 years in 1964. Nevertheless, Libyan participation rates in the age groups under 15 years were significantly lower than other North African countries, apart from Algeria and Tunisia (Table 7.2). Furthermore, the expectation of working life in Libya is short. Many infants and children die before they have reached working age and many of those who begin their working careers are eliminated by death before they have completed their full span of potentially productive years. The age of retirement for government officials is 60 years; in private industry there is no uniform age of retirement.

Table 7.2

Age Specific Male Activity Rates of Indigenous Populations in Selected North African Countries

Country	Year	Age in years							
		10-14	15-19	20-24	25-34	35-44	45-54	55-64	65 & Over
Libya	1954	18(a)	----75---		93	94	92	89	68
	1964	14(b)	39	79	93	96	94	85	50
Algeria	1954	12(c)	62	92	98	97	97	95	79
Egypt (d)	1957-8	33	69	86	96	98	98	94	48
Sudan (d)	1956	52	95	---------		98	---------		86
Morocco (d)	1960	68	59	87	95	96	94	90	69
Tunisia (d)	1956	9(c)	64	79	92	96	94	87	70

Source: U.N. Economic Bulletin for Africa, (Jan. 1964), p.70

(a) Activity rate for age group 5-14 years
(b) Activity rate for age group 6-14 years
(c) Data on economically active persons under 15 years of age, tabulated without sub-division were related to the population aged 10-14 years to obtain the activity rates.
(d) Relates to the total population of all ethnic groups.

Durand has shown that economic activity of children aged 10-19 years indicates some correlation with the degree of economic advancement of the nation. While the Libyan statistics for economically active persons aged 5-19 years hide the amount of actual participation, it is apparent that there is a decreasing involvement of children. Between 1954 and 1964, the economically active persons under 15 years decreased by 11,000 persons, while the economically inactive population increased by 98,000 persons (Table 22, Appendix C). Most of the change was accounted for by the decrease in reported unpaid family workers from 20 per cent to 3 per cent during the ten year period. Although, a number of those classified economically inactive in 1964 were probably involved in agricultural pursuits increased education was the main reason for the change in activities of young persons.

The change in participation of young persons may initially have been detrimental to the economic development of Libya. The large reservoir of young workers, and their tendency towards early employment, achieved a balance between the numbers of economically active and their dependants that compared favourably with many highly industrialized countries.[8] This numerical balance was achieved by mass employment of people without special skills, and inflicted its own cost in terms of low output per person. Libya may now be passing through a temporary phase of change where neither the numerical balance nor the returns of education offset the decrease in the young labour force.

The pursuit of livelihood in Libya followed a pattern by age group typical of other North African countries (Table 7.2). The young who were commencing work showed the greatest variation from other countries, while crude activity rates were the lowest of any age groups. Between about 25 and 54 years of age, over 90 per cent of the men were classified economically active; a situation which exists in most countries irrespective of the level of economic development.[9] The principal change in the proportion of men

working for a living in Libya occurred amongst the old who were in the course of retirement.

The nature of agricultural work in the traditional economic sector permits old people to continue working after their period of maximum productivity is over. In much of the small scale farming, for example, there are many tasks that can be performed adequately, perhaps not efficiently, by older workers, thereby delaying their full retirement.

However, crude activity rates of Libyan males over 55 years showed the largest decrease of any age group during 1954-64. In 1964, about two-thirds of the persons over 65 years classified economically active, were in agriculture; they also formed about one-tenth of the total agricultural labour force in Libya.

7.2.2 Unemployment and Underemployment

Included in the economically active population are those persons unemployed and seeking work. The overall amount of reported unemployment in Libya fell from about 60,000 to 34,000 persons between 1954 and 1964. This gave a rate of 8.4 per cent of the total economically active in 1964; citizen population rates being higher than those for aliens. Despite the declining number and rate of unemployed between 1954 and 1964, the level of unemployment was high considering the increased demand for labour. The existence of such people represented an unutilized and underutilized segment of the potential labour supply which, if re-allocated, could have increased the real output of the economy.

Five types of unemployment have been identified[10] - cyclical, seasonal, frictional, technological and structural, but it is probably the nature of Libya's labour supply rather than the economic demands, which have accounted for the Libyan unemployment. The existence of inflation and the low levels of unemployment in all economic sectors (apart from those "not adequately described" in the 1964 census) ruled out the possibility of cyclical unemploy-

ment. A moderate drought during the summer of 1964 may have slightly decreased the number of workers required at the end of the harvest season, and this, together with unemployed school leavers, may have yielded a small amount of seasonal unemployment. Despite the high labour turnover in some sectors of the economy, the strong demand for labour and the small size of the modern organizational sectors have removed significant frictional unemployment. Technological unemployment, though small at present, is an increasing threat to the agricultural sector where labour-intensive techniques are being replaced by capital-intensive techniques. The achievement of a labour ceiling in the oil industry indicates the possible consequences in other industrial sectors. Structural unemployment caused by a lack of demand for the products of a particular industry or location has been minimal.

The structural imperfections in the supply of labour probably determined the level and nature of unemployment. Most of the unemployed did not have the requisite skills to assume positions in the modern economic sector. The bulk of the 31, 716 unemployed male citizens in 1964 were from activities not adequately described. 23, 917 of these were new workers seeking employment, so that only 7, 800 persons must have been registered as former workers without jobs but seeking work.

Rates of unemployment in 1964 were highest in manufacturing and construction (0.5 per cent of the economically active male citizens), apart from industries not adequately described (73.1 per cent). On a regional basis, rates were highest in Gebel Akhdar and Sebha, followed by Homs, Misurata and Derna (Table 7.3). While the actual numbers unemployed in Tripoli and Benghazi were high in absolute terms, the low rates per total economically active suggested that urban unemployment was not widespread. Various factors accounted for the small amount of urban unemployment: first, the vast demand for labour in the modern economic sector; secondly,

industrialization has not developed to the stage where labour is displaced by capital-intensive techniques; and thirdly, the government administrative sector has provided a sponge for surplus labour. It has been noted,[11] however, that a certain amount of wastage occurs within the Government, creating hidden under-employment at both unskilled and skilled levels.

Table 7.3 Unemployment Amongst Male Citizens, Six Years and Over by Muqataa, 1964

Muqataa	Seeking Work		Ecconomically Active	Unemployed Percent
	Number	Percent of total		
Tripoli	4,197	13.2	81,094	5.1
Benghazi	4,232	13.4	68,794	6.1
Sebha	1,611	5.1	11,231	14.3
Gebel Gharbi	3,274	10.3	43,562	7.5
Zawia	3,401	10.7	42,715	7.9
Homs	3,471	11.8	34,625	10.8
Misurata	4,116	13.0	38,369	10.7
Derna	1,882	5.9	18,738	10.0
Gebel Akhdar	4,566	14.4	20,989	21.7
Ubari	697	2.2	7,717	9.0
TOTAL	31,717	100.0	367,834	8.6

Source: Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966), pp.33-4.

The amount of underemployment is more difficult to assess, although it is probably larger than the unemployed, for there are many potential areas for increasing the output of the economy by re-allocating workers. For instance, underemployment in agriculture has been extensive.

Until the establishment of minimum wages by the labour code of 1957, wage-paid labour in agriculture was restricted to mechanical repair shops and to seasonal labour on some larger Concession holdings in Tripolitania. However, the spread of the wage system in Libyan agriculture will tend to reduce the capacity of family farms to absorb extra population; this is already happening in Egypt.[12] The past level of underemployment in agriculture has been demonstrated by the recent rural to urban migrations. Farm output has been maintained despite the decrease in farm population.[13]

7.2 Economically Inactive Population

In studying the potential and actual supply of the labour force it is important to analyse the growing sector of persons of working age who report no occupation. International classification of the workforce includes unpaid workers, students and those not classified by economic status as "economically active". In the Libyan context, however, variable terminology in the 1954 and 1964 population censuses makes intercensal comparisons difficult on this basis. Consequently, students, unpaid workers and other workers are designated economically inactive to indicate changing trends in the better defined and consistent workforce groups. However, each element in the labour force is identified and elaborated.

The economically inactive population increased from 64 to 70 per cent of the total population over 5 years of age between 1954 and 1964. A large proportion of the economically inactiver population is composed of unpaid family workers; in 1954, 321,000 persons were enumerated in this category (mainly women), although in 1964 only one-tenth of this number was classified "unpaid family workers". Despite these census misreportings, the principal factors determining the level of economically inactive population were education, infirmities and marital status.[14]

7.2.1 Education

The strict government control of immigration, particularly foreign workers, imposes strains on the Libyan educational system. As all professional, technical and other skilled manpower must have the necessary school and university education at the appropriate level, the output of the educational system inevitably sets limits beyond which the supply of these categories cannot be stretched.

Total school attendance increased from about 50,000 pupils in 1954 to 190,000 in 1964,[15] accounting for about one-quarter of the total economically inactive persons. The loss of such a large proportion of Libyan youth from work which was low in productivity created two problems. First, the country could ill-afford to provide similar training for older persons already economically active, i.e. there was no stop-gap of trained and qualified persons. Secondly, before oil revenues, Libya found it cheaper to provide employment than schooling. The long term implications are that the high cost of the present educational system, detracting from more immediately productive investments, will be offset by the cost of not training the population in subjects relevant to the country's problems. So far, however, a poor economic return is being obtained from the resources employed; in 1963, for instance, an intake of 50,000 children to Grade I primary schools was matched by an output of only 400 secondary school leavers.

Increased attendance in primary schools was impressive during the period 1958-64 (67 per cent for boys and 102 per cent for girls), while the total population increased by about 24 per cent. In 1964, it was estimated that four-fifths of Libyan boys aged 6 to 11 years attended school, although only about one-quarter of the girls at equivalent ages. It would appear, however, that many pupils remain in the early school grades, resulting in an imbalanced distribution of attendance by age group. Regional disparities in rates of primary school attendance indicated that the urban Muqataa (

of Tripoli, Sebha and Benghazi, were well above average in 1964 (Table 7.4). The eastern Tripolitanian coastal Muqataa of Misurata and Homs were well below average.

Enrolment in preparatory and secondary schools tripled for boys and rose eight times for girls between 1958 and 1964. In part, this reflects the low absolute level of the 1958 attendance, although the increase indicates the massive investment in school education. While the level and rate of attendance decreased markedly after primary education, regional differences showed that urban areas were at least twice as high as most of the rural Muqataa. The Muqataa of Misurata, Homs and Ubari were also well below the national average for preparatory and secondary school attendance.

The conflict of short term losses, both financial and of manpower, versus long term returns on educational outlays, has produced significant adaptations in the economy. The shift in the pattern of early employment has necessarily raised the level of skill throughout the economically active population. In theory, the young age groups are an efficient route for introducing new skills into a country with a youthful age structure. In practice, limited intake capacity in secondary schools, and the large number of drop-outs and failures, * produce an inadequate output from the educational system.

Moreover, there is a need to train for jobs in industry rather than "white-collar' jobs. In 1960, resistance was noted from boys and young men who preferred secondary and, if possible, university education followed by an office or administrative job.[16] Not only should the educational system

---

* A preliminary examination of school atatistics indicated that the wastage due to drop-outs and failures was 70 per cent in primary schools, 60 per cent in preparatory schools, 40 per cent in secondary schools, and 35 per cent in universities. Thus, for every 1,000 who enter the system, only 40 complete the course.

Table 7.4 Attendance of citizens (aged over 6 years) in Primary, Preparatory and Secondary Schools per 100 Citizens aged 5-25 years in 1964.

	Per cent of Citizens aged 5-25 years in schools		
Muqataa	Primary	Preparatory	Secondary
Tripoli	40	6	2
Zawia	29	6	1
Homs	18	2	1
Misurata	14	2	1
Gebel Gharbi	24	4	1
Benghazi	32	6	2
Gebel Akhdar	26	5	1
Derna	28	6	2
Sebha	33	6	1
Ubari	22	2	1
Libya	29	5	1

Source: Ministry of National Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966), p.23.

guide the school output to make the best use of the students' abilities (for the majority, an academic education is alien to their abilities), but the output should be in the country's interests.

In 1964; about 4,000 students were in full-time higher education in teacher training colleges and at the University of Libya. Together with the 191,000 school attenders, the educational system accounted for about 23 per cent of the economically inactive population.

7.2.2 Infirmities

In 1964, about 46,000 Libyans were afflicted with infirmities which would prevent or curtail their working activities. Partial blindness, deafness or dumbness made up one-half of the disabled, probably restricting their work to the agricultural sector where partial unemployment is more easily absorbed than in the modern sector. More adequate medical services have probably reduced the number of infirmed but it is likely that at least 25,000 persons were totally withdrawn from the labour force, making up about 3 per cent of the economically inactive population in 1964.

7.2.3 Marital Status

In contrast to men, women must choose between participation in economic activity and family responsibility. While Libyan women have not been prevented from part-time work in the traditional economic sector, the rise of full-time wage labour has restricted their participation in activities outside their homes. The expansion of the modern economic sector, together with a rise in the number and proportion of marriages, has inevitably removed more persons from the economically active population. The proportion of married women to the total population, for instance, increased from 67 to 77 per cent between 1954 and 1964. If no married women were economically inactive, then they would form about 36 per cent of the economically inactive population in 1964.

The ratio of active to inactive persons indicated a national dependency ratio of 2.0 in 1964, compared with only 1.8 in 1954. The bulk of the increase was due to the expansion of education, and in part to an increase in the number of married women. The decline in infirm persons only slightly offset the rise in economically inactive persons, forming about 70 per cent of the total citizen population over 5 year of age in 1964. The urban centres of Tripoli and Benghazi did not appear to have higher than average dependency burdens, despite the higher rates of school attendance.

The high proportion of single men and women was probably a contributary factor in the large number of economically active persons. Only Ubari, Misurata and Homs Muqataa had significantly below average dependency ratios, mainly because of the small proportion of young persons in full-time education.

The three elements of education, infirmities and marital status accounted for about two-thirds of the nationally inactive population (as defined on page 183), and nearly three-quarters of the urban Muqataa of Tripoli, Benghazi and Sebha, This would imply that a greater number of inactive persons in the rural Muqataa were made up of eligible persons, whereas there appeared to be less wastage of potential workers in the urban regions.

7.3. Types of Economic Activity

The demographic characteristics of the population have been shown to influence both the potential and actual supply of the labour force. Yet the demands of the growing modern economic sector have provoked changes in the types of work available which have caused the geographical redistribution of population noted in Chapter VI. The precise sectoral changes in the economy have been more a product of the type of economic growth, than of the demographic structure.

Two common ways of distinguishing the types of economic activity are by the occupation of each individual, and the industry in which the person is employed. As the total economically active population only increased by 35,000 during 1954-64, a comparison of the population in each division of economic activity indicates the changes in Libya's manpower utilization.

7.3.1 Changes by Type of Industry, 1954-64

As a consequence of oil revenues, the Libyan gross domestic product rose over six times between 1958 and 1964. Table 23, Appendix C, shows the varying changes by industrial sector and by employment. While economically active male citizens in 1954 do not necessarily reflect gross domestic product allocations in 1958, both years provide measures of conditions

existing before oil exports in 1962. Employment figures published by the International Bank for Reconstruction and Development in 1960, and relating to 1958, suggest that the employment structure of the industrial sectors did not change radically between 1954 and 1958.[17]

In 1958, only about one-quarter of the total product was derived from agriculture. While the product value of agriculture almost doubled during 1958-64, its proportion of the total product fell to about 7 per cent. Omitting the dominating influence over gross domestic product of the mining and quarrying activities, agriculture's proportion of total product had declined to 15 per cent by 1964. The decrease in male employment from 212,000 to 141,000 between 1954 and 1964 had the effect of doubling the per capita domestic product of those economically active. In view of the small amount of agricultural credit made available by Libyan banks (£L 8 million during 1957-64[18]), it is likely that a significant underemployed element was removed from the agricultural sector. In 1954, about 67,000 of the male agricultural workers were under 25 years of age; the number had fallen to about 28,000 by 1964. Economically active male citizens over 55 years also fell during the period. Thus, young and aged agricultural workers together accounted for about two-thirds of the total decrease in male workers.

Mining and quarrying activities were the major origins of revenues and the fastest growing industrial sector during 1958-64. In 1964 they produced nearly half of the total domestic product. In terms of employment opportunities, however, their stimulus was small. From a total of 400 workers in 1954, a peak of 12,000 persons had been reached by 1964. Per capita products of the economically active males were eighty times that of agriculture, despite half the Libyan employees being unskilled labourers and transport workers in 1964.[19] Although a peak has been reached in the employment of Libyans, a recent revival of exploration outside the Sirte basin may create new employment demands.

The manufacturing activities doubled their value of domestic product during 1958-64, but only increased their share of male workers by 4,400 during 1954-64. Their share of the total product (excluding mining and quarrying) fell slightly, while the proportion of total economically active males rose between 1954 and 1964.

The revenues derived from oil exports were indirectly brought to bear most significantly in the tertiary sector of the economy (Table 7.5).

Table 7.5 Sectoral Proportions of Gross Product and Male Employment, 1954 - 1964

Economic Sector	Gross Domestic Product (excluding mining and quarrying) Per cent added by sectors		Per cent Economically Active Male Citizens (aged over 5 years)	
	1958	1964	1954	1964
Primary (excluding mining and quarrying)	28.0	14.5	63.2	43.2
Secondary	17.7	15.1	6.7	16.7
Tertiary	54.3	70.4	30.1	59.9

Source: Table 23, Appendix C.

Excluding mining and quarrying activities, tertiary activities accounted for over half the domestic product in 1958 and over two-thirds in 1964. Within ten years these activities also dominated the employment structure, accounting for 60 per cent of the economically active males in 1964. The external sources of income from oil revenues (discussed in Chapter I), made possible a high level of imports which provided the basis for most profits earned in wholesale and retail trading, personal services, commerce and banking.

It also provided the bulk of the Government's revenue, creating a big demand for offices, houses and transport facilities.

Construction and transportation, for instance, showed a particularly sharp increase in both gross value added and in employment over the ten period preceding 1964. Both activities increased their value of domestic product about five times in six years, while the male labour force increased three times in the ten years preceding 1964. However, the service sector showed the largest value of domestic product, particularly the Government services, followed by wholesale, storage and trade.

7.3.2 Regional Implications of Industrial Changes

Correlation coefficients discussed in Chapter II, indicated that transport, construction, services, commerce, and public services were highly associated with the urban element of factor 1. In contrast, mining and manufacturing activities are not completely dominated by urban centres, the mining being concentrated in the Sirte basin, and the manufacturing being prominent in small towns (for instance, in Misurata[20]). The urban influence was therefore selective, being particularly related to the tertiary economic sector.

Outside the agricultural sector, over half of the economically active citizens in 1964 were concentrated in Tripoli and Benghazi (Fig. 7.1). To a certain extent Tripoli had lost its overall dominance in the early 1960's, having controlled nearly two-thirds of the labour force in the modern sector in 1956 (Table 7.6). Not only had Benghazi emerged as a major centre of tertiary activities by 1964, but most Muqataa contained a growing modern economic sector.

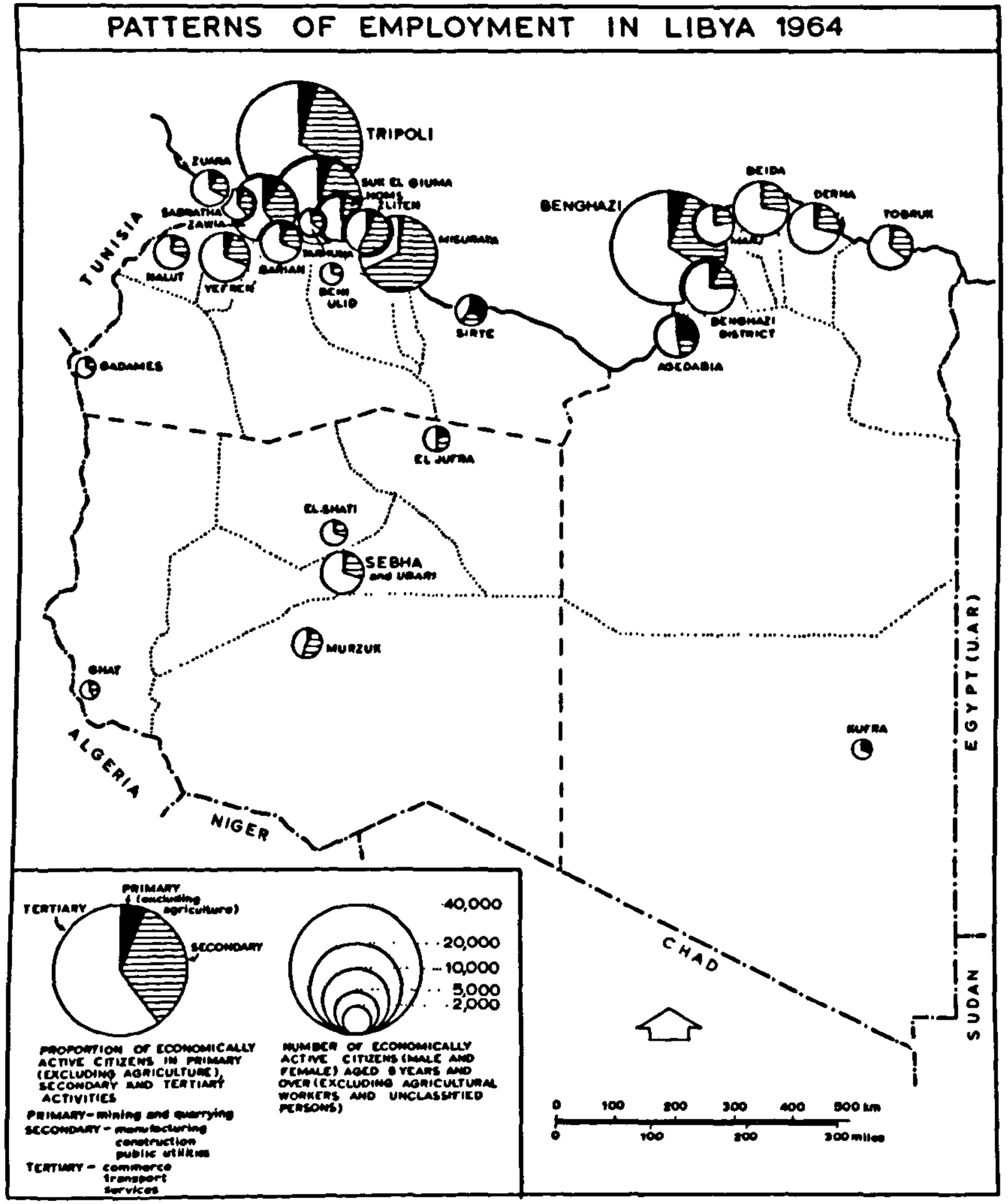


Figure 7.1

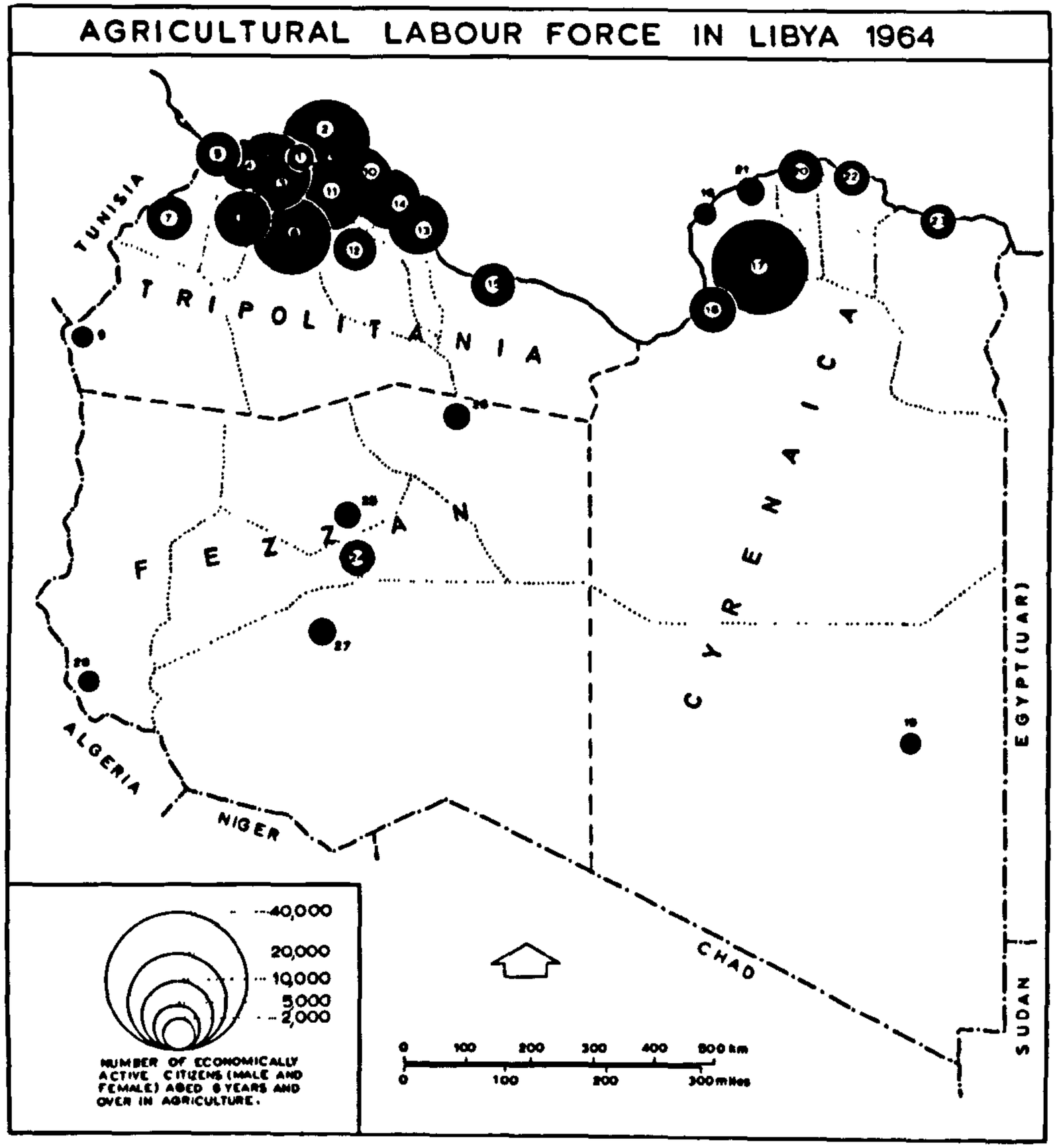


Figure 7.2

Table 7.6 Localization of Industry. Number of Libyans engaged in each economic activity 1956 and 1964

		Tripoli Mutassarrifia				Benghazi Mutassarrifia			
		1956		1964		1956		1964	
		number	%(1)	number	%(1)	number	%(1)	number	%(1)
2-3	Manufacturing	11,493	79	10,250	39	1,631	11	3,500	13
4	Construction	1,920	70	6,900	23	9	-	5,100	17
5	Electricity water and gas	485	43	2,000	35	283	25	1,000	18
6	Commerce	7,468	58	9,650	39	2,648	20	4,000	16
7	Transport	2,407	60	8,050	37	1,384	35	5,000	23
8	Service	17,024	54	24,700	32	7,435	24	13,000	17
	Total 2-8	40,797	61	61,550	33	13,390	20	31,600	17

(1) Per cent of total economically active in each economic activity.

Source : Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

Index to Figure 7.2

1. Mutassarrifia		11. Mutassarrifia		20. Mutassarrifia	
1.	Tripoli	11.	Tarhuna	20.	Beida
2.	Suk el Giuma	12.	Beni Ulid	21.	Marj
3.	Zawia	13.	Misurata	22.	Derna
4.	Sabratha	14.	Zliten	23.	Tobruk
5.	Zuara	15.	Sirte	24.	Sebha, Ubari & Oragen
6.	Garian & Mizdah	16.	Benghazi	25.	El Shati
7.	Nalut	17.	Benghazi Dist.	26.	El Jufra
8.	Yefren	18.	Agedabia	27.	Murzuk
9.	Ghadames	19.	Kufra	28.	Ghat
10.	Homs				

As with the economy as a whole, oil revenues have indirectly provided the financial basis for industrial changes in the urban centres, particularly Tripoli and Benghazi. Increased incomes (Table 7.7), large capital resources, favourable balance of payments, improved social conditions, and more efficient communications, have produced a sense of security and optimism, and an efflorescence of tertiary activities.

Table 7.7 Percentage Distribution of Income Groups in Urban and Rural Areas, 1962-1966

Income Range	Urban 1962[1]	Urban 1966[2]	Rural 1962[1]
low income £L 360	64%	40%	80%
middle income £L 360 - £L 1,080	30%	45%	20%
high income + £L 1,080	6%	15%	-

Sources: (1) Lassere, M. Monograph for a Seminar on Housing Statistics and Programmes in Libya. Ministry of Housing and State Property, Tripoli. (1966), p.5.

(2) Whiting Associates International, Tripoli Master Plan, Tripoli, (1966).

Most of the factors determining the concentration of the modern economic sector in urban centres have been highlighted; some expansion of industry has taken place before oil wealth, a partial infrastructure had been established, and, as the origin of public and private revenues, the cities of Tripoli and Benghazi became the optimum location for demand and supply requirements. However, four economic factors may combine to restrict further economic growth:

(a) The role of the government sector has become increasingly dominant, both as a source of income and employment. Despite the administrative decentralization and growth of Beida and Sebha, Tripoli still has nearly one-third, and Benghazi one-sixth, of the total Libyan employees involved in service activities. Moreover, both Tripoli and Benghazi have over one-quarter of their economically active citizens involved in government services.

(b) The importance of trade and service employment (and the "get-rich-quick" attitude of the entrepreneurs) based on the reliance on imports, has offset real progress in the use of local resources. Increased demands and rising prices will further attract people to the service trades, particularly in the urban centres of Tripoli and Benghazi. Consequently, imports are beginning to substitute rather than supplement local production.

(c) The shortness of Libya's rapid economic development span still causes a lack of confidence in long term investment by private entrepreneurs. High capital accumulation has taken place in the form of hoarding (e.g. carpets, assets in foreign banks and some durable goods) as well as along traditional lines (e.g. real estate and short term commercial ventures). The result, especially the latter, has stimulated land speculation, inflation and rising land prices. Particularly affected are the low income brackets in urban areas (comprising about 40 per cent of Tripoli's population in 1966) thereby stimulating the growth of shanty towns.

(d) Specialization of functions in Tripoli and Benghazi is in part a mark of the economic development typical of the modern sector. Concentration of resources provides a compact market, enables economies of scale to be utilized, and attracts specialists and specialized industries. Nevertheless, further division of the urban industrial structure may be detrimental to future growth; specialization should not inhibit interdependence of sectors, while concentration of resources and employment should not offset growth elsewhere.

Figure 7.1 describes the pattern of employment in activities other than agriculture throughout Libyan Mutassarrifia. Mining and quarrying

activities form a large part of the locally employed male population in the regions bording the Gulf of Sirte, notably Sirte, Agedabia and El Jufra. However, the urban centres of Tripoli and Benghazi contained the largest proportion of the total workforce in mining and quarrying (38 per cent in Tripoli alone). Specialized manufacturing activities concentrate on Misurata and Zliten. Local handicraft industries and commercial activities in Misurata particularly, serve an extensive hinterland, taking in most of the inhabited parts of the Mutassarrifia of Misurata, Beni Ulid and El Jufra.[21] Construction, commerce and service activities were significant in Misurata, Zawia and Gebel Gharbi. In contrast to Tripoli's dominance over surrounding Mutassarrifia, Cyrenaican towns, particularly Tobruk, Derna, Beida and Agedabia, were beginning to show signs of specialized urban functions (noted in Chapter IV). In the Fezzan, Sebha contained most of the provincial modern economic sector, particular with service activities and construction employment.

The traditional economic sector was dominated by the 141,000 males involved in agriculture in 1964, four-fifths of whom were unpaid family workers or workers on their own account and not directly involved in the the wage sector of the economy. Figure 7.2 indicates the distribution of agricultural workers in 1964, not including those unclassified in the 1964 population census, although many of these were undoubtedly agricultural workers or pastoralists. Tripolitania contained most of the agricultural workers with large clusters both along the coast and inland Gebel. Most of the agricultural workers in Cyrenaica were concentrated in Benghazi District, while the rest of the province showed concentrations of agricultural workers smaller than any Tripolitanian Mutassarrifia, other than Ghadames. Only small pockets of economically active citizens engaged in agricultural activities were situated in the Fezzan and Kufra.

7.3.3 Occupational Activity Changes, 1954-64

Numerically, farming remained the most important citizen occupation,

although the proportion of farmers to the total economically active, had fallen from 68 to 40 per cent between 1954 and 1964. Craftsmen continued to form the second most important occupation with about 64,000 workers in 1964, an increase of 34,000 in ten years. Sales and service workers expanded steadily, forming one sixth of the economically active males in 1964. The fastest growing occupations were miners (although making up less than 2 per cent of the total), clerical and transport workers. Professional and technical workers trebled their numbers during the decade 1954-64, while numbers of managerial and administrative workers increased by only 500 (Table 7.8);

Table 7.8 Occupational Distribution of Economically Active Male Citizens in Libya (aged 5 years and over*), 1954 and 1964.

Occupational Activity	1954 number	1954 %	1964 number	1964 %
Professional & technical	3,328	1.1	10,469	2.8
Admin., Executive and Managerial	4,841	1.6	5,386	1.5
Clerical	1,582	0.5	18,216	5.0
Sales	14,962	4.8	23,109	6.3
Farmers	211,448	68.2	141,853	38.6
Miners	472	0.2	6,916	1.9
Transport	5,313	1.7	19,571	5.3
Craftsmen	28,022	9.0	63,965	17.4
Services	19,282	6.2	36,769	10.0
Not classified	20,761	6.7	41,347	11.2
Total	310,011	100.0	367,601	100.0

* 1964 data relates to population over 6 years of age

Sources: (a) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959).
(b) Ministry of Economy and Trade, Libya. General population Census 1964, Tripoli, (1966).

The fastest growing occupations have been those associated with government employment and certain private industries. Clerical, transport and professional occupations connected with the government increased at least three times during the ten year intercensal period. In the private economic sector craftsmen, miners, sales and service workers had the fastest growth rates. Farming was the only occupational activity which had more than half of its workers with more than ten years experience in 1964. (Table 24, Appendix C). Three-quarters of the mining and quarrying workers were employed between 1959 and 1964. Transport, clerical, service and professional activities showed about half of their workers with less than five years experience.

Apart from farming occupations, at least 40 per cent of economically active male citizens were situated in Tripoli and Benghazi Mutassarrifia. Despite the urban concentration, however, the more skilled occupations had the widest regional distribution. For instance, Zawia and Gebel Gharbi Muqataa contained significant proportions of professional, technical, administrative and executive workers. The most urban orientated occupations, identified in Chapter II, were clerical, sales and transport workers.

7.3.4 Changes in Economic Status, 1954-64

The erosion of the traditional economic sector by modern sector economic activities, can also be noted by the changing status of workers. Male citizens provide the most reliable measure for inter-censal comparisons because of the difficulties of classifying female unpaid family workers. Employees formed the largest group of workers, having expanded from 32 to 51 per cent of the total economically active male citizens during 1954-64 (Table 7.9). Workers on own account and unpaid family workers, typical of the traditional economic sector, formed most of the remainder in 1964. However, their proportion had declined from 53 to 40 per cent of the total male labour force, while numbers had declined by 25,000 persons. The small increase in the number of employers suggested that the government sector had retarded the potential growth of private entrepreneurs.

At the same time, the growth of the public sector was in part responsible for the decline in unemployed males.

Table 7.9 Economic Status of Economically Active Male Citizens in Libya 1954-64

Economic Status	1954 number	1954 %	1964 number	1964 %
Employers	2,447	0.8	3,186	0.9
Employees	104,374	32.4	186,292	50.7
Own Account workers	129,401	40.2	123,274	33.5
Unpaid family workers	42,390	13.2	23,013	6.3
Seeking work	43,086	13.4	31,717	8.6
Total Economically Active Male Citizens	321,698	100.0	367,482	100.0

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), p.231, and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli (1966), p.33.

On the basis of economic status of workers, three groups of economic activities distinguished the traditional and modern economic sectors. Firstly, economically active citizens classified as workers on own account and unpaid family workers were essentially traditional economic groups. Both reflected small-scale production and unpaid labour (in terms of wages or salaries). Agriculture, and commercial activities had significant proportions of their total labour force classified in this traditional sector (80 and 76 per cent respectively). Secondly, the modern economic sector contained a large proportion of wage-paid labour, typical of the employers and employees economic status groups. Mining, construction, public

utilities and service activities showed not less than 95 per cent of their male labour forces in the modern economic sector as defined above. Finally, a group of activities contained elements of both the traditional and modern sectors. The proportion of total labour force in the modern sector was 78 per cent in transport and 68 per cent in manufacturing activities. However, transport and manufacturing activities also contained elements of the tradtional sector; 21 per cent of the transport and 28 per cent of the manufacturing activities were classified as unpaid family workers and workers on own accounts.

The modern economic sector in Libya, defined as employers and employees combined, increased its proportion of the total male workforce from 33 to 52 per cent between 1954 and 1964. Expressed regionally, those Muqataa containing more than half their labour force in the modern sector in 1964 were, in decreasing order, Tripoli, Benghazi, Sebha, Derna and Tobruk. The regions with the smallest proportions were the Tripolitanian Muqataa of Homs, Misurata and Gebel Gharbi. Zawia and Ubari were slightly below the national average of 51.5 per cent in 1964.

7.4 Recent Employment Trends in the Private Sector

The Manpower Section of the Ministry of Labour and Social Affairs in Libya is undertaking bi-annual surveys of employment conditions in the private sector of the economy. Some of the evidence obtained from detailed questionnaire surveys reveals changes and processes that were dominant during the decade 1954-64. This section deals with the demand and supply of manpower in the private sector during July - December 1966. It is based on information received from about 840 establishments covering all industries and services throughout the country, although about two-thirds of the questionnaire replies were from Tripolitania.[22]

During the second half of 1966 there was an overall increase in employment of 11 per cent. All industries showed a marked increase in employment except manufacturing and commerce which showed a decline. Mining and

quarrying, construction, public utilities, and transport activities showed an employment increase above 11 per cent, mainly in Tripolitania. The decline in manufacturing industries (15 per cent during June - December 1966) was substantially more in Benghazi than in Tripoli. Commercial activities also showed a decline (6 per cent) though with no regional concentration. Both manufacturing and commercial industries registered higher proportions of family workers than the rest of the modern economic sector.

4,500 job vacancies were filled during the second half of 1966, though over 3,000 reported vacancies remained unfilled at the end of the period. Of the vacancies remaining unfilled, almost three-fifths were in the construction industry. By occupation, nearly one-half of the vacancies were for craftsmen and production process workers and 30 per cent for unskilled workers.

A slight decline in the employment of non-Libyans was matched by an increase of 10 per cent in the employment of women. Of the 900 unemployed persons registered with the Employment Offices functioning in the country, the large majority of those seeking work were unskilled persons.

Shortages of different categories of manpower were reported by about one-third of the sample industries. Construction and transport establishments reported the largest shortage. The categories of workers reported to be in short supply covered a wide range of occupations, including unskilled labour as well as technical and professional personnel.

7.5 Sample Surveys of Oil and Construction Companies

Two sets of sample surveys were undertaken by the author in 1966 and 1967 respectively, designed to highlight the geographical and occupational mobility of urban employees. One survey related to the petroleum companies and attempted to assess the occupational impact in the oil industry which initiated many of the economic processes operating in Libya. The second survey related to the construction industry, one of the fastest

growing industries in the post-oil phase of Libya's economic development. The sample surveys were of two types; one studied classified information relating to employees, particularly in the oil companies; the other was a questionnaire study, relating mainly to the construction companies. The firms and companies selected were located in Tripoli and Benghazi, and were planned to be representative of the varying sizes of operations. Actual coverage, however was inevitably dependent upon those firms willing to co-operate. The statistical material obtained was consequently piece-meal, yet the conclusions provided further evidence to test the census data.

7.5.1 Oil Companies

The Libyan oil industry initiated a demand for labour far beyond its own needs. Indirectly, the industry provided the finances and revenues for other, "parasitic", industries. Directly, the oil companies provided employ ment for about 12,000 persons. During the phase of oil exploration most of the oil company employees were hired in rural areas; at present, most are hired in the cities of Tripoli and Benghazi.

(a) Impact in Rural Areas

Following the Atshan oil discovery in 1957, the Fezzan became the centre of oil activity. Interest later shifted to the Sirtica area around the oases of Aujila, Jalo, Marada, Zella and El Jufra [illegible]. Local labour was utilized because of the temporary and shifting nature of the oil exploration, and the impracticability of transporting large numbers of un-skilled workers from the major towns. Thus, at the height of the oil exploration phase during mid-1960, about four-fifths of the 6,300 Libyan employees on the payrolls of the oil companies were involved in desert exploration activities. It has been estimated by Thomas[23] that one oil rig needed between 30 and 60 field-hired labourers, while a seismic party employed between 40 and 70 persons. This meant that about 4,000 casual labourers were hired in 1960. In addition, the nature of the exploration work, the seasonal harvesting demands on the casual labourers, and the government stipulation of local field-hiring combined to cause a high labour

turnover. Consequently, many locally hired Libyans were involved in oil operations, gaining experience of new living and working conditions.

The contacts between modern and traditional socio-economic systems in rural areas were varied. Experience of regular hours of work, pay and food had a two-fold effect. On the one hand, the oil companies demanded sustained hard-work and discipline which created conflicts of values and customs for rural Libyans; on the other hand, it gave many rural people their first experience of the material benefits offered by the modern economic sector.

The development of the oil industry from the exploration to the production stage imposed new demands on the rural areas. While local casual labour was hired to construct the oil field and terminal facilities, few casual Libyan workers were needed in the operation of the plants. At Esso's Marsa Brega oil terminal, for instance, only 70 out of 474 Libyan employees were hired locally in 1966, mainly from Agedabia, Bisher and Sirte. Of the rest, Benghazi provided 284 persons, Tripoli 50 and Misurata 20. At the Zelten oilfield 150 miles south of the Gulf of Sirte, 100 Libyan employees are hired locally, mainly from Marada. However, the meagre educational qualifications of the local labourers and the high cost of training has resulted in the importation of semi-skilled employees from Benghazi despite the costs of transportation. British Petroleum's Sarir oilfield also depends mainly on imported workers, only 14 of the 120 labourers being hired from the Kufra oases.

While the petroleum companies themselves have cut down on their casual and unskilled labour, many of the contracting companies hire local labour. At Marsa Brega, for instance, 1, 660 Libyan workers form the largest concentration of employees associated with the oil industry, outside Tripoli and Benghazi.

The catering contractors depend on imported food, particularly frozen goods trucked and flown weekly from Tripoli and Benghazi. Consequently, there has been little stimulus to local agriculture to meet the growing demands of the desert operations of the oil industry.

(b) Impact in the Towns.

The influence of the oil boom is most readily apparent in Tripoli and Benghazi. Here the oil companies have concentrated their administration and technical services which demand the largest number of oil company employees. In June 1966, four of the major companies were studied (Table 7.10). The Libyan employees comprised about one-third of the total Libyan labour force in the oil industry.

Within Esso Libya Ltd., half of the 323 Tripoli-based workers came from Tripoli itself, while the central coastal region and central Gebel provided most of the remainder. The concentration of Benghazi hired local labour at Marsa Brega reflects the recent move of the Company from Benghazi to its Gulf of Sirte oil terminal. About two-thirds of the Tripoli workforce were monthly employees, i.e. semi-skilled workers with a minimum educational qualification of intermediate certificate. This compared with only one-third of the oil field employees. The small size of the casual and unskilled workforce reflects the nature of the oil industry itself. Most of the monthly workers were hired in Tripoli itself, indicating that educational qualifications determined occupational movements of semi-skilled and skilled workers. Monthly workers were generally younger, had a higher proportion of single men, and had a shorter length of service than daily workers.

Evidence relating to places of birth suggested that casual workers migrated direct to Tripoli. Workers born in Tripoli showed a smaller length of service in Esso Company than persons born outside the city. Occupational mobility appeared to be a trait of the skilled workers located in Tripoli, and of the unskilled casual labourers located in the oilfields.

Table 7.10 Employment of Libyans and Expatriates by Company and Place of Work, June, 1966.

Company	Place of Work	Libyan Employees Daily	Libyan Employees Monthly	Expatriate Employees	Total
Esso	Tripoli	124	234	260	618
	Field	308	155	207	670
	Tripoli	----	449 ----	332	781
Oasis	Terminals	----	346 ----	108	454
	Field	----	118 ----	111	229
Mobil	Tripoli	----	300 ----	551	1,464
	Field	----	613 ----		
British Petroleum	Tripoli	16	2	3	21
	Benghazi	170	102	73	351
	Terminal	60	41	19	120
	Field	78	66	39	183
	Other	118	35	11	164
Total			3,341	1,714	5,055

Source: Field Work, June 1966

Replies to questionnaires by British Petroleum employees in Benghazi validated the conclusions relating to Tripoli. Migrants appeared to move directly to Benghazi, though not directly to the oil company. The majority of the monthly employees were born in Benghazi, although most had changed occupations at least once within the city. Government service, the British Army and other oil companies were the main sources of new employees to British Petroleum.

7.5.2 Construction Companies.

346 workers were questioned in six Benghazi based construction companies during May and June 1967. Most of the construction work was centred in Benghazi City, although some workers were involved in activities at Beida and Derna.

Half of the workers had moved to Benghazi between 1962 and 1967. The Gebel Akhdar settlements and the towns of Derna and Tobruk supplied about one-fifth of the workers. The area around Benghazi, stretching from Marj to Agedabia supplied about 15 per cent of the migrants. Most migrants from Marj had been forced to leave after the earthquake of 1962. About 10 per cent of the workers originated in the Fezzan, and a similar proportion came from Egypt, Syria, the Lebanon, Morocco and Ethiopia.

Stepped-migration was difficult to assess. About one-fifth of the workers who had migrated, had moved to at least one other place between their birthplace and Benghazi. Generally these were the migrants who had travelled a long distance. Migrants from Egypt, for instance, had remained for some time in Tobruk, while many of those born in Zliten and Misurata had lived in Derna (probably working at British barracks) before moving to Benghazi. In contrast, workers originating within 100 miles of Benghazi had tended to migrate directly to the city. Few of the construction workers intended to return to their birth-places. The marital status of workers showed no correlation with distance travelled, although most of the children had been born in Benghazi. Libyan daily rates of pay in the urban construction industry appeared to act as a "pull" factor for migrants; rates of pay had risen four times between 1964 and 1967 and twice since the Libyan Labour Law of 1965 stipulated minimum daily wages of £L 0.6.

The occupational level of migrant construction workers tended to vary with distance travelled. Foreign workers usually had more specialized training and experience than local Cyrenaican workers, many of whom had been peasants and farm labourers. However, half of the workers who

answered the questionnaires had been involved in other urban occupations, particularly other construction activities and the British Army.

7.6 Future Requirements

Estimates of present and future manpower requirements have been based on the Five Year Development Plan[24] to the extent that the manpower components of the projects included in the Plan could be ascertained.[25] These requirements have been considered separately in respect of the government and private sectors, but in respect of the latter, only three industries were included in the study (i.e., petroleum, construction and automobile). While the demand and supply characteristics of the economy vary regionally, the government and private sectors, relating essentially to Tripoli and Benghazi, reflect the bulk of the national requirements.

Table 7.11 summarizes the demand and supply of manpower during the period 1964-1969. Considerable shortages of supply have developed and will continue to develop at each level of the educational system. By

Table 7.10 Estimated Demand for and Supply of Personnel during 1964-69

Educational Level	Demand for Personnel: Govt.	Private Sector	Total	Supply of personnel (including Libyans studying abroad)	Shortage Govt. Sector (Assuming the entire supply is absorbed in Govt.) Col. (2)-(5)	Overall Col. (4) -(5)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
University	2, 514	2, 540	5, 054	1, 841	673	3, 213
Secondary School	10, 459	3, 898	14, 357	7, 171	3, 288	7, 186
Below Secondary School (Skilled)	8, 325	5, 484	13, 809	2, 210	6, 115	11, 599
Below Secondary School (Unskilled)	3, 934	[illegible]	3, 934	adequate	-	-
Total	25, 232	11, 922	37, 154	11, 222	10, 076	21, 998

Source: Nair, A.N.K. A Survey of Requirements of Professional Technical and Skilled Manpower in Libya, Ministry of Labour and Social Affairs, Tripoli, (Oct. 1966), p. 55.

1969 the overall shortage in both government and private sector would be in the order of 22,000 persons.

However, these figures present only the broad picture. Within each educational level there are serious imbalances between demand and supply among individual occupations which are hidden by the overall totals. Thus, the shortage of university level personnel is shown to be 27 per cent of the demand for the government sector (according to the assumption in column 6 in Table 7.11) and 64 per cent overall. There are many categories belonging to this group such as engineers, scientific workers, agronomists, architects, doctors and veterinarians, in which the shortage is nearer 100 per cent. Moreover, such skilled personnel usually prefer to live in the major cities, rather than in the rural areas, where, in many cases, their services are most urgently needed.

At the secondary school level the overall shortage is likely to be 50 per cent of the demand, while at intermediate and primary school levels the shortage of supply of semi-skilled workers is estimated to be 84 per cent. These shortages are critical; the demand for technicians, nurses, agricultural assistants, technical supervisors, and other sub-professional persons far exceeds the demand for senior skilled personnel. The increased status of a university degree may also be creaming potential technical training candidates from the system. The existing training capacity for these sub-professional groups is very inadequate. As against an estimated demand for over 10,000 craftsmen and 2,200 technicians between 1964 and 1969 in the public and private sectors together, the estimated output from government training programmes is around 2,500 persons.

The shortage of teachers, particularly secondary technical teachers, is a major bottleneck with similar disparities between demand and supply.

7.7 Summary and Conclusions

In the foregoing sections an analysis has been made of the current geographical patterns of employment in Libya with regard to different industries and occupations. It was noted how the recent growth of the economy has initiated new manpower demands, and how, in turn, actual and potential sources of supply have imposed quantitative and qualitative restraints on further economic expansion. In the long-run, the surplus potential, particularly in agriculture and female occupations, will help to meet the demands of the modern economic sector. In the short-run, however acute shortages of skilled personnel may damage the sustained economic growth which has typified the post-oil export phase in Libya.

A stop-gap for the short-term bottlenecks has been achieved by importing "human capital". The 40,000 Italians and 10,000 Jews provided a valuable productive workforce in the pre-independence period. Their depletion was reinforced by an influx of British and American skilled persons and by other Middle Eastern skilled and semi-skilled labour since independence In large part, they have gravitated to the Government offices and University posts. Government action restricting immigration of foreign workers and increasing Libyanization schemes will tend to exacerbate the demand and supply problems.

The major shortages and surpluses of manpower in Libya have been identified. Many of them are common to all modernizing societies. The Libyan government has attempted to develop a strategy to overcome these problems by appropriate incentives, training employed persons, and rationally developing formal education. Basically, however, Libya's manpower problem is not the rate of accumulation of human capital or its commitment to productive activities, important though this strategy is; it is the problem of total stock of human resources and its distribution.

The distribution of population (analysed in Chapters III and IV), together with the process of continued accretion in urban centres (Chapter VI),

has been a partial demographic adjustment to the location of economic opportunities. Since the spatial distribution of consuming power is in part determined by the distribution of population, and because the Libyan economy has a tertiary bias, the urban concentration of population dominates the distribution of consumer-orientated economic activities. Combined with the process of industrial linkage and inertia, the disadvantages of rising labour costs, rentals and import costs on raw materials have been offset. Thus, the forces of the market in the modern economic sector have in part determined the distribution and industrial structure of the population.

Significantly, however, the structure, distribution and growth of the Libyan population itself have set quantitative and qualitative limitations to the nature of economic growth. Adaptations in the occupational structure and distribution of the population have been responses to the new economic demands. Nevertheless, the accumulation of total stock of human resources will dictate the level and rate of future economic growth. The elements involved in Libya's accumulation of human stock are studied in Chapter VIII.

References

1. Harbison, F. H. "Human Resources Development Planning in Modernising Economies", International Labour Review, Vol. 85, (1962), p. 436.

2. Higgins, B. "Expert Urges 10 Year Plan to Meet Labour Needs", quote in the Sunday Ghibli, (March 13th 1966), p.1.

3. International Bank for Reconstruction and Development (I.B.R.D.). The Economic Development for Libya, The Johns Hopkins Press, Baltimore, (1960), p.300.

4. Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), p. XVII.

5. Nair, A. N. K., Libya's Manpower Resources and Educational and Training Needs 1964-71, Ministry of Labour and Social Affairs, Tripoli, (1967), p.10.

6. Ministry of Agriculture, Libya. 1960 Census of Agriculture, Tripoli, (1962), p.494.

7. Durand, J. D. "Population Structure as a Factor in Manpower and Dependency Problems of Under-Developed Countries", in U.N. Population Bulletin of the United Nations, No. 3, New York, (Oct. 1953), p.5.

8. ibid. pp. 7-8.

9. Barclay, G. W. Techniques of Population Analysis, John Wiley and Sons Inc., New York, (1958), p.270.

10. Wedley, W. "Unemployment and Underemployment, "The Libyan Economic and Business Review", Vol. 2, No. 2, (Autumn 1966), pp. 57-84.

11. Nair, A. N. K. A Survey of Requirements of Professional, Technical and Skilled Manpower in Libya, 1964-69, Ministry of Labour and Social Affairs, Tripoli, (Oct. 1964), p.58.

12. Issawi, C. Egypt in Revolution: an Economic Analysis, Oxford Press, London, (1963), pp. 33-4.

13. Ministry of Planning and Development, Libya. First Annual Report on Development Activities for the Year ending 31st March, 1964, Tripoli, (1965), p. 9.

14. Barclay, G. W. op. cit., p. 272.

15. Auble, A. "Student Enrolment Data through 1964-1965", Statistical Paper No. 8, Ministry of Planning and Development, Tripoli, (July 1965), p.1.

16. Reports and Inquiries. "Manpower and Employment Problems in Libya", International Labour Review, Vol. 85, (Jan. 1962), p.40.

17. I.B.R.D. op. cit., p.34.

18. Ministry of Economy and Trade, Libya. Statistical Abstract 1965, Tripoli, (1966), p.220.

19. Ministry of Economy and Trade, Libya. Employment in the Petroleum Mining Industry 1964, Tripoli, (1966), pp. 2 and 10.

20. Blake, G. H. Misurata: A Market Town in Tripolitania, Department of Geography, University of Durham, Research Paper No. 9, (1968), p.21.

21. ibid, p.22.

22. Ministry of Labour and Social Affairs, Libya. Report on Employment in the Private Sector in Libya for the half-year ending 31st December 1966, No. 3, Tripoli, (December 1966), pp. 1 - 9.

23. Thomas, E. C. "The Libyan Oil Worker", Middle East Journal, Vol. 15, (1961), p.266.

24. Ministry of Planning and Development, Libya. Five-Year Economic and Social Development Plan 1963-68, Tripoli, (1963).

25. Nair, A. N. K. A Survey of Requirements, op. cit., p.55.

CHAPTER VIII

PAST, CURRENT AND PROSPECTIVE POPULATION GROWTH

According to the difference between the 1954 and 1964 population censuses, the Libyan population grew at a geometric rate of 3.65 per cent per annum. A large proportion of this growth was composed of the citizen population which had an annual growth rate of 3.9 per cent during the ten year period; the annual growth of the alien population was only 0.3 per cent. Differential growth rates of citizens and aliens had reversed since 1931, when Italian immigration dominated national growth rates (Table 8.1).

Table 8.1 Geometric Population Growth Rates of Citizen Alien and Total Libyan Populations 1931-64

Date	Citizen Population Number	Citizen Population % Growth per annum	Alien Population Number	Alien Population % Growth per annum	Total Population Number	Total Population % Growth per annum
1931	654,716	2.3	49,407	18.5	704,123	3.8
1936	732,973	2.0	115,637	5.1	848,610	1.4
1954	1,041,599	3.9	47,274	0.3	1,088,873	3.7
1964	1,515,501		48,868		1,564,369	

Sources: (a) Pan, C.L. "The Population of Libya", Population Studies Vol. 3, No. 1, (June 1949), pp. 100-125.

(b) Ministry of National Economy, Libya. Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya, Population Census 1964, Tripoli, (1966).

After Kuwait, Libya's annual rate of increase during 1954-64 was the fastest growth rate in the Middle East and North Africa. While the rate of growth was impressively high (and, shown later, suspect), the

actual volume of population increase was small in comparison to other Middle Eastern countries (Table 8.2). Despite a rate of growth nearly twice as large as Algeria's, Libya's annual increment was only one-quarter as great. At current rates of growth Libya would double its population in twenty years.

Table 8.2 Population Size, Rate and Amount of Increase, and Rate of Births and Deaths in selected Middle East Countries 1958 - 1966

Country	Total Population in 000's persons mid-year estimates 1966	Annual Rate of Increase 1958-66	Amount of Annual Increase (in 000's persons) 1958-66	Crude Birth Rate 1960-66	Crude Death Rate 1964
Libya	1,677	3.7	42	25.1	4.6
Algeria	12,150	2.0	176	48.2a	11.0b
Morocco	13,451	2.6	246	46.1c	18.7c
Tunisia	4,470	1.2	41	45.1	10.6
Egypt	30,147	2.5	549	41.2	15.8
Sudan	13,940	2.8	279	51.7d	18.5d

a. Moslem population 1963
b. Data excludes deaths of infants dying before registration of birth
c. Estimates based on births reported for 12 month period preceding 1962 sample survey of Moslem population
d. Estimates based on sample survey in 1956.

Source: U.N. Demographic Yearbook 1966, New York, (1967).

The problem of an enlarged Libyan population is not simply one of additional numbers of people, but also of the capacity of the physical, economic and cultural environments to sustain this demographic growth. In the past, physical determinants largely dictated the distribution, density and growth of the population. At present, economic factors both encourage and enable the population to change. Food imports, based on oil revenues, have lessened the dependence on domestic agricultural production. This has in turn weakened, although by no means eradicated, the traditional population controls of disease, drought and famine, thereby allowing the population to increase. The expansion of the non-agricultural economic sectors, through occupational and geographical mobility, has facilitated an increase in per capita incomes. The major geographical consequence has been the concentration of the population in urban areas which are forming an increasing proportion of total population growth. For instance, Tripoli and Benghazi cities together accounted for one-third of the national population growth in the decade 1954-64. However, future population growth may be determined by cultural, political and organizational factors, rather than by purely economic conditions. The modern economic sector is beginning to feel the strains of a small labour force, yet the educational system is already working to full capacity. The ability of the Government to expand and improve the efficiency of the economy and social services may influence the restraints and bottlenecks for future economic and demographic growth.

While the association between economic and demographic growth may suggest cause and effect relationships, it is those variables affecting fertility, mortality and migration directly which ultimately determine population growth. Thus, the major hypothesis of demographic transition states that mortality and fertility both decline in the course of modernization, mortality passing from a high, unstable level to a low stable level, and fertlity passing from a high unregulated level, to a low, controlled level.

The fertility decline lags behind the mortality decline and gives rise, therefore, to a transitional interval of rapid growth in the total population.[1]

This idealized sequence and direction of change is only partially applicable to the Libyan demographic transition because the timing and content of the modernization process has itself changed. Consequently, the fertility, mortality and migration variables are responding to a set of proximate causes which contain new elements, occur in new combinations, and which have a pace never experienced before. It is therefore necessary to analyse the principal demographic variables separately, to note how the modernization process has influenced their precise changes, particularly in a regional context.

8.1 Patterns of Fertility

According to Table 8.2, declining mortality and sustained high fertility have been the main determinants of population growth in Libya during 1958-66, as in other Middle Eastern countries. With a registered birth rate of about 25 per 1,000 persons, nearly two-thirds of the net annual population growth could be attributed to natural increase, the remaining one-third being due to net immigration. The plausibility of the official population growth rate is questionable.

As yet Libya does not have a complete system of birth and death registration. Available statistics relating to Municipal and Mutassarrifia districts reveal much variation in both time and space. Between 1964 and 1965, for instance, the Libyan birth rate apparently rose from 25 to 30 per 1,000 persons,[2] while 1964 crude birth rates by Muqataa regions ranged from 13 to 32 per 1,000 persons. If accurate, the published Libyan rates would compare with the more developed countries of the world, thereby alienating Libya from its cultural and social North African setting.

8.1.1 Fertility of Citizen Population

Two sample surveys, taken in 1950 and 1963 respectively, give more precision to the pattern of fertility in Libya. A United Nations survey,[3] undertaken in 1950 as a preliminary to Libya's first population census in 1954, sampled 3,000 settled and semi-nomadic tribesmen. The survey covered approximately three per cent of the indigenous population in Zawia Mudiriah, a coastal area west of Tripoli. The evidence suggested gross live birth rates of 56 per 1,000 settled persons and 64 per 1,000 semi-nomadic persons, giving a weighted national average of 53 per 1,000 total population. Although these rates appeared high, they compared with other North African estimates for the same period (i.e. Algeria 42; Morocco 47; Egypt 57). Moreover, a United Nations calculation based on the reverse-survival method of the 1954 population census revealed a birth rate between 37 to 40 per 1,000 total population.[4] Bearing in mind the possible underenumeration of children under five years of age in the 1954 populsation census* the sample-survey rate of 53 per 1,000 appears feasible for 1950.

A demographic analysis of Benghazi city in 1964[5] provides a comparison of crude birth rates with 1950 estimates, and also gives an indication of fertility patterns in Libya's urban areas. Fifteen of Benghazi's districts, known as "Mahallat" were typified by numbers of citizens, total population, and number of deliveries and deaths during 1962-64. Six Mahallat were chosen for intensive study because of the accuracy of registration and the "closed" nature of the population, i.e. there was little net migration. The number of deliveries to 1,000 registered population gave a crude birth rate of 58 in 1963 and 54 in 1964. Despite the apparent

*The total citizen population in 1954 aged 0-3 years revealed: under one year 31,045; one year 22,167; two years 35,452; and three years 32,460.

stability of the birth rate between 1950 and 1964, together with the high urban level, the figures are likely to be representative of the situation. Firstly, the rates are consistent with recorded birth rates in other Middle Eastern countries in the 1960's (Table 8.2). Secondly, accurate registration of both total population and the total number of deliveries was likely because of the accessibility of the six urban Mahallat. Thirdly, lack of registration of the few premature cases of death (i.e. immediately after delivery) would tend to raise rather than lower the birth rate. Finally, the sex ratio of 105 male deliveries per 100 female births proved authentic. It appeared, therefore, that the crude birth rate had remained relatively stable since Libyan independence.

The two sample surveys also suggested that similar fertility patterns prevailed in both urban and rural areas. The association between urban life and low fertility, however, has been observed so frequently that urbanization has seriously been suggested as a means to population control. In addition, an entire theory concerning the "changing functions of the family" has been formulated to explain the decline in fertility associated with urbanization.[6] It is therefore particularly significant that in Libya, urban and rural fertility patterns appeared to remain substantially the same during the period of rapid economic change in the country.

Some indication of changing fertility patterns in urban and rural areas is indicated by relating the number of children under five years to women of child-bearing ages; this is known as the fertility ratio. In 1954 the fertility ratio of the total Libyan population was below that in neighbouring countries in the mid-1950's. By 1964, however, the ratio had risen twenty per cent and was higher than the ratio in Algeria, Morocco and Egypt. Internal, adjustments also indicated changing regional patterns (Table 8.3). In 1954 urban and rural fertility ratios were similar, with Tripoli Mutassarrifia slightly below the rural average. By 1964, however, Libyan citizen rates had risen thirty per cent, and both the urban areas of Tripoli and Benghazi indicated higher fertility ratios than rural areas. Further evidence

relating to internal Libyan fertility changes (Table 25, Appendix C) showed that in 1954 rural areas had the highest ratios. Areas with particularly high values were the eastern coast and Gebel Mutassarrifia of Tripolitania, and the Gebel Akhdar of Cyrenaica. In short, areas with a large proportion of their population classified semi-nomadic and nomadic in 1954 had high fertility ratios. Evidence from the United Nations sample survey in 1950 supported this theory. By 1964, however, Mutassarrifia with marked fertility ratios above the national average had changed towards urban centres, i.e. Tripoli, its neighbouring regions of Suk el Giuma and Zawia, Benghazi, Beida and Sebha (Table 25, Appendix C).

Table 8.3 Urban-Rural Fertility Ratios, 1954 - 1964

(fertility ratio = children under five years ÷ number of married, divorced and widowed women)

Year	URBAN (A) Tripoli		URBAN (B) Benghazi		RURAL Total Libyan - A & B	
	Citizen	Alien	Citizen	Alien	Citizen	Alien
1954	----- 54.1 -----		----57.3 ---		----- 57.0 ----	
1964	90.9	44.1	85.3	52.4	73.7	58.0

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya General Population Census, 1964, Tripoli, (1966).

The movement of this crude fertility variable in time and space appears, at first, diametrically opposed to the expected fertility decline associated with economic and social development. Part of the reason may lie in the changing marital status of the citizen population. The incidence of early marriages increased between 1954 and 1964 despite the delayed entrance of school-leavers into the labour force. The increase in numbers of early marriages (from 15,300 marriages of under twenty year olds in 1954

to 28, 400 in 1964) occurred without any significant change in the ratio of male and female marriages of under twenty-year olds, which remained approximately 1 to 4.

Nevertheless, the apparent increased fertility ratios between 1954 and 1964 are difficult to reconcile with the high and stable birth rates. Two proximate causes would seem to have influenced the changes in Libyan fertility. Firstly, the large volume of rural to urban migration of young persons (identified in Chapter VI) may acoount for the differential fertility ratios in Libyan Mutassarrifia regions. Yet the overall increase in national fertility ratios cannot be explained purely in terms of net migration to Libya. Secondly, both the national and internal changes are likely to have been influenced by a decrease in child mortality. While the sample surveys of 1950 and 1964 indicated stable conditions of high birth rates (i.e. children under one year in relation to total population), the fertility ratios marked a probable decrease in mortality of children under five years. This would give an impression of increasing fertility, rather than a stable high fertility and a changing mortality variable.

It would seem that there were few inducements to women to practise some form of birth control. Even the rapid increase in female education, from 5, 000 in 1965 to 40, 000 in 1967, failed to erode traditional fertility attitudes. This was probably caused by the large increase in primary education for girls aged under ten years, rather than for women of child-bearing ages. Nor did the increase in female citizen employment, particularly in the modern economic sector, appear to deter women from increased pregnancy. In fact, generous family allowances and the lack of many family planning centres may have actually encouraged an increase in citizen fertility levels. Whatever the precise causes, the alternative benefits of decreased cost and inconvenience to pregnant and child-bearing women had little attraction to either urban or rural citizens between 1954 and 1964.

8.1.2 Fertility of the Alien Population

The foreign population is numerically small and localized, and contrasts in its demographic composition from the citizen population. These differences may in part have caused the alien urban fertility ratio to decline during 1954-64, while the rural ratios remained constant (Table 8.3). This tendency was already notice in Egypt[7] and the Lebanon[8] where a cultural dualism, represented by an urban-rural gradient, was evident in the fertility data. In both countries, Christian sub-cultures, chiefly Maronite in the Lebanon, and Coptic in Egypt, have participated more fully in the fertility decline than have the Moslem sub-cultures of the two countries. The general explanation is that Maronites and Copts have also participated more fully in Western commercial and cultural life than have the Moslems. There remains, moreover, a difference between Christains and Moslems within the same socio-economic classes, which suggests that there is more resistance to fertility change among Moslems than Christians when similarly exposed to the modernizing processes. Continued participation of both citizen men and women in the urban socio-economic sector may ultimately weaken the traditional Libyan fertility patterns.

The total picture contrasts the citizen population with the alien, essentially urban, community. Despite the increasing importance of citizens in urban centres, increased education and income has not yet influenced a marked fertility reduction of the citizen population. Family allowances, changing marital status, internal migration, and, significantly, reduced child mortality, appear to have been responsible for the increasing national and regional fertility rates and the high, stable birth rates.

8.2 General Mortality Differentials

The maintenance of a high, stable birth rate during 1954-64 implies that the large rate of population growth was due either to significant net immigration or to a marked decline in mortality. Low immigration

(Chapter VI) and rising fertility ratios suggests that a decline in mortality was the proximate cause of population growth.

Published mortality statistics indicated a drop from 42 to 5 deaths per 1,000 population between 1953[9] and 1965;[10] a feasible but highly unlikely situation. It is possible for a population with a youthful age structure which succeeds in reducing infant mortality to achieve a low overall mortality rate. Kuwait, for instance, had a crude death rate of 7.3 per 1,000 citizens in 1965;[11] this low death rate being a function of universal access to free hospital and medical treatment. Other evidence for Libya, however, indicates neither such a wide distribution of medical facilities, nor such a sharp reduction in overall mortality rates as suggested in published statistics.

Notification and registration of deaths are incomplete and, in fact, are less effective than births. In 1965, regional mortality rates ranged from 32 per 1,000 in Gebel Akhdar to 67 per 1,000 in Benghazi Muqataa, giving a total rate for northern Libya of 46 per 1,000 total population. These rates not only indicate an improbably large decline since the early 1950's, but they also appear to be far below crude death rates for other North African countries. A recent paper prepared by the Economic Commission for Africa[12] includes estimates of crude death rates per 1,000 persons as follows: Egypt (U.A.R.) 21; Sudan 20-25; Morocco 19; and Tunisia 26, all significantly higher than the United Nations estimates included in Table 8.2.

It is certain that the general Libyan mortality rate did not remain stable during the period of rapid economic change. Fluctuations caused by droughts and epidemics were matched by better nutrition, improved obstetrical care, and prevention, control or cure of certain diseases. Evidence from a variety of sources (Table 8.4) would suggest that crude mortality rates decreased from about 35 to 26 per 1,000 total population between 1954 and 1964. Regionally, the urban mortality rates appeared to have been

below the rural rates in both 1954 and 1964, although the amount of change was greater in rural areas.

Table 8.4 Patterns of Urban and Rural Mortality, 1954-64.

Measures of Mortality	Urban[1]				Rural	
	Tripoli		Benghazi			
	1954	1964	1954	1964	1954	1964
Crude Death Rate (per 1,000 total population)	22	19	26	21	35	26
Infant Mortality (per 1,000 live births)	370	200	310	120	400	300
Stillbirths (per 1,000 live births)	134[2]	99[3]	NA	NA	NA	NA

1 Municipalities; 2 1958; 3 1960; NA not available.

Sources: (a) Nielson, J. Report on a visit to Libya, 1961, W.H.O., Tripoli, (1961), p. 4.

(b) United Nations. Report Series 5, A.A.C. 32. Council, R.167, (1951).

(c) Ministry of Health, Libya. Vital and Health Statistics 1965, Tripoli, (1967).

(d) Ministry of National Economy (and Trade), Libya. General Population Census 1954 (1964), Tripoli, (1959, 1966).

8.2.1 Mortality by Age and Sex

No data is regularly published in Libya relating to the numbers of deaths. A sample of 20,000 male and female patients in government hospitals in 1954 indicated a crude death rate of 43 per 1,000 males and 29 per 1,000 females in 1954.[13] The difference between the two fatality rates was attributed to the large number of delivery cases treated which had a fatality rate of only 3.2 per 1,000 persons. Thus, ignoring the delivery cases, the female mortality rate was nearly 40 per 1,000.

The commonest age of patients who died in government hospitals in 1954 was the under one year age group, representing 18 per cent of the total deaths. The lowest death rate occurred in the 10-19 age group. While the selective intake of these hospitals make comparisons at later dates tenuous, a similar mortality pattern was apparent in 1965. A sample of 4,000 persons in Mudiriah districts indicated that registered deaths under one year of age accounted for 32 per cent of the total, and those aged 1 - 4 years a further 18 per cent. The lowest mortality rate was in the age group 5-14 years. Estimates of infant and child mortality were very much in excess of more advanced countries, whereas, deaths in later years were only slightly higher in Libya.

8.2.2 Infant and Child Mortality

Health experts in Libya emphasize that an infant mortality rate of 300 per 1,000 live births was probable in 1965. Indeed, Libyan statistics for 1952 indicated a rate of 450 per 1,000 live births.

With such an infant mortality rate, the birth rate could hardly have prevented the population from declining even with very low mortality rates in other age groups. A sample survey of 1,000 patients attending maternal child centres in the Zawia and Suk el Giuma districts in 1959 showed a rate of 400 per 1,000 live births.[14] Therefore, there appears to have been some decline in the Libyan infant mortality rates between 1952 and 1965. Evidence in Table 8.3 suggests that while there was little difference in urban and

rural conditions in 1954, urban rates were substantially below rural rates in 1964.

Libyan cities were notoriously unhealthy environments in the late 19th century. High urban population densities and poor sanitary and medical facilities made the urban areas as vulnerable to the quarantinable diseases as rural areas. The plague was particularly active in causing high mortality particularly of infants. In 1816, for instance, the population of Derna decreased from 5,000 to 500 within the town boundaries.[15] Effective action by the Italians later controlled the disease, especially in urban areas. Smallpox remained a minor Libyan disease, although it increased with improved traffic routes, the growth of population, and its concentration in large settlements. Systematic vaccination since 1945 overcame a sustained outbreak lasting from 1944 to 1948, corresponding with a smallpox outbreak in Egypt. The Italians also cut down serious epidemics of typhus, which was probably brought into Libya by pilgrims travelling from Tunisia to Mecca on foot. The use of DDT in the late 1950's completed its eradication. Libya seems to have been spared the great North African cholera epidemic of 1892. The threat of cholera in urban areas died out with the fundamentally improved hygiene conditions introduced by the Italians.

Recent rural-urban migrations have impeded a decline in urban infant mortality. Relief of population pressure in rural areas was matched by increasing urban population pressure, particularly in the shanty settlements. At present, infant mortality is much higher amongst babies being delivered at home and outside the towns; about 98 per cent of the Libyan births are still delivered at home. Infections due to unclean obstetric practices and to the ignorance of domestic midwives account for many still-births and significant maternal and perinatal mortality. In a sample survey by Föllmer[16] all prematurely born children died as a result of inadequate care; 20 per cent of the births to mothers under 20 years of age were premature. Even in hospitals, the mortality of mother and children during

obstertrics is higher in Libya than in more developed countries. However, the high value attached to maternal health results in only slightly higher maternal mortality, though much higher infant and child mortality than equivalent rates in Germany (Table 8.5).

Table 8.5 Measures of Infant Mortality

Country	Maternal Mortality	Stillbirths	Perinatal Mortality
Libya (1962)	2.6%	31.0%	108.3%
Germany (1958)	1.2%	16.4%	21.1%

Source: Föllmer, von W., and Bracale, R. "Geburt and Geburtskamplikationen bei jungen Muttern eines Entwicklungslandes". Geburtshilfe und Frauenheilkunde, (January 1964), pp.40-50.

While respiratory infections during the first six months of life are responsible for the bulk of the infant mortality, deaths thereafter are due mostly to intestinal causes. Birth trauma and tetanus of the umbilical cord are substantial causes of death in the country as a whole. Excessive breast feeding with no supplementary feeding cause malnutrition before weaning usually between 1-2 years of age. Children are fed immediately with adult diet and no special care is taken in its preparation; nor is it safeguarded from contamination. Indigestible food results in diarrhoea, vomiting and dyspepsia. This explains the inadequate weight increase of infants, their protein deficiency, and their reduced resistance against disease. The main causes of high infant mortality are summarized in Table 8.6.

Correlation co-efficients of illiteracy and cause of disabilities in the 28 Libyan Mutassarrifia regions suggest that lack of prenatal care of children may have been more significant than post-natal care in causing disabilities in the population. A significant association was formed between

Table 8.6 Causes of Infant Mortality

(a) Causes of death for children under 1 year of age by:-

Tetanus	Nutritional	Measles	Premature Birth	Enteritis Dyspepsia	Other Causes
27%	17%	14%	12%	12%	18%

(b) Causes of death for children older than 1 year of age by:

Intestinal	Other Infections	Nutrititional	Other Causes
37%	36%	7%	20%

Source: Jusatz, H. J. (Ed.) Libyen-Libya, Springer-Verlag, Heidelberg, (1967), p.145.

illiteracy and a high proportion of disabilities caused by birth. Although significantly associated with high educational qualifications, however, urban regions failed to show a smaller proportion of disabilities than rural areas. Thus, education did not appear to eradicate the high proportion of disabilities caused by birth.

It has been estimated that 5,000 Libyan children die each year from infantile gastro-enteritis, mainly in the larger settlements during June to September. Eye infections, transmitted by dust and flies are also often fatal with small children. Endemic measles and whooping cough are other serious diseases which, complicated by pneumonia, kill a large number of children, especially below two years of age. Estimates of 50 per cent mortality of children aged 6 months to 5 years have been made.[17]

8.2.3 Disease Occurrence and Distribution

Increased mortality after 15 years of age in Libya parallels conditions in more developed countries. The determinants governing the general health of the population have been responsible for this level and trend in mortality. The large scale of the country, the long distance between individual settlements, and the difficulties of communications have not encouraged the rapid spread of epidemics. On the other hand, healthy environmental conditions have been impaired by endemic diseases. Three major types have been identified;[18] first, "nestling epidemic diseases" which are at home in the region independent of man, and transmitted to man by insects, water and/or foodstuffs; second, "shifting epidemics" which are exported and spread by man or animal, and which can cover large areas; and third, diseases associated with poor standards of hygiene.

(i) It is known that there is a dependence between malaria and "nestling epidemic" conditions. Malaria occurs everywhere in Libya, although the rate of infection has changed radically since the 17th century. Water must be present at particular times in spring for breeding and carrier sources. Individual species have adapted to stagnant and running water, fresh and brackish water, and sunlight and shade. Coastal areas with spring rainfall, high temperatures, stagnant water, and protective vegetation provide flourishing mosquitoe areas. The Tripolitanian coast around Tripoli and Tauorgha, Benghazi, and the Fezzan oases have been the main centres for potential and actual malaria outbreaks.

Bilharziasis is another endemic disease greatly dependent on physical environmental conditions. The Fezzan contains the most favourable elements for the spread of the disease. Here the molluscs live in open wells, irrigation trenches, and artesian wells. The infected population, and above all the children, continue to pollute the water, thereby spreading the disease. The Tripolitanian coast has always been endangered, formerly

by caravans which used to rest near the swamps at Ain Zara (since drained) and at present by migrants from the Fezzan living in the urban shanty towns.

(ii) Geomedical conditions in Libya enable shifting epidemics to cover large areas. Insufficient hygiene among the nomads of Cyrenaica and the Fezzan has enabled cases of typhus caused by rickeltsiae to spread from small epidemic outbreaks. Lice as well as ticks also spread borreliae which cause relapsing fever. Transitional areas of arid climatic zones and desert oases are also permanent foci for the spirochaetosis. Transmission via ticks, rodents and nomads accounted for the advance of disease from the Fezzan to Tunisia and Algeria during 1942-44.

The plague was also a shifting epidemic. Imported into Libya from overseas and by land routes, epidemics originated particularly in towns and ports and were transmitted via infected rats, fleas and semi-nomads to the rodent fauna of the steppe and semi-desert. This led to the infection of large rural areas. The urban epidemic in Egypt from 1917-22 is said to have been imported by caravans from Benghazi with fleas transferring the disease.[19] There does not seem to have been an overland connection between the Tripolitanian and Cyrenaican foci. Fleas as well as their larvae are very sensitive to extreme aridity and require a certain degree of humidity to flourish. The Sirte areas seem to present a border zone for the fleas advancing either along the coastal zone or south to the Fezzan. As motor vehicles increase in numbers, however, this desert boundary may be less effective and fleas may once more spread shifting epidemics.

(iii) Conditioned by the cultures of various communities are diseases associated with low standards of hygiene. Bacterial eye diseases and trachoma may serve as examples. The former are especially widespread in the desert oases where high summer temperatures and stagnant water encourage flies to proliferate. Particularly dangerous is autumnal conjunctivitis at the time of the date harvest, and kevato conjunctivitis in connection with malnutrition.

Pollution and infection of the soil by inadequate sewage disposal, together with high temperatures, speed-up the development of worm eggs. These often pass into humans by way of drinking water and foodstuffs, leading to further spread of dysentery and typhoid bacteria in the irrigated oases.

Much is being done to eradicate these diseases. A Malaria Eradication Programme was launched in 1958, while mobile units carry out the fight against bilharziasis and trachoma, directed by the Epidemiology Centre for Trachoma. Teachers are being trained in the uses of hygiene, and maternal and child centres are being established in most large centres. However, many diseases which are easy to eradicate are still rampant, particularly tuberculosis, measles, whooping cough, amebiasis, enteritis and trachoma. Other ailments common to more developed countries also incapacitate and kill. Two broad types of disease and sickness have a particular bearing on population and economic growth; first, the diseases which are responsible for the high infant mortality and which, in Libya's youthful age structure, are a key element to population growth; and second, the diseases which intensify sickness, remove people from the labour force, and lessen their ability to concentrate on work. The quality of health in the Libyan population is as significant for further economic growth as the total numbers in the population.

8.2.3 Medical Facilities

Prior to the occupation of Libya by the Italians, rudimentary measures of hygiene were few, being confined to Tripoli and places with Turkish garrisons. The Italians were therefore faced with the fight against infectious diseases, the establishment of urban sanitation, and the erection of modern hospitals. In Tripoli civil and military organizations worked together to control traffic from the interior and to establish medical centres in Suk el Giuma and Gargaresc. The lack of serious epidemic outbreaks in Libya after 1912 can be partly attributed to a legacy of medical,

sanitary and water facilities constructed by the Italians, even though most facilities were initially aimed at serving the Italian population.

Although rudimentary improvements in health facilities were made after 1945, particularly repairs to damaged sewers, it was not until the 1960's that deep drainage and the expansion of sewage, medical and water facilities were undertaken. Despite the inevitable concentration of medical facilities in Tripoli and Benghazi, the Libyan government has succeeded in establishing a wide distribution of scarce medical resources in relation to population (Table 26, Appendix C).

The number of persons per hospital did not show any marked regional pattern in 1966. The proportion of persons per one hospital indicate that Tripoli and Benghazi Muqataa had more persons per hospital than the national average. The number of hospital beds, however, emphasized that Tripoli and rural Cyrenaica were better served per person than the rest of the country. Concentration of specialist facilities in Tripoli and the establishment of hospitals at Derna, Marj, Tobruk, Messa and Agedabia accounted for the regional ratios. The rural areas of Tripolitania fared worst with only one-sixth the number of beds per person as the provincial capital. Other health establishments and para-medical personnel were well distributed throughout the country, although rural Tripolitania showed deficiencies per person below the national average. Tripoli and Benghazi had by far the highest ratio of doctors per patient, indicating the common tendency for specialists to concentrate in urban areas.

8.2.4 Nutrition

Evidence of calory intake in Libya suggests that the rural population has adjusted to a restricted food intake, both in a physiological and social sense. Calory requirements of individuals depend on physical activity, body size and composition, age, and climatic environments. Under normal conditions a man, medium aged, healthy and engaged in occupational work,

needs at an average approximately 3,200 calories per day, with a range from 2,400 to 4,000 depending upon the degree of his physical activity. The necessary intake for women and children is generally less, although the actual amount depends on their age, other things being equal.

However, there are numerous individuals whose food intake is below this scale of calorie requirements. In 1959, for instance, an average 2,182 calories were consumed per head per day in Libya.[20] To some extent, physiological adjustment has taken place in the form of a low body weight and a low basal metabolic rate (referring to the organism in the fasting and resting state when it uses just enough energy to maintain vital cellular activity, respiration and circulation). Social adjustment has been even more important in Libya. The whole manner of life is adapted to an insufficient supply of calories, resulting in lack of drive and initiative, avoidance of physical and mental effort, and excessive rest.

The quantity of food has not been the major nutritional problem in Libya. The value of domestic agricultural production almost doubled during 1958-65. The value of foreign food and live animal imports increased fivefold since 1950, and in 1965 formed half of the value of domestic agricultural production. The improvements in communications and the increasing concentration of population in urban centres has facilitated the distribution of imported foodstuffs to a large section of the population. This advantage has been only partially offset by the increase in price of agricultural produce.

The quality of Libyan foodstuffs, however, reflect certain nutritional deficiencies. In part, this is the result of the physical environment, particularly the susceptibility of agricultural production to droughts and crop failures. However, social customs and the economic structure of the traditional sector have also influenced dietary habits of the Libyan population.

Basically, dietary patterns are simple and monotonous, varying more with socio-economic groups than with geographical regions. More than half the calory intake in 1959 was composed of cereals, 14 per cent each by sugar, milk, fats and oils, and fruits and vegetables, and only two per cent by meat, fish and eggs. The consumption of protective foods (animal foods, beans and nuts, and yellow and green leafy vegetables) is very low. The main foods are barley, wheat, dried dates and figs, onions, tomatoes, red and green peppers, oil and sugar. Wheat and barley are consumed as common bread, unleavened flat bread or other traditional preparations (e.g. "cuscus", "bazin", and "zamitta"). Urban families may use "pasta". Millet, rice and maize are also used in small quantities. Sugar consumption is high, associated especially with the Libyans' tea consumption. Fresh fruits are not usually consumed, with the exception of water-melons present in the diet of coastal dwellers. Dates and figs constitute important foodstuffs during 7-8 months of the year. Consumption of meat, eggs and fish is low. Poor families may eat meat only four or five times a year, and middle income families only once a week. Only ten per cent of the population were estimated to have an adequate intake of milk, although consumption was higher among pastoral people.

A consumption survey carried out by F.A.O. experts in 1957[21] revealed regional patterns of food intake by economic status and requirements. The calory intake for each group was compared with its requirements, calculated in accordance with the number of persons, and the age and sex structure of the group. The data indicated consumption based on monthly purchases (Table 27, Appendix C). Both sets of figures were similar, although there was some discrepancy in Cyrenaica.

In low-income families, irrespective of geographical location, calorie consumption was always below the calculated requirements. Total protein consumption was also low for this group, except in the Fezzan where the amount was slightly higher. Both animal protein and fat consump-

tion in low-income families were lower than in middle-income families. Calorie and protein consumption of middle-income families generally covered the calculated requirements, except for Suk el Giuma. Consumption of animal protein was low, particularly in the Tripolitanian coastal belt where level of income did not apparently influence consumption.

While food deficiencies may sap the potential efforts of the total population, the infants and pre-school children suffer most. A valuable index of nutrition and health of children was obtained from the maternal and child health centre at Suk el Gima in 1962.[22] Average birth weights of 3,200 gms. corresponded to those in U.S.A. and Italy at equivalent dates. The growth curve of children with increasing age equalled that of the U.S.A. until the age of 3 months, and to that of Italian children until 7 months. The curve declined below the rates of the more developed countries so that at one year of age Libyan children corresponded to U.S. children at 6 months and Italian children at 8 months. The Libyan growth curve then paralleled those of more developed countries, although at a lower level. At any given age after 5 years, the Libyan children and adults showed a lag of 3 years in weight and height. Children in the Fezzan had the poorest physiology, having only three-quarters the height and weight structure of the Cyrenaican children. There was little difference between weight of men and women, although lack of exposure to the sun in part caused women and children to have a higher rate of rickets than men.[23] Malnutrition of children appeared to be higher in the settled rural areas of the Tripolitanian coast and Gebels than in urban centres or the Fezzan oases. Level of income was also inversely related to poor dietary habits. While Libyan health conditions were typical of many developing countries, Cyrenaica had a good general status, followed by Tripolitania and the Fezzan.

8.3 Population Growth 1954 to 1964.

The demographic transition of high population growth which Libya is now experiencing demonstrates the classic situation of reduced mortality

and maintained high fertility. Combined with a net immigration to Libya the intercensal annaul growth rate of 3.65 per cent, although high, is feasible. In view of the small absolute size of the total population any sizeable migration or mortality reduction can significantly influence the population growth. Nevertheless, most experienced statisticians and planners in Libya "feel" that this rate of population increase is too high.

Auble[24] has suggested three possible explanations for the exceedingly high rate of population increase. First, the 1954 Population Census was probably an underenumeration. It was the first census of its kind conducted in the country, * the staff was not adequately trained, and the Libyans were not accustomed to taking part in a census.

Second, the 1964 Population Census was possibly an "overcount". It is possible, for instance, that many people were counted more than once for the following reasons:

(i) Parents might report a grown child away from home as being part of their household, while he at the same time might be included in the census count in another place.

(ii) The Census was taken just before an election and people might have been anxious to be counted more than once so that they would be certain of getting voting rights.

(iii) Under both the Federal system of government with three provinces and the Unitary system with ten Muqataa, grants to the regions and districts depended partly on the size of the population. Local authorities may therefore have been anxious to have the counts as large as possible.

The third possible reason for the high intercensal population increase may have been an illegal immigration between 1954 and 1964. Many Libyans are known to have emigrated to Algeria, Tunisia, Chad, Niger and Egypt,

---

* Apart from the Italian Population Censuses of 1931 and 1936.

particularly during the Italian colonization of the 1930's. Their return in recent years was probably stimulated by the expansion of urban occupational activities.

In order to check these uncertainties and to suggest the probable rate and amount of recent population growth, two hypotheses have been formulated. Both hypotheses present extremes of possible population growth between which the actual rate probably lies. The three most likely variable elements are discussed - possible underenumeration in the 1954 Population Census, age-specific mortality, and net immigration.

The following broad assumptions are made:

(i) The 1964 age group enumeration was accurate.

(ii) The 1954 Population Census was an underenumeration, young age groups and females under 20 years of age being particularly prone to misreporting.

(iii) Immigrants were over 20 years of age and had few children.

(iv) Infant mortality was similar for both sexes, and mortality rates between 20 and 54 years of age in 1964 were between 30 and 40 per 1,000 population.

(v) Enumeration of the population over 55 years of age was accurate in 1964.

If these assumptions are valid, then any increase in numbers in equivalent quinquennial age groups above the expected age-specific mortality during 1954-64 must have been due either to underenumeration in 1954, or to net immigration. Table 28, Appendix C, describes the increase and decrease in quinquennial age groups for both male and female citizens, and summarizes the findings postulated by the two hypotheses.

Hypothesis I maintains a low infant mortality of 150 per 1,000 persons age 0-4 years in 1954. Thus, an apparent excess of 8,400 males for this age group in 1964 indicates an underenumeration of about 20,000 males in

1954, accepting the five assumptions already mentioned. For females, the underenumeration would have been about 8,000 children. The decrease in the age group 15-19 years in 1964 is assumed accurate. The age-group 20-34 years in 1964 showed excesses of both sexes compared with the equivalent age group in 1954. Assuming a mortality of 2 per cent for this age group (partially validated by section 8.1), the excess must have been due to underenumeration or to net immigration. It is maintained that net immigration of males was likely and that underenumeration of women aged 10-19 years in 1954 was probable. If the male mortality over 35 years of age was similar to the enumerated females in equivalent age groups, then a male increase of 3,000 could be attributed to migration. The resultant total enumeration in the 1954 census would therefore appear to be in the order of 39,000 persons, and net immigration to Libya between 1954 and 1964 about 34,000 persons.

Hypothesis II assumes an infant mortality of 300 per 1,000 male and female citizens aged 0-10 years in 1954; an extreme situation, but one which has been postulated by planning experts.[25] Underenumeration of citizens of both sexes in the age group 0-10 years in 1954 therefore becomes 73,000, while that of women aged 10-19 years in 1954 is slightly less than in Hypothesis I. The resultant underenumeration was ten times more than the 1954 Population Census estimated.[26] Maximum net immigration to Libya during 1954-64 appears to be in the order of 70,000 persons, the majority being males.

Given these two extreme situations of underenumeration and immigration, the postulated range of annual natural increase between 1954 and 1964 is 2.6 to 3.1 per cent (Table 8.7). Both rates are more comparable with natural increase rates in other North African countries. If the birth rate estimate of 45 per 1,000 persons is accurate (and there is little evidence to suggest it was less), the possible range of death rates is 14 to 19 per 1,000, A combination of the two hypotheses, maintaining high infant mortality and

and a low net immigration of 34,000 to Libya, gives a probable natural increase rate of 2.8 per cent per annum.

International migration formed 8 per cent of the population increase postulated by Hypothesis I and 20 per cent by Hypothesis II. Considering the level of officially published net immigration, 14,000 persons between 1957 and 1964,[27] 8 per cent is probably more accurate. However, internal Libyan migration has been a more potent force determining regional population growth. Figures 3.1 to 3.4 graphically indicated the distribution and volume of growth in the Mudiriah districts of northern Libya,

Table 8.7 Natural Increase, Birth and Death Rates for Libyan Citizens, 1954-64

Rates	Hypothesis I (low infant mortality, low immigration	Hypothesis II (high infant mortality & immigration	Hypothesis III (high infant mortality & low immigration
Natural Increase (% per annum)	3.1	2.6	2.8
Crude Birth Rate (per 1,000 citizens)	45	45	45
Crude Death Rate (per 1,000 citizens)	14	19	17

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli (1959), and Ministry of Economy and Trade, Libya. General Population Census 1964. Tripoli (1966)

while Table 29, Appendix C, summarizes the amount and rate of population increase in the 29 Mutassarrifia regions. Estimates of a 2.8 per cent annual natural increase throughout Libya's "urban" Mutassarrifia, defined in Chapter II, indicated that between 45 and 60 per cent of the population increase between 1954 and 1964 was composed of net in-migration. A shift

in the relative importance of migration and natural increase for Libya's urban growth is indicated by the contrasting situations in Tripoli and Benghazi. Over one-half of Tripoli's urban growth during the ten year intercensal period was composed of natural increase, compared with only one-third in Benghazi. Improvements in Tripoli's sanitary and medical facilities probably developed quicker than in Benghazi, while a move towards family migration to Tripoli has been identified. The phenomenon of increasing proportions of urban growth being composed of natural increase has also been identified in Egyptian cities.[28]

8.4 Population Projections

While it is not the aim of this chapter to project the regional populations for the country, some of the implications of an enlarged population in the period up to 1980 are significant. Table 8.8 compares linear and geometric population projections using average annual percentage increases of 2.0, 2.5, 3.0 and 3.5. Even the highest annual growth rate of 3.5 per cent would only give a 70,000 increase in population - small in relation to Egypt's 700,000 annual increment. However, the significance of a Libyan population double its present size in the next 20 to 25 years has serious economic, social, political and geographical implications.

At current rates of growth the population will be about 2 million in 1974. Despite the small size of population relative to other developing countries, the pressure of increasing demands on the existing economic resources and social infrastructure will be serious. Already there is a great demand for houses, schools, hospitals and other non-productive, but vital, facilities. These pressures will be selective, depending on the nature of the population in 1974. If the present fertility and mortality patterns are maintained, about 57 per cent of the population will be composed of children under 15 years of age. The number of familes can be expected to increase at 3.2 per cent per annum, the number of potential mothers at 2.3 per cent, and the number of old people at about 1.0 per cent. Even if current rates

Table 8.8 Linear and Geometric Projections of Libya's Population to 1980 (in millions)

Date	Linear[a]	Geometric At the following annual rate of increase			
		2.0%[b]	2.5%	3.0%	3.5%
1954 (Census)	1.09				
1954 (Census)	1.56	1.56	1.56	1.56	1.56
1966	1.65	1.62	1.64	1.65	1.67
1968	1.75	1.69	1.72	1.76	1.79
1970	1.84	1.76	1.81	1.86	1.92
1972	1.94	1.83	1.90	1.97	2.05
1980	2.31	2.14	2.31	2.51	2.70

(a) 1954 Census was 1,088,889 or 475,480 less than in 1964. Linear method is to add one tenth of the increase (or 47,548) to each succeeding year.

(b) 1965 is 2% more than 1964, 1966 is 2% more than 1965, etc.

are not maintained, those presently alive will present a new demographic pattern in the near future. Thus, if the present rate of mortality is maintained those persons aged 5 to 19 years in 1964 will provide nearly half a million potential persons for the labour force by 1984. This would form a 58 per cent increase over the age group 25 to 39 years in 1964. However the actual workforce in 1984 will be determined partly by the sectoral demands of the economy (especially the participation of women), and partly by the ability of the educational system to delay entry into the workforce.

Regionally, the pattern of the population distribution will reflect continued urbanization. Linear projections of the population indicate that Tripoli and Benghazi will comprise 24.3 per cent of the total population in 1972, compared with 22.4 per cent in 1964. By the geometric projection,

the two cities will compose 26.4 per cent in 1972. Even if internal migration becomes less of a determing factor in urban growth, the large size of the present urban population will continue to grow through natural increase. Consequently, despite differential population growth rates in the Libyan regions, the present pattern of population distribution is likely to remain essentially the same, although with a greater urban concentration (Table 30, Appendix C).

The exact pattern of future population growth is difficult to foresee. At best, the choice for Libya in the next twenty years is between very rapid growth and moderately rapid growth in population. Government control of further immigration may lessen the present slight increase through net immigration. Mortality rates appear to have been reduced from 30 to 20 per 1,000 persons between 1954 and 1964. A continued reduction is likely considering the expansion of medical facilities, the increase in educatio for women, better nutrition and personal hygiene, government housing scheme and improved sanitary conditions.

Yet no reduction in fertility seems to have occurred amongst Libyan citizens, either in rural or urban areas. The beginning of a decline, associated with increasing education, overcrowding and changing traditional values, is likely to occur first in the top socio-economic groups in urban areas, as experienced in Egypt, Turkey and the Lebanon. The indications of a decline in fertility of aliens living in Tripoli and Benghazi may be the first signs of a potential change in demographic processes operating in Libya.

A decline in fertility will not only mark a new stage in the country's demographic evolution; it will be a demographic change necessary for continued economic growth. An immediate reduction in fertility would, in the short run, reduce the burden of child dependency that would eventually permit a higher level of investment. According to Coale[29] after 25 to 30 years, reduced dependency would be enhanced by a markedly slower growth of the labour force, making it possible to achieve a faster growth in capital

per worker from any given investment, and making it easier to approach the goal of productive employment for all who need it. The additional gains in per capita income resulting from a 50 per cent reduction in fertility occurring within 25 years would be about 40 per cent in 30 years, giving the same labour force and the same total national income. This last variable may at first sight appear irrelevant to Libya with its annual average increase in gross domestic product of 34 per cent between 1958 and 1965. Yet the base line for measuring rates of growth was so low in 1958, that the country has a large backlog of social and economic investments to maintain.

In sum, a reduction in fertility would make the process of modernization more rapid and more certain. It would accelerate the growth in income, provide more rapidly the possiblity of productive employment for all adults who need jobs, and make the attainment of universal education easier; it would also have the immediate effect of providing the women of Libya some relief from constant pregnancy, parturition and infant care.

References

1. Shorter, F. C. "The Application of Development Hypotheses in Middle Eastern Studies", Economic Development and Cultural Changes, Vol.14, No.3, (April 1966), p.341.
2. Ministry of Economy and Trade, Libya. Statistical Abstract 1965, Tripoli, (1966), p.19.
3. El Shanawany, M. R. The Organisation of the Vital Statistics of Libya, United Nations, Tripoli, (September 1951).
4. United Nations. Demographic Yearbook 1965, New York,(1966).
5. Divo Institut. City of Benghazi School Equipment Program until 1974, Part 1. Frankfurt, (December 1964).
6. Abu-Lughod, J. "Urban-Rural differences as a function of the demographic transition: Egyptian data and an analytical model", American Journal of Sociology, Vo. 69, (1963-64), p.477.
7. Rizh, H. Fertility patterns in Selected Areas in Egypt, Ph.D. dissertation, Princetown University, (1959).
8. Yaukey, D. Fertility Differences in a Modernizing Country: A Survey of Lebanese couples, Princeton University, Princeton, (1961).
9. Higgins, B. The Economic and Social Development of Libya, United Nations, New York,(1953), p.4.
10. Ministry of National Economy and Trade, op. cit., p.20.
11. Annual Abstract of Statistics, 1967. Planning Board, Kuwait, (1968), p.44.
12. Som, R.K. "Some Demographic Indicators for Africa", Economic Bulletin for Africa, Vol.6, (1966), p.13.
13. Ministry of National Economy, Libya. Morbidity Statistics in Government Hospitals 1954, Tripoli, (1955), p.5.
14. Föllmer, V.W. "Die Sauglings - und Kindersterblichkeit und ihre Ursachen in einem Entwicklungsland", Deutsche Medizinische Wochenschrift, No. 45, (1960), pp. 1-12.
15. Jusatz, H. J. (Ed.) Libyen-Libya, Springer-Verlag, Heidelberg, (1967), p.131.
16. ibid, p.144.
17. ibid, p.144.
18. ibid, p.146.
19. ibid, p.148.

20. Kroeller, E. H. Food Balance Sheet for Libya 1959, Ministry of National Economy, Tripoli, (August 1960), p.2.

21. Ferro-Luzzi, G. Report to the Government of Libya on Nutrition, F.A.O., No. 920, Rome, (1958).

22. Yang, Y. H. Food and Nutrition Policy, F.A.O., Rome, (1963).

23. Interdepartment Committee on Nutrition for National Defence. Nutrition Survey of the Armed Forces in Libya, Tripoli, (1957).

24. Auble, A. Technical Problems in Forecasting the Population of Libya, Statistical Paper No. 7, Ministry of Planning and Development, Tripoli, (May 1965), p.6.

25. Divo Institut. op. cit., p.25.

26. Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), p. vii.

27. Ministry of Economy and Trade, Libya. Statistical Abstract 1965, Tripoli, (1966), p.23.

28. Abu-Lughod, J. op.cit., p.480.

29. Coale, A. J. "Population and Economic Development", in P. M. Hauser (Ed.). Population Dilemma, Prentice-Hall, Inc., New Jersey, (1963), pp. 46-69.

CONCLUSION

The aim of this thesis has been to study the interrelationships between the demographic and economic transitions in a specific regional context and in quantitative terms. The major research finding has been the identification of an intermediate stage in the process of demographic transition. This stage is characterized by a geographical and occupational redistribution of the population, preceding and accompanying the initiation of population growth through a decline in mortality. The cause of this increased population mobility is primarily economic although its precise form is also determined by the physical, social and cultural environments. The characteristics of this stage of transition are related to a marked dichotomy between urban and rural areas. Although the difference between the two areas is initially economic, the transformation of a modern economic sector permeates the country's social, cultural and hence demographic structure. The consequent duality in the socio-economic characteristics of the population forms both the means by which further erosion of the traditional economic system takes place, and also an incipient stage for further demographic transition.

Despite the rapidity of the economic transformation (emphasized in Chapter One), Libya's experience cannot be dismissed merely as a unique or exceptional case. Many of the Libyan "deviations" from the normal process of demographic-industrial revolution (outlined in the Introduction) are not capricious but bear a systematic relation to each other and to the historic and cultural context of their appearance. As such, Libya's experience of recent population changes can be placed in a wider context of demographic transition, in which the country's deviations find congruence.

On the basis of the theory of demographic transition and the expanding body of knowledge relating to the dynamics of demographic change, a hypothetical model has been constructed in which specific urban-rural

differentials (or their absence) can be predicted at various stages of the transition.[1] The model presented below is consciously derived from the Egyptian case, although it has been modified by data from other areas.

Beginning with the simplest proposition let it be assumed that: The demographic transition from a preindustrial equilibrium (a function of high birth, crude death, and infant mortality rates leading to a relatively stable, young, and small population) to an industrial equilibrium (a function of relatively low birth rates, very low infant mortality rates, and moderate mortality rates leading to a relatively stable, older and larger population) takes place over time in a given and predictable temporal sequence that affects certain variables before others and certain social and geographical subgroups of the population before others. Therefore, at any particular point in time, observed differences in the characteristics of the urban and rural populations can be explained with reference to the temporal sequence.

A second proposition must be appended if the remaining variations observed in the Libyan case study are to be accounted for, namely: both (a) the technologies of birth and death control extant at the historic epoch during which a country's transition is effected and (b) the cultural-social system of the society undergoing the transition will modify the rates at which specific changes take place and may even lead to minor revisions in the temporal sequence itself. The temporal sequence of the demographic transition, like the growth of the economy, may be summarized in terms of several non-discrete phases.

(a) <u>Preindustrial or Feudal Agrarian</u>

(i) The economy is based upon subsistence agriculture or, if under colonial administration, an exported agricultural surplus, and the total population is therefore "relatively" small.

(ii) Crude birth rates are high and fluctuate little annually. While there may be a relationship between economic status and size of family (due to survival), a gross urban-rural fertility differential is unlikely.

(iii) Crude death rates are high and subject to periodic fluctuations. Because of insanitary conditions, cities usually have much higher mortality rates than rural areas.

(iv) Natural increase is higher in rural than urban areas, and urban growth depends heavily upon continual replenishment through migration. Selective migration leads to marked age and sex differences.

(v) Only a small percentage of the population can reside in cities[2] which serve chiefly as the locus of religious and military power, as central places for a very circumscribed hinterland, and/or as "break-in-bulk" points for wider trade. The urban population consists of a very small élite, a somewhat larger and fairly stable artisan-merchant class, and a massive "floating" population, unskilled and of rural origin. The last group is culturally undifferentiated from the peasant class except in terms of temporary place of residence.

(vi) There is little dominance of the cities over the hinterlands except in tax and conscription matters. Cultural values of the urban élite - including those affecting fertlity and mortality - are transmitted neither to the urban proletariat nor to the peasants.

(b) Early Transition

(i) The first variable affected when a society begins the demographic transition (which need not necessarily coincide with economic reorganization) is mortality. At least two major periods can be distinguished: first, moderately rapid decreases in mortality, are achieved through advances in epidemic control, public health regulations, and environmental sanitation. Both urban and rural mortality rates decline, the latter earlier but more gradually than the former. The decline in mortality is associated more with the imposition of death-control technology than through indigenous development. Second, mortality rates fall rapidly in response to widespread use of antibiotics. The decline is probably faster in urban than rural areas. Depending upon the pre-existing gap between urban and rural mortality rates

and upon the extent of urban-rural diffusion, the mortality differential may disappear.

(ii) Fertility rates remain constant. The lack of a noticeable urban-rural fertility differential persists.

(iii) The "population explosion" experienced at this stage results from the progressively larger gap between stable fertility and declining mortality. Whether this explosion is more marked in urban or rural areas is totally dependent upon the direction and degree of mortality differential.

(iv) The pressures created by the population increase can be relieved through emigration, premature rural-urban migration, or land expansion through reclamation of marginal territory. Where only rural-urban migration takes place, the time lag between premature urbanization and commensurate industrial development may be great.

(v) Since much of the pressure is relieved through migration from rural to urban areas, rather marked differences between the age and sex compositions appear. Selective migration on a large scale modifies the age and sex structures of both sending and receiving areas. The specific differentials that determine the degree and consistency of migration depend on the geographical and cultural patterns of each country. Most countries develop uniform age differentials since in all countries youth tend to be more mobile than middle age. With respect to sex ratios, on the other hand, cultural attitudes toward and opportunities for employment of women outside the home are the key variables affecting urban-rural sex ratios.

(c) Industrialization and the Transition Proper.

Once the economy has passed the "taking-off" point and the processes of industrialization have become firmly and irreversibly established, hitherto inert variables begin to change.

(i) A decline in fertility appears but is not distributed at random in society. It begins with certain socio-economic and cultural groups and diffuses according to a fairly predictable sequence. As in the case of mortality several epochs in the technology of birth control distinguish the

decline in fertility. Newly developing countries may be able to reduce birth rates as effectively and quickly as the reduction in death rates.

(ii) Fertility reduction occurs first in the urban groups at the higher end of the socio-economic scale and spreads to smaller towns, low-income groups, and eventually to rural areas.

(iii) The simultaneous urbanization of the country exaggerates the urban-rural differentials created by the sequence of fertility decline. Urbanization serves to increase membership in classes likely to be experiencing a fertility decline, while it reduces membership in those classes least affected by the new fertility patterns.

(iv) During the period of "incipient" industrialization, the urban population may expand to include one-fifth or more of the total without any alteration in the role of cities in the economy. Urban growth results more from pressures expelling people from rural areas than from urban opportunities attracting them. Once industrialization becomes established, however, urban growth attains a self-propelling momentum of economic viability.

(v) There is an increase in the percentage of labour force engaged in urban-type occupations and thus an increase in the number of persons "exposed" to conditions and values favouring lowered fertility.

(vi) Proliferation of the transport and communication networks prerequisite to industrial growth, results in a radical expansion in the city's sphere of influence. There is an increased capacity of the city to affect economic and social conditions in an ever widening hinterland.

It is significant that the changing role of cities in the national economy and the increase in urban occupations tend to increase the demographic contrast between urban and rural areas. At the same time, the extension of the urban sphere of influence tends, in the long run, to destroy it. In contrast to the history of urbanization occurring in much of the Western world, countries undergoing the transition are currently experiencing all three processes simultaneously. This may prevent the emergence of an extreme

urban-rural contrast in developing countries.

(vii) The process of urban-rural coalescence reduces the fertility differential, resulting in moderate population growth for the country as a whole.

Libya's recent demographic and economic evolutions indicate similar stages of change, though with different rates of change for the two transitions. Thus, the major "deviation" from the model of demographic transition appears to be in the time lag between economic growth and demographic response. Libya's stage of economic development indicates the characteristics of "take-off", where urban growth and non-agricultural occupations are beginning to dominate the national economic structure. Yet the resultant demographic conditions are not those of the transition proper. The country's population structure and trends appear characteristic of the early transition. Part of the reason lies in the nature of the economic growth itself, and part in the structure of the population.

It is the nature of Libya's early transition that the major deviations occur from the hypothetical model. Four significant differences exist. First, the regional distributions highlighted in Chapter Two indicate that the urban-rural dichotomy is similar for both the demographic and economic systems. This suggests that the Libyan economic transition has not reached the mature stage of "take-off" which the level of urbanization would imply. Second, this dichotomy has widened despite a geographical and occupational redistribution of the population through internal migration in response to the growth of a modern economic sector. Thus, urbanization has occurred earlier in Libya than the hypothetical model stipulated, mainly because the growth of the modern economic sector has been associated with tertiary economic activities unrelated to the indigenous economy. Third, the small absolute size of the coastal towns and the rapid economic development within them enabled mortality to be reduced first in the urban centres and not, as the model suggests, in the rural areas. This emphasizes that the

demographic transition, like the economic growth, occurred through the urban, essentially modern, economic system. Finally, the growth of a dominant tertiary economic sector has attracted migrants from the rural areas. This occurred prior to and accompanying the mortality decline which has resulted in a marked population growth. Thus, "pull" factors in urban areas were as important as "push" factors in rural areas in determining the level of migration, rather than the dominance of population pressure suggested by the model.

Both Libya's similarities to and deviations from the hypothetical model have been determined in part by its geographical anatomy. Thus, the large scale of the country, its location as a zone of transition, the small absolute size of its population, its meagre resource base, the strength of the Muslim culture and the low level of indigenous technology have combined to set quantitative and qualitative limits on the direction and rate of population and economic change. This amalgam of conditions has produced a national distinctiveness within a wider context of association with other rapidly developing countries.

The basis for further demographic and economic changes has been laid. Just as the preconditions for sustained economic growth have been achieved, so the decline in mortality, initiated by economic development, marks the incipient stage of the demographic transition. Yet no analogous reduction in fertility has occurred. While continued economic growth may provide Libya with a breathing spell, it seems implausible that the country could afford continued high fertility. Since the economic advantages of a reduction in fertility are cumulative, the ultimate benefits are greater, the sooner it occurs. Moreover, a decline in fertility depends on the alteration of long-established customs and institutions. Thus, economic growth by itself, even if allowed by the population structure, could not guarantee the consequent stability of population growth. As such, Libya's economic growth remains a necessary but not sufficient condition for the country's rapid pace of modernization.

References

1. Cowgill, D. "Transition Theory as a General Population Theory", Social Forces, (March, 1963), pp. 270-74, and Abu-Lughod, J. "Urban-Rural Differences as a Function of the Demographic Transition : Egyptian Data and an Analytical Model", American Journal of Sociology, Vol. 69, (1963-4), pp. 484-90.

2. Sjoberg, G. The Preindustrial City, Glencoe, I..ll., Free Press, (1960), and Lampard, E. "The History of Cities in the Economically Advanced Areas," Economic Development and Cultural Change, Vol. 3, (Jan 1955), pp. 81-136.

APPENDIX A

DEMOGRAPHIC MATERIAL AND SOURCES

1. Census Material

(a) The first population census of Libya was undertaken in 1931 by the Italian "Instituto Centrale Di Statistica". Three kinds of schedules were used. The first, calling for a complete listing of data for each individual, was used only for Italians and contained the largest amount of detail. The other two schedules were used for the enumeration of Libyan citizens. One provided for a separate listing of each member of the family; the other, collective information for each family without any identification of individuals. As many of the native population had only first names, identification was difficult. Also, it was not possible to check efficiently for underenumeration or repeated counting of the same individual, even where records of individuals were obtainable. Combined with the prevailing anxiety and unrest under Italian rule, and the lack of familiarity with census enumerations, considerabl inaccuracy is likely. The total "de facto" population according to this census was 543, 672 for Tripolitania and 160, 451 for Cyrenaica.

(b) The second population census was also carried out by the Italians five years later in 1936. In this census both schedules for Italians and Libyans uniformly called for a listing of information by individuals. Other improvements consisted of a statement of name, father's name, and surname of each person to establish his or her identity as a basis for later review. Where religious registers were available, as in Tripoli, Benghazi and Marj, they provided checks on the census coverage. Moreover, the cities were divided into sectors, communities into wards, and the rest of the country into district corresponding to the localities inhabited by the various tribes. Each division was assigned to the local administrative authority for the execution of the census, and each was supervised by a tribal chief who co-operated with the native population.

The improvements in organization and implementation enabled more details to be collected than in 1931. There was a breakdown of the Libyan population by nomads, semi-nomads and settled, and by age, sex, religion, language, race, marital status, and economic activity. This allowed a direct comparison with the 1936 resident Italian population for the first time.

The application of "de jure" criteria may have facilitated the task of enumeration in urban areas, but it created a number of problems. First, it hindered comparisons with the 1931 census. Second, persons temporarily present in the districts were not counted, irrespective of the duration of their stay or the distance from their usual residence. Third, for the nomads who had no definite residence, an exact location of residence was impossible to identify, possibly resulting in double counting. Certainly, the choice of April as the census month was a bad one, considering the seasonal movements of a large segment of the population.

Source: Instituto Centrale di Statistica VIII Censimento generale della popazione, 21 Aprile 1936-XIV Vol. 5, Rome, (1939).

(c) The taking of a general population census for the whole country in 1954 was the first step towards the development of a vital statistics system and served as a framework for other socio-economic surveys. Not least was the need for population statistics for the general elections planned under the new 1951 Constitution.

The necessary legislation for the census was formulated in the Statistical Law of 1953. The existing administrative machinery, based on local "mudirs" and "sheikhs", was fully utilized, although advisory committees under the U.N. Technical Assistance Scheme directed the census operations.

Four considerations weighed with the advisory committee in framing the census questionnaire: First, it was considered essential that the

completed questionnaire would serve as the starting point for the development of a vital statistics registration system in the country. Second, one set of questionnaires was used for the entire population. Third, information sought was restricted to those socio-economic attributes of immediate interest to the State. Fourth, individual identity was checked.

It was arranged to enumerate the town-dwellers and settled people in two days, beginning on 31st July. For the nomadic people, however, the enumeration period was extended over three months owing to the wide scatter of the population and inadequate means of transport. In practice, census registers were kept open for an extra ten weeks in isolated areas.

Despite widespread publicity and the new administrative machinery, two major factors handicapped the census organization. First, there had been no cadastral survey of Libya and no maps indicated precise boundaries of tribes (cabila), districts or even provinces. Second, the problems of inaccessiblity delayed the quick completion of the census enumeration. This probably resulted in double counting of nomadic tribes and the omission of babies born in the five months after the initiation of the census in July 1954. It was estimated by the Census and Statistics Department that a maximum of 10,000 persons may have been omitted from the census; this would have given a 99 per cent coverage. Table 1 shows that 14 groups of tables give a fairly comprehensive enumeration of socio-economic characteristics of the Libyan population. Information was published at a Mutassarrifia district level.

Source: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959).

(d) The 1964 population census was the first since the change from a Federal to a Unitary form of government. The actual legal provision for undertaking the census was provided by the Census and Statistics Law (no. 16) of 1963.

The census, like that in 1954, was "de jure", i.e. enumeration was on the basis of usual place of residence, irrespective of whether a person was resident at the time of enumeration. The criterion adopted for usual place of residence was residence for a period of not less than one year prior to the census enumeration. The date of the census (31st July to 1st August) was also comparable with the 1954 census, although the time allowed for enumeration was limited to one day. Complete enumeration was made possible by a ten day pre-census survey of household particulars, and by the imposition of a curfew by the Government during the census day and night. Other improvements in the organization of the census were more widespread publicity, improved transport facilities, intensive training of enumerators and supervisors, and the use of sophisticated tabulation techniques.

The 1964 census results were a distinct improvement on earlier census information. Table 1 shows that a larger group of tables were produced compared with 1954, although much of the detail was published in Arabic in ten Muqataa regional volumes. There was a greater emphasis on the citizen population, and despite numerous boundary changes (Appendix A), more detail was available for smaller areal units. Also a number of new tables were added covering such topics as place of birth and present residence, infirmities, and education.

Source: Ministry of Economy and Trade, Libya.
General Population Census 1964, Tripoli, (1966).

2. Vital Registration

Vital registration in Libya is haphazard and incomplete, allowing only crude estimates of actual conditions. Two events are likely to improve this situation. First, the establishment of a central statistics office in 1956 allowed centralization of data and the application of standard registration criteria for the whole country. Second, legal enforcement of registration is at present being discussed. However, not only will this take a number of

years to enforce effectively, but legal action may not be the answer to the present poor registration. During the post-war British Administration in Libya, registrars of births and deaths were established in 19 towns, villages and oases, and it was made law to register vital events. Underenumeration in the main towns was matched by a complete failure of registration in rural areas. Thus, lack of "civic responsibility" rather than lack of legislation appeared to be the main cause of poor registration. The implications of effective registration will place a new burden on the present electoral boundaries, possible necessitating comprehensive changes by the Government.

3. Sample Surveys

(a) There have been no post-census enumerations of the Libyan population. Demographic evidence from a variety of official sample surveys at different dates are listed below:

(i) Agostini, E.di Le popolazione della Tripolitania. Notizie etnich e storiche, Governo della Tripolitania, Vol.2, Tripoli, (1917) and Agostini, E.di La popolazione della Cirenaica, Governo della Cirenaica, Benghazi, (1922-3).

These rough ethnic surveys were sponsored by the Italian Government between 1917 and 1925 and were carried out before the worst Italian excesses. Besides classifying the population according to ethnic extraction, De Agostini attempted an urban-rural and nature of settlement sub-division. Together with the mapping of major tribal boundaries these surveys provided a valuable first statistical appraisal of Libya's northern territories.

(ii) In 1943 the British Military Administration carried out a survey of the Libyan population for rationing purposes. Some of the results were published in the handbooks of Tripolitania and Cyrenaica, but no official tabulation was made of the results.

(iii) El-Shanawani, M.R. The Organization of the Vital Statistics of Libya. U.N. Technical Assistance Mission to Libya, A AC.32/TA/8, (1951).

This U.N. sponsored survey aimed at establishing a system of vital registration in Libya. It was limited to the Municipality of Zawia and the

and the Mudiriah of Bir el Ganam. Information other than births and deaths included marital status, economic activity and education. It covered approximately 3 per cent of the indigenous population.

(iv) Divo Institut. City of Benghazi : School Equipment Program until 1974, Part 1, Frankfurt, (Dec. 1964).

With special reference to the educational needs of Benghazi City, the survey sampled mortality and fertility conditions in seven Mahallat (Wards

(v) Four consultant firms (McGaughy, Marshall, McMillan and Lucas, Whiting Associates International, A.P.I., and Doxiadis) completed inventories of existing socio-economic conditions throughout Libya in 1966. While much of the information on population related to the 1964 General Population Census, a complete survey of population distribution in settled areas was undertaken.

(b) Two sets of sample surveys were undertaken by the author in 1966 and 1967 respectively, designed to highlight the geographical and occupational mobility of urban employees. One survey related to the petroleum companies and attempted to assess the occupational impact in the oil industry which initiated many of the economic processes operating in Libya. The second survey related to the construction industry, one of the fastest growing industries in the post-oil phase of Libya's economic development. The sample surveys were of two types; one studied classified information relating to employees, particularly in the oil companies; the other was a questionnaire study, relating mainly to the construction companies. The firms and companies selected were located in Benghazi and Tripoli, and were planned to be representative of the varying sizes of operations. Actual coverage, however, was inevitably dependent upon those firms willing to co-operate. The statistical material obtained was consequently piecemeal, yet the conclusions provided further evidence to test census data.

(c) Other sources of data were obtained from individual Libyan Government ministry departments, international organizations (particularly in the U.N. specialized agencies), the Bank of Libya, the Municipalities of Tripoli and Benghazi, and individual companies operating in Libya. The published information referred to in the thesis is compiled in the bibliography (Appendix D).

4. Administrative Units

Before Libya became a unitary state in 1963, it was a federation of three provinces - Tripolitania, Cyrenaica and the Fezzan. These provincial names have been used throughout the thesis. Each province, or "Wilayet", was ruled by a Wali or governor responsible to the King, and was divided into a number of regions called Muqataa adminstered by the Ministry of the Interior. The Muqataa were divided into districts known as Mutassarrifia, which in turn divided into Mudiriah. The districts and Mudiriah were administered by Commissioners and Mudirs respectively, appointed by the Wilayet administration. The 1954 Population Census was based on this administrative sub-division.

The change to a unitary state in 1963 resulted in a revision of the names of the old administrative system rather than a radical change in the regional structure. The three provinces became known as Regions; Tripolitania - Western Regions, Cyrenaica - Eastern Region, and the Fezzan Southern Region. Within the three Regions are 10 Muqataa, which in turn are divided into 28 Mutassarrifia districts (Table 2).

Between 1954 and 1964, 3 new Mutassarrifia were created and several Mudiriah were transferred from one Mutassarrifia to another:-

(a) The Mudiriah of the 1964 Mutassarrifia of Mizdah were in Garian Mutassarrifia in 1954.

(b) The Mudiriah of the 1964 Mutassarrifia of Sabratha were in Zawia Mutassarrifia in 1954.

(c) In 1964 the Mudiriah of Garefah, Bent Beiha and Ubari were in Ubari Mutassarrifia. In 1954 Ubari Mudiriah did not exist, while the Mudiriah of Garefah and Bent Beiha were in Sebha Mutassarrifia.

(d) The 1964 Mutassarrifia of Oragen was not tabulated in the 1954 Population Census. To enable comparisons between 1954 and 1964, Sebha, Ubari and Oragen Mutassarrifia are combined in 1964.

(e) Administrative difficulties of Mudiriah location are emphasized by indefinite boundaries. The Mudir is responsible for a group of Cabila, or tribes, instead of a specific area. Thus, several tribes enumerated in the same Mudiria may live in different places outside the administrative units.

Table 1. Census Tabulations, 1954 and 1964

Details of Tabulations	1954	1964
Total Groups of Tables[1]	14	32
Mudiriah only[2]	-	-
Mutassarrifia only	5	32
Muqataa only	-	-
Provinces only	-	-
Libya only	-	-
Citizen Population only	4	18
Alien Population only	4	3
Citizen and Alien only	5	9
Households[3]	1	2
Sex Structure only	8	20
Age Structure only	-	-
Age and Sex Structure only	4	12
Without Sex or Age	2	-
Family Households	2	1

(continued over)

(continuation)
Table 1.

Religion	1	2
Marital Status	1	3
Economically Active:		
(a) Occupation	2	5
(b) Industry	2	4
(c) Economic Status	2	3
Education	1	4
Place of Birth and Place of Present Residence	-	1
Infirmities	-	3

(1) The 1954 General Population Census contained 234 tables in one volume. The 1964 General Population Cenus contained 78 tables in the summary volume, together with 24 tables in each of the 10 Arabic volumes relating to Muqataa regions.

(2) Both the 1954 and 1964 censuses gave a breakdown of Mudiriah populations by sex.

(3) Definitions of "households" and "household units" vary in the two censuses. In 1954, it was admitted in the population census that due to ambiguity of definition the actual numbers of households did not correspond with the number of enumerated households. In 1964 this confusion of terms was eradicated, household being defined as "one or more persons living together at a dwelling and sharing food from a common arrangement for preparation". Although only one group of tables was defined in 1964, 8 sub-tables gave a comprehensive cross-classification of household information.

Table 2 Administrative Structure, 1964

Province	Muqataa	Mutassarrifia
Tripolitania	Tripoli	Tripoli City
		Suk el Giuma
	Zawia	Zawia
		Sabratha
		Zuara
	Gebel Gharbi	Garian
		Mizdah
		Yefren
		Nalut
		Ghadames
	Homs	Homs
		Tarhuna
		Beni Ulid
	Misurata	Misurata
		Zliten
		Sirte
Cyrenaica	Benghazi	Benghazi City
		Benghazi Dist.
		Agedabia
		Kufra
	Gebel Akhdar	Marj
		Beida
	Derna	Derna
		Tobruk
Fezzan	Sebha	Sebha
		El Shati
		El Jufra
	Ubari	Ubari
		Murzuk
		Ghat
		Oragen

APPENDIX B

Significant Correlation Co-efficients ($\pm$ 0.45) between

(i) Demographic Variables v 3 Factors and Demographic Variables

(ii) Demographic Variables v Economic Variables

(iii) Demographic Variables v 3 Factors and Economic Variables.

(i) Demographic Variables v 3 Factors and Demographic Variables

(Numbers refer to demographic characteristics in Table 2.1)

Demographic Variables	FACTORS			DEMOGRAPHIC VARIABLES						
	1	2	3	1	2	3	4	5	6	7
1	0.67									
2	0.66									
3	0.77			0.46	0.97					
4	0.62			0.99						
5	0.86			0.59	0.59	0.69	0.55			
6	0.90			0.63	0.62	0.72	0.58	0.98		
7	-0.90			-0.64	-0.60	-0.71	-0.59	-0.98	-0.97	
8	0.91			0.55	0.77	0.85	0.48	0.93	0.04	-0.9
9		-0.79						0.61	0.51	-0.5
10	0.47								0.48	
11	0.86			0.59	0.60	0.67	0.54	0.78	0.80	-0.8
12		-0.77								
13	0.59	0.63								
14	-0.67			-0.51			0.55	-0.56	-0.60	0.5
15		-0.48		0.47			0.51			
16			0.54							
17	-0.66			0.54			-0.56	-0.53	-0.61	-0.5
18	-0.55	-0.67								
19			-0.53							
20		0.79								
21		-0.56								
22		-0.61								
23		-0.79								
24	-0.73							-0.54	-0.57	0.5
25	0.72				0.83	0.79		0.61	0.63	0.6
26	0.93			0.56	0.56	0.65	0.51	0.79	0.80	-0.8
27	0.82					0.53		0.69	0.70	-0.7
28		-0.47	0.65							
29			-0.81							
30							-0.47			
31		-0.45								
32			-0.69							
33	0.74			0.53		0.50	0.51	0.58	0.65	-0.6
34	0.75			0.58		0.55	0.56	0.63	0.65	-0.6
35	0.56		-0.53			0.46				
36			-0.74			0.45				
37	0.74				0.65	0.65		0.64	0.66	-0.6
38	0.89			0.48	0.65	0.74		0.78	0.83	-0.8
39	0.89			0.50	0.57	0.68		0.77	0.83	-0.8
40	0.82			0.84		0.50	0.79	0.70	0.74	-0.7

Demographic Variables

	8	9	10	11	12	13	14	15	16	17	18	20
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11	0.85											
12		0.55										
13				0.45	-0.88							
14	-0.49		-0.56	-0.49								
15							-0.54					
16								-0.69				
17	-0.53		-0.51	-0.53			0.74	-0.59				
18					0.88	-0.98						
19								0.74	-0.94			
20		-0.53			-0.49	0.52				-0.54		
21						-0.47				0.47	-0.7	
22		0.48									-0.6	
23		0.54			0.49	-0.52				0.54	-0.9	
24	-0.60			-0.59		-0.54	0.64			0.45	0.51	-0.4
25	0.77			0.77								
26	0.83			0.77		0.58	-0.66			-0.52	-0.54	
27	0.72			0.60		0.46	-0.70			-0.56	-0.44	
28		0.57										
29		-0.49										
30							0.71	0.45				
31						-0.53					0.49	
32												
33	0.60			0.46		0.51	-0.53			-0.51	-0.49	
34	0/59			0.53			-0.57			-0.56		
35												
36												
37	0.76			0.80		0.46					-0.45	
38	0.87			0.83		0.58				-0.47	-0.44	
39	0.84			0.80		0.58	-0.45			-0.47	-0.54	
40	0.70			0.76		0.51	-0.55			-0.50	-0.46	

Demographic Variables

Demographic Variables

	20	21	22	23	24	25	26	27	28	32	33	34	35
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21	-0.77												
22	-0.70												
23	-0.99	0.77	0.70										
24	-0.47			0.47									
25					-0.50								
26					-0.87	0.64							
27					-0.89	0.49	0.92						
28													
29									0.88				
30							0.45						
31	-0.45	0.51		0.45	0.50			-0.45					
32													
33					-0.55		0.63	0.59		0.50			
34			-0.49			0.69	0.69		0.71	0.80			
35						0.47	0.45		0.73	0.85	0.80		
36									0.98	0.52	0.69	0.76	
37			-0.53	0.86	0.70	0.52							
38			-0.62	0.73	0.81	0.65				0.62	0.53		
39			-0.63	0.64	0.80	0.66				0.66	0.56	0.45	
40			-0.53	0.49	0.73	0.61				0.58	0.53		

Demographic Variables

(ii) Demographic Variables v Economic Variables (Numbers refer to demographic and economic characteristics in Tables 2.1 and 2.2)

Demographic Variables	Economic Variables 1	2	3	4	5	6	7	8	9	10	11	12
1	0.45	0.45					0.56		0.62		-0.45	
2	0.57	0.69						0.61	0.66			
3	0.72	0.74						0.67	0.76			
4							0.57		0.58			
5	0.75	0.77	-0.60				0.70	0.69	0.82	0.58		
6	0.78	0.79	-0.60				0.65	0.71	0.86	0.57		
7	-0.79	-0.80	0.63				-0.74	0.78	-0.88	-0.59		
8	0.85	0.85	-0.58				0.58	0.79	0.87	0.50		
9							0.55					
10										0.56		
11	0.85	0.86	-0.58				0.68	0.84	0.84	0.51		
12												
13	0.51	0.52										
14							-0.64		-0.58	-0.64		
15												
16												
17									-0.58			
18												
19												
20												
21												
22												
23												
24	-0.60	-0.60	0.64				-0.59	-0.61	-0.70	-0.66	-0.81	
25	0.82	0.79							0.65	0.61		
26	0.79	0.80	-0.61				0.52	0.70	0.78	0.82	0.73	
27	0.60	0.60	-0.60				0.51	0.60	0.68	0.71	0.79	
28												
29												
30							-0.55					
31												
32												
33	0.51	0.54							0.71			
34							0.58	0.54	0.75			
35									0.57			
36												
37	0.96	0.93						0.66	0.60			
38	0.96	0.97	-0.56					0.81	0.81			
39	0.90	0.93	-0.59				0.50	0.80	0.82	0.50		
40	0.67	0.69					0.55	0.61	0.69	0.57		

Economic Variables

	13	14	15	16	17	18	19	20	21	22	23
1							0.58			0.45	
2				0.54			0.57				
3				0.60			0.68				
4							0.56				
5			0.70	0.64	-0.65		0.79		0.60		
6			0.72	0.66	-0.64		0.82		0.57		
7			-0.73	-0.72	0.67		-0.84	-0.50	0.59		
8			0.70	0.74	-0.61		0.81				
9											
10									0.61		
11			0.67	0.82	-0.64		0.77	0.55			
12											
13		0.57	0.58								
14	-0.58		-0.68				-0.58		-0.60		
15											
16											
17							-0.54				
18		-0.53	-0.54								
19											
20											
21											
22											
23											
24	-0.75	-0.69	-0.90	-0.64	0.65		-0.66	-0.49	-0.69		
25			0.50	0.59			0.52				
26	0.65	0.60	0.88	0.70	-0.63		0.77	0.51	0.64		
27	0.75	0.59	0.86	0.62	-0.64		0.69		0.70		
28					-0.45						
29					0.45						
30	-0.56										
31		-0.57									
32											
33			0.55				0.67				
34			0.52				0.72				
35							0.53				
36											
37			0.59	0.61			0.49				
38			0.74	0.75	-0.60		0.72	0.52			
39		0.52	0.76	0.75	-0.62		0.74	0.53			
40		0.55	0.69	0.58			0.64		0.52		

Demographic Variables

Economic Variables

Demographic Variables	24	25	26	27	28	29	30	31	32	33	34
11											
2				0.51				0.56			
3								0.52			
4			-0.43	0.51							
5				0.61							
6				0.56							
7				-0.57							
8				0.57							
9			-0.58								
10							0.59				
11				0.50							
12											
13											
14											
15											
16								-0.50			
17											
18											
19											
20			0.58		-0.57	0.58					0.50
21											
22			-0.66		0.66						
23			-0.56		0.56	-0.59					-0.50
24							-0.51				
25				0.66							
26											
27											
28											
29									0.52		
30								0.52			
31									0.51		
32											
33											
34											
35	0.48										
36											
37				0.62						0.47	
38											
39											
40											

Demographic Variables	Economic Variables 35	36	37
1			
2			-0.62
3			
4			
5			
6			
7			
8			
9		0.63	
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29		-0.50	
30			
31			
32		-0.67	
33		-0.47	
34		-0.53	
35		-0.64	
36		-0.67	
37			
38			
39			
40			

(iii) Economic Variables v 3 Factors and Economic Variables
(Numbers refer to economic characteristics in Table 2.2)

Economic Variables	Factors			Economic Variables								
	1	2	3	1	2	3	5	6	7	8	9	10
1	0.85											
2	0.86			0.99								
3	-0.60		-0.45	-0.53	-0.55							
4												
5												
6	0.45			-0.54								
7	0.65			0.45	0.47	-0.50		0.56				
8	0.80			0.77	0.79	-0.63		0.47	0.59			
9	0.91			0.75	0.79	-0.64		0.50	0.73	0.85		
10	0.63					-0.67		0.51	0.62	0.50	0.51	
11												
12							0.60					
13	0.45											0.64
14	0.54					-0.53						0.67
15	0.82			0.70	0.70	-0.72		0.49	0.67	0.69	0.72	0.90
16	0.72			0.72	0.70	-0.63		0.45	0.56	0.99	0.80	0.48
17	0.63		-0.45	-0.56	-0.59	0.98		-0.51	-0.52	-0.67	-0.68	-0.69
18												
19	0.84			0.65	0.70	0.70		0.53	0.72	0.81	0.98	0.53
20	0.53			0.49	0.54	-0.61	0.87	0.68	0	0.60	0.64	
21	0.56		0.45			-0.60		0.48	0.65		0.45	0.96
22												
23							0.64					
24												
25												
26		-0.60							0.45			
27	0.47	0.46		0.59	0.58	-0.50				0.47		
28												
29							0.50					
30												
31			-0.72									
32												
33		0.47										
34												
35		-0.46										
36												
37			0.70									

Economic Variables

	11	12	13	14	15	16	17	19	20	21	24	25	26
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14			0.49										
15			0.64	0.70									
16						0.64							
17				-0.49	-0.74	-0.65							
18													
19						0.70	0.77	-0.72					
20		0.46					0.53	-0.60	0.67				
21			0.53	0.53	0.79			-0.62	0.47				
22	0.99												
23		0.96							0.54				
24													
25											0.66		
26													
27					0.45	-0.52	0.43			0.45			
28													-0.9
29									0.50		-0.64		0.5
30			0.44								-0.48		0.4
31													
32				-0.45							-0.50	-0.50	
33				0.45									
34											-0.77	0.45	
35													
36													
37													

Economic Variables

APPENDIX C

SUPPLEMENTARY TABLES

Table 1 Rank Groupings of Regions on Factors 1, 2 and 3

Factor 1		Factor 2		Factor 3	
Tripoli	+146	Ghat	+ 33	Ghat	+ 55
Benghazi City	+104	Zliten	+ 32	Murzuk	+ 37
Suk el Giuma	+ 26	Kufra	+ 28	Kufra	+ 23
Sebha	+ 24	Ghadames	+ 27	Tobruk	+ 20
Tobruk	+ 22	Homs	+ 24	El Marj	+ 17
Beida	+ 11	Zuara	+ 22	Agedabia	+ 16
Nālut	+ 9	El Shati	+ 21	Beida	+ 14
Zawia	+ 8	Tripoli	+ 18	Derna	+ 13
Yefren	+ 6	Sabratha	+ 15	Ghadames	+ 10
Derna	+ 3	Nalut	+ 14	Tripoli	+ 10
		Yefren	+ 14	El Shati	+ 10
Zuara	- 3	Murzuk	+ 11	Benghazi City	+ 8
Ghadames	- 6	Zawia	+ 7	Sirte	+ 4
Sabratha	- 7	Sebha	+ 5	Sebha	+ 3
El Jufra	- 10	Misurata	+ 5		
Benghazi Dist.	- 13	Benghazi City	+ 1	El Jufra	- 3
Agedabia	- 13	Suk el Giuma	+ 1	Sabratha	- 9
El Marj	- 14			Zliten	- 11
El Shati	- 14	El Jufra	- 2	Nalut	- 13
Misurata	- 16	Beni Ulid	- 2	Beni Ulid	- 14
Garian	- 18	Garian	- 11	Homs	- 15
Homs	- 23	Tarhuna	- 14	Garian	- 16
Sirte	- 24	Agedabia	- 15	Misurata	- 17
Beni Ulid	- 26	Derna	- 22	Benghazi Dist.	- 18
Ghat	- 33	El Marj	- 22	Yefren	- 20
Tarhuna	- 35	Benghazi District	- 36	Zuara	- 20
Kufra	- 35	Tobruk	- 44	Zawia	- 24
Murzuk	- 35	Beida	- 47	Tarhuna	- 26
Zliten	- 36	Sirte	- 60	Suk el Giuma	- 35
Standard Deviation (for standardised data)	23.2	Standard Deviation (for standardised data)	14.1	Standard Deviation (for standardised data)	11.8

Table 2 Demographic Variables Highly Correlated with Factor 1

Factor Loadings	Primary Variables (Demographic)	Variables see Fig. 2.2
0.930	Per Cent of total pop. (over 6 years), 1964 with preparatory school cert.	(26)
0.913	Per Cent of citizen pop., 1964, born outside the region of present residence but inside of Tripolitania	(8)
0.903	Rate per 1, 000 citizen pop., 1964, born outside the region of present residence	(6)
-0.897	Per Cent of citizen pop., 1964, born in the region of present residence	(7)
0.895	Pop. density, 1964, (persons per sq.km.)	(38)
0.887	Pop. density, 1964, (Persons per ha. of settled and tribal holdings)	(39)
0.858	Per cent of citizen pop., 1964, born outside the region (Muqataa) of present residence	(5)
0.857	Per cent of citizen pop., 1964, born abroad	(11)
0.823	Per cent of total pop., (over 6 yrs.), 1964, with elementary school certificate ¶	(27)
0.802	Net migration, 1954-1964, (absolute numbers)	(40)
0.767	Per cent of total pop., 1964	(3)
0.755	Total pop., 1964, aged 15-44 yrs. (Males per 1, 000 females)	(34)
0.742	Total pop., 1954, aged 15-44 yrs. (Males per females)	(33)
0.741	Pop. density 1954 (persons per sq.km.)	(37)
-0.734	Per Cent of total pop., (over 6 yrs.), 1954, illiterate	(24)
0.716	Per Cent of total pop., (over 6 yrs), 1954, with secondary school certificate	(25)
0.674	Net Migration, 1954-64, as per cent of citizen pop. 1954.	(1)
-0.673	Per Cent of total pop., 1954, aged 60 yrs. and over	(14)
-0.663	Per Cent of total pop., 1964, aged 60 yrs and over	(17)
0.659	Per Cent of total pop., 1954	(2)

continued over....

Table 2 (continued)

0.622	Percentage increase in total pop., 1954-1964	(4)
0.588	Per Cent of toal pop., 1954, aged 15-59 years	(13)
0.562	Total pop., 1954, all ages, (males per 1,000 females)	(35)
-0.547	Dependency ratio, 1954, (children and aged ÷ adults)	(18)
0.468	Per Cent of citizen pop., 1964, born outside the region of present residence but inside Fezzan	(10)

Table 3 Economic Variables highly correlated with Factor 1

Factor Loadings	Secondary Variables (Economic)	Variables see fig. 2.3
0.908	Per Cent of citizen pop., (over 6 yrs.) in transport activities	(49)
0.860	Per Cent of total industrial establishments, 1956	(42)
0.849	Per Cent of toal employees, 1956	(41)
0.842	Per Cent of citizen pop., (over 6 yrs.), 1964 in transport occupations	(59)
0.819	Per Cent of citizen pop., (over 6 yrs.), 1964 in clerical occupations	(55)
0.798	Per Cent of citizen pop., (over 6 yrs), 1964 in commercial occupations	(48)
0.651	Per Cent of citizen pop., (over 6 yrs), 1964 in public service occupations	(47)
-0.634	Per Cent of citizen pop., (over 6 yrs), 1964 in farming occupations	(57)
0.634	Per Cent of citizen pop., (over 6 yrs), 1964 in service activities	(50)
-0.595	Per Cent of citizen pop., (over 6 years), 1964 in agricultural activities	(43)
0.569	Per Cent of citizen pop., (over 6 yrs.), 1964 in service occupations	(61)
0.535	Per Cent of citizen pop., (over 6 yrs.), 1964 in administrative, managerial and executive occupations	(54)
0.532	Per cent of citizen pop., (over 6 yrs), 1964 in craft occupations	(60)
0.467	Per cent total area of holdings, 1960, rented from others	(67)

Table 4 Demographic and Economic Variables highly correlated with Factor 2

Factor Loadings	Primary Variables (Demographic)	Variables see Fig. 2.2
0.789	Per Cent of total pop., 1954, classified "settled"	(20)
-0.787	Per Cent of citizen pop., 1964, born in rest of Cyrenaica	(9)
-0.768	Per Cent of toal pop., 1954, aged 0-14 years	(12)
-0.667	Dependency ratio, 1954, (children and aged ÷ adults).	(18)
0.632	Per Cent of total pop., 1954, classified "nomadic"	(22)
-0.559	Per Cent of total pop., 1954, classified "semi-nomadic)	(21)
-0.480	Per Cent of total pop., 1964, aged 0-14 yrs	(15)
-0.473	Per Cent of citizen pop., (over 15 yrs.), 1964, single	(28)

	Secondary Variables (Economic)	Variables see Fig. 2.3
0.657	Per Cent of total area of holdings, 1960 owned by holder	(66)
-0.604	Per Cent of total area holdings, 1960, under tribal tenure.	
0.473	Per Cent of total holdings, 1960, under permanent crops	(73)
0.460	Per Cent of total holdings, 1960 under 5 hectares	(69)
-0.456	Per Cent of Holdings, 1960, under wood and forest.	(75)

Table 5 Demographic and Economic Variables highly correlated with Factor 3

Factor Loadings	Primary variables (Demographic)	Variables see Fig. 2.6
-0.805	Per cent of citizen pop., (over 15 years), 1964, married	(29)
-0.739	Total population, 1964, all ages, (males per 1,000 females)	(36)
-0.686	In-migrants, 1964, (males per 1,000 females)	(32)
0.651	Per cent of citizen pop., (over 15 yrs.), 1964, single	(16)
-0.531	Total pop., 1954, all ages, (males per 1,000 females)	(35)
-0.526	Dependency ratio, 1964, (children and aged-÷- adults)	(19)

	Secondary variables (Economic)	Variables see Fig.2.7
-0.720	Per cent of farm population, 1960	(71)
0.703	Distance of nearest city over 100,000 by road	(77)
0.438	Per cent of citizen pop. (over 6 yrs.) in service occupations	(61)
-0.433	Per cent of citizen pop. (over 6 yrs.), in agricultural occupations	(57)
-0.428	Per cent of citizen pop., (over 6 yrs.), in agricultural activities	(43)

Table 6 Settlement Hierarchies, Libya 1954 and 1966

Rank	Number of inhabitants	Number of Settlements 1954	Number of Settlements 1966	Total Population in Settlements 1954 Number	1954 Percent of total settled population	1966 Number	1966 Percent of total settled population
7	500 - 1,000	213	182	143,000	29	134,000	17
6	1,000 - 2,000	33	56	44,000	9	77,000	9
5	2,000 - 5,000	13	24	37,000	8	70,000	8
4	5,000 - 10,000	6	4	44,000	9	28,000	3
3	10,000 - 25,000	2	9	32,000	6	135,000	16
2	25,000 - 100,000	1	-	64,000	13	-	-
1	over 100,000	1	2	129,000	26	384,000	47
		269	277	493,000	100	828,000	100

Sources: (a) Strechman, S. Population Map of Libya 1954, Department of Regional Geography, University of Warsaw, Poland, 1:1 million, (1964).

(b) Ministry of Planning and Development, Libya, Inventory Reports of Planning Consultants, Tripoli, (1966)

Table 7 Population Clusters: the Size Continuum, 1966

Rank	Settlement	Total Population 1966 (in 000's persons)	Rank	Settlement	Total Population 1966 (in 000's persons)
1	Tripoli	234	21	Cussabat	4
2	Benghazi	150	22	Tarhuna	4
3	Derna	24	23	Zuara	3.6
4	Misurata	19	24	Yefren	3.5
5	Agedabia	18	25	Tauorgha	3.5
6	Beida	16	26	El Jof (Kufra)	3.4
7	Sebha	15	27	El Abiar	3.4
8	Marj	14	28	Hon	3.4
9	Suk el Giuma	12	29	El Mahrugah	3.3
10	Tobruk	12	30	Sabratha	3.2
11	Zawia	10	31	Aujila	3
12	Zanzur	9	32	Cabao	3
13	Tanguira	8	33	Beni Ulid	2.8
14	Garian	6	34	Solluk	2.8
15	Homs	5	35	Brak	2.7
16	Nalut	5	36	Cyrene	2.5
17	Zliten	4.5	37	Messa	2.5
18	Sirte	4	38	Sussa	2.3
19	Benina	4	39	El Gubbah	2.2
20	Waddan	4			

Source: Ministry of Planning and Development, Libya. Inventory Reports of Planning Consultants, Tripoli, (1966)

Table 8 Citizen and Alien Age Groups In Libya, 1954-64

Country	% Total Population 0-14 years	15-59 years	60 years & over
Libyan Citizens 1954			
male:-	38.2	52.3	9.5
female:-	38.8	51.6	9.6
Libyan Citizens 1964			
male:-	43.7	48.7	7.6
female:-	44.4	48.8	7.8
Libyan Aliens 1954			
male:-	26.7	64.4	8.9
female:-	28.4	62.0	9.6
Libyan Aliens 1964			
male:-	33.7	59.7	6.6.
female:-	32.3	60.9	6.8
Total Population 1954			
male:-	38.2	52.3	9.5
female:-	38.8	51.6	9.6
Total Population 1964			
male:-	43.3	49.0	7.7
female:-	44.0	49.2	6.8

Source: (a) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959)

(b) Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966)

Table 9 Regional Age Structures in Libya 1954 - 64

% of total citizen population (Age in years)

	1954			1964		
1. Tripolitania	0-14	15-59	60+	0-14	15-59	60+
a. Tripoli City	35.3	57.6	7.1	45.2	49.5	5.3
b. Coastal Mut.	37.4	52.1	10.5	43.2	48.5	8.3
c. Gebel Mut.	36.7	53.2	10.1	44.1	47.7	8.2
d. Interior Mut.	38.7	51.4	9.9	43.2	48.5	8.3
2. Cyrenaica						
a. Benghazi City	35.2	58.0	6.8	43.0	51.2	5.8
b. Coastal Mut.	43.5	49.0	7.5	44.6	48.7	6.7
c. Gebel Mut.	40.8	49.7	9.5	43.1	50.1	6.9
c. Interior Mut.	40.7	48.8	10.5	42.4	50.1	7.5
3. Fezzan						
a. Sebha Mut	39.1	54.1	6.8	43.2	50.9	5.9
b. Other Interior Mut.	38.0	52.6	9.4	43.0	49.1	7.9
Libya	38.6	52.6	8.8	44.1	48.7	7.2

N.B. Mut. = Mutassarrifia groupings for the regions:-

Tripolitanian Coast - Zuara, Sabratha, Zawia, Suk el Giuma, Homs, Zliten, Misurata
" Gebel - Garian, Mizdah, Nalut, Yefren, Tarhuna.
" Interior. - Ghadames, Beni Ulid, Sirte.
Cyrenaican Coast - Derna, Tobruk.
" Gebel - Beida, Marj.
" Interior - Benghazi District, Agedabia, Kufra.
Fezzan Interior - Ubari, Oragen, El Shati, Murzuk, El Jufra, Ghat.

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya. General Population Census, 1964, Tripoli, (1966)

Table 10. Sex Ratios by 5 year age groups for Selected Countries 1940-64

	(males per 100 females)					United Stated
	Libya[c]		India	Morocco	Sudan	America
Age Group	1954	1964	1961[b]	1963[b]	1964[b]	1940[a]
under 1	103	106	101	100	103	104
1-4	99	103	101	100	103	104
5-9	103	104	105	101	102	104
10-14	120	116	114	100	102	103
15-19	112	104	108	99	103	102
20-24	115	110	95	100	103	98
25-29	108	101	103	101	104	98
30-34	103	106	108	102	104	99
35-39	109	116	115	102	104	100
40-44	90	106	112	101	104	101
45-49	111	112	117	98	102	101
50-54			114	99	101	100
55-59	123	126	116	96	98	99
60-64			103	92	92	97
65-69	109	119	104	88	90	96
70-74			96	78	88	93.
75+		128	99		82	87

Sources:
(a) Native white only. Smith, T.L. Fundamentals of population Study, New York (1960), p.185
(b) U.N. Demographic Year book 1964, New York (1965)
(c) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya, General Population Census, 1964, Tripoli, (1966).

Table 11 Correlation co-efficients between (1) Excess of males over females of total population aged 15-44 years with (2) demographic and economic variables defined in Chapter II, 1954-64

	1954	1964
1. Distribution		
(a) % Total Population 1954 in each district	0.38	0.44
(b) % Total Population 1964 in each district	0.50	0.55
(c) Population density 1964 (persons/sq. ml.)	0.62	0.54
(d) Rural Population density 1964 (persons/sq. ml.on farm holdings 1960)	0.66	0.56
(e) Population increases 1954-64	0.51	0.56
(f) Increasing distance from urban areas 1964	-0.47	0.53
2. Migration		
(a) Net migration (absolute numbers) 1954-64	0.58	0.53
(b) % citizen population born outside area of present residence.	0.58	0.63
(c) % of citizen pop. born in Tripolitania or rest of it.	0.60	0.60
(d) % of citizen pop. born in Cyrenaica or rest of it.	0.21	0.29
(e) % of citizen pop. born in Fezzan or rest of it	0.33	0.36
(f) % of citizen pop. born abroad	0.46	0.53
3. Age Group		
(a) % total population aged 15-60 years, 1954	0.51	0.33
(b) % total population aged 15-60 years 1964	0.01	0.02
(c) % total population aged 60 years + 1954	-0.53	-0.57
(d) % total population aged 60 years + 1964	-0.51	-0.56
(e) Dependency Ratio 1954	-0.49	-0.31
(f) Dependency Ratio 1964	0.04	0.03
4. Education		
(a) % total population (6 years.+) illiterate 1964	-0.44	-0.49
(b) % total population (6 years +) with secondary certs 1964	0.30	0.30
(c) % total population (6 years +) with preparatory certs "	0.63	0.69
(d) % total population (6 yrs.+) with elementary certs "	0.60	0.69
5. Occupation		
(a) % of total number of employees, 1956	0.51	0.45
(b) % of total number of establishments, 1956	0.54	0.49
(c) % of total number of citizens (6 yrs.+) in transport activities, 1964	0.71	0.57
(d) % of total number of citizens (6 yrs.+) in clerical activities, 1964	0.55	0.52

Source: Appendix B.

Table 12 Sex ratios of Citizen Population (males: 1000 females) for age groups 15-44 years by Mutassarrifia, 1954 and 1964.

	1954		1964
Benghazi City	1339	Benghazi City	1202
Tobruk Town	1327	Tobruk Town	1175
Tripoli City	1202	Beida Town	1145
Nalut	1138	Tripoli City	1133
Sebha	1127	Sebha (Ubari & Oragen)	1108
El Jufra	1104	Derna Town	1079
Beni Ulid	1091	Nalut	1076
Marj District	1078 UQ	Benghazi District	1071 UQ
Sirte	1066	Misurata	1068
Marj Town	1060	Zuara	1057
Derna Town	1060	Beida District	1054
Beida District	1056	El Jufra	1048
Ghadames	1056	Zawia	1048
Derna District	1056	Sabratha	1043
Garian	1054	Suk el Giuma	1042
El Shati	-1050 - M	Ghadames	1036
Misurata	1049	Marj District	1034 M
Zawia (Sabratha)	1047	Yefren	1033
Suk el Giuma	1039	Beni Ulid	1033
Zuara	1035	Tobruk District	1031
Yefren	1026	Derna District	1029
Homs	1023	Garian	1022
Tarhuna	1022 LQ	Marj Town	1014
Benghazi District	1021	Tarhuna	1012
Agedabia	997	Homs	1005 LQ
Zliten	991	Zliten	988
Tobruk District	971	Mizdah	975
Ghat	941	Agedabia	970
Kufra	903	Kufra	969
Murzuk	791	El Shati	962
		Sirte	949
		Murzuk	916
		Ghat	885
Libya	1077	Libya	1062

M Median
UQ Upper Quartile
LQ Lower Quartile

Sources: Ministry of National Economy, Libya. General Population Census, 1954 Tripoli, (1959), and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

Table 13 Net Migration of Citizen Population 1954-64 : Reverse Survival Method

District	A Born 1954-64 0-9 years	B Pop. 1954	C Pop. 1954 + 0-9 yrs	D Pop. 1964	E Pop. 64- Pop. 54+ 0-9 yrs	F Estimated no.deaths 1954-64 20/000	G Estimated crude net migration 1954-64
Tripoli	65, 005	99, 925	164, 930	182, 672	+17, 742	+ 1, 998	+19, 740
Suk el Giuma	58, 262	106, 981	165, 243	162, 485	- 2, 758	+ 2, 140	- 618
Zawia	38, 567	78, 134	116, 701	111, 050	- 5, 651	+ 1, 562	- 4,089
Sabratha	14, 626	30, 285	44, 911	42, 561	- 2, 350	+ 606	- 1,744
Zuara	12, 316	30, 468	42, 784	36, 305	- 6, 479	+ 610	- 5, 869
Garian	21, 357	39, 415	60, 772	61, 076	+ 304	+ 788	+ 1, 092
Nalut	12, 002	20, 853	32, 855	35, 424	+ 2, 569	+ 418	+ 2, 987
Mizdah	6, 690	15, 716	22, 406	18, 191	- 4, 215	+ 314	- 3, 901
Yefren	20, 586	32, 243	52, 829	60, 037	+ 7, 208	+ 644	+ 7, 852
Ghadames	1, 846	4, 855	6,701	5, 881	- 820	+ 98	- 722
Homs	20, 540	61, 669	82, 209	65, 878	-16,331	+ 1,232	-15, 099
Tarhuna	15, 400	38, 204	53, 604	48, 214	- 5, 390	+ 764	- 4, 626
Beni Ulid	7, 148	21, 929	29, 077	22, 189	- 6, 888	+ 438	-6, 450
Misurata	22, 660	54, 690	77, 350	69, 559	- 7, 791	+ 1, 094	- 6, 697
Zliten	13, 416	41, 059	54, 475	45, 498	- 8, 977	+ 822	- 8, 155
Sirte	10, 162	18, 258	28, 420	29, 953	+ 1, 533	+ 366	+ 1, 899
Tripolitania	340, 583	694, 685	1, 035, 268	996, 973	-38, 295	+13, 894	-24, 399

Table 13 continued

Benghazi City	43,839	67,188	111,031	130,618	+ 19,587	+ 1,344	+ 20,931
Benghazi Dist.	27,727	64,291	92,018	89,836	- 2,182	+ 1,286	- 896
Agedabia	13,895	27,688	41,583	43,673	+ 2,090	+ 554	+ 2,644
Kufra	2,281	6,230	8,511	7,501	- 1,010	+ 124	- 886
Beida	15,566	30,881	46,447	47,345	+ 898	+ 618	+ 1,516
Marj	12,626	36,218	48,844	39,954	- 8,890	+ 724	- 8,166
Derna	14,532	35,605	50,140	44,711	- 5,429	+ 712	- 4,717
Tobruk	11,985	19,729	31,714	35,797	+ 4,083	+ 394	+ 4,477
Cyrenaica	142,451	287,831	430,282	439,435	+ 9,153	+ 5,756	+ 14,909
Sebha	9,470	17,654	27,124	28,338	+ 1,214	+ 352	+ 1,568
El Shati	6,468	15,869	22,337	18,869	- 3,471	+ 318	- 3,153
Murzuk	4,894	11,967	16,861	14,976	= 1,885	+ 240	- 1,645
El Jufra	4,230	9,711	13,941	12,490	- 1,451	+ 194	- 1,257
Ghat	1,421	3,882	5,303	4,420	- 883	+ 78	- 805
Fezzan	26,483	59,083	85,566	79,093	- 6,473	+ 1,182	- 5,291
Libya	509,518	1,041,599	1,551,117	1,515,501	- 35,616	+ 20,832	- 14,781

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

Table 14 Net Lifetime In- and Out-Migration by Sex and Muqataa Regions, 1964

	In			Out			Net		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
Tripoli	45, 387	35, 320	80, 707	-11, 233	- 9, 502	-20, 735	+34, 154	+25, 813	+59, 972
Zawia	8, 160	6, 881	15, 041	-13, 176	-11, 058	-24, 234	- 5, 016	- 4, 177	- 9, 193
Homs	815	938	1, 753	-17, 878	-13, 569	- 31, 447	-17, 063	-12, 631	-29, 694
Misurata	2, 908	2, 680	5, 588	-18, 126	-12, 702	-30, 828	-15, 218	-19, 022	-25, 240
Gebel Gharbi	1, 638	1, 528	3, 166	-15, 395	-11, 530	-26, 925	-13, 757	-10, 022	-23, 759
Benghazi	25, 736	18, 177	43, 913	- 5, 925	- 5, 509	- 11,434	+19, 811	+12, 668	+32, 479
Derna	4, 778	3, 509	8, 287	- 4, 746	- 3, 875	- 8, 621	+ 32	- 366	- 334
Gebel Akhdar	6, 316	4, 920	11, 236	- 5, 352	- 4, 794	-10, 146	+ 964	+ 126	+ 1, 090
Sebha	2, 419	1, 952	4, 371	- 4, 942	- 2, 378	- 7, 320	- 2, 523	- 426	- 2, 949
Ubari	246	177	423	- 1, 630	- 1, 165	- 2, 795	- 1, 384	- 998	- 2, 372
Total	98, 403	76, 082	174, 485	98,403	76, 082	174, 485	-54, 961	-38, 612	-93, 541

Source: Ministry of Economy and Trade, Libya. General Population Census, 1964, Tripoli (1966)

Table 15 Place of Birth and Present Residence of Libya's Net lifetime Migrations, 1964

	Tripoli	Zawia	Homs	Misurata	Gebel Gharbi	Benghazi	Derna	Gebel Akhdar	Sebha	Ubari	Born Abroad
Tripoli	+76,641	+8,700	+21,005	+10,848	+19,331	- 2,891	- 508	- 709	+3,871	+ 325	+16,669
Zawia	- 8,700	-6,030	+ 430	+ 171	+ 1,069	- 1,595	- 218	- 494	+ 106	+ 38	+ 3,165
Homs	-21,005	430	-29,369	- 937	- 81	- 5,958	- 479	- 589	- 229	+ 14	+ 325
Misurata	-10,848	- 171	+ 937	-23,369	+ 507	-11,969	- 1,512	-1,383	- 757	- 42	+1,399
Gebel Gharbi	-19,331	-1,069	+ 81	+ 937	-21,084	- 1,756	- 353	- 465	- 323	- 36	+ 2,675
Benghazi	+ 2,891	+1,595	+ 5,958	+ 81	+ 1,756	+41,708	+2,819	+3,720	+1,667	+104	+ 9,229
Derna	+ 508	+ 218	+ 479	+5,958	+ 353	- 2,819	+ 950	- 940	+ 188	+167	+ 1,284
Gebel Akhdar	+ 709	+ 494	+ 589	+1,385	+ 465	- 3,720	+1,940	+1,772	+ 191	+ 37	+ 682
Sebha	- 3,871	- 106	+ 229	+ 757	+ 323	- 1,667	- 188	- 191	- 1,743	+1,765	+ 1,206
Ubari	- 325	- 38	- 14	- 42	+ 36	- 104	- 67	- 37	- 1,765	-2,030	+ 326
Total											+ 36,958

Source: Ministry of Economy and Trade, Libya, General Population Census 1964, Tripoli, (1966), p. 74

Table 16 Rates of Internal Migration per 1, 000 Libyan Citizens, 1964.

(Number of migrants reflect total lifetime changes in residence between birthplaces and other Muqataa regions).

Muqataa	Mutassarrifia	In-Migration (per 1, 000 citizens)		Out-Migration (per 1, 000 citizens)	Net Migr. (+ or - per 1, 000 citizens)
Tripoli	(Tripoli	292)	234	60	+174
	(Suk el Giuma	110)			
Zawia	(Zawia	123)	(79)	128	- 49
	(Sabratha	16)			
	(Zuara	16)			
Homs	(Homs	20)	(13)	231	-218
	(Tarhuna	4)			
	(Beni Ulid	12)			
Misurata	(Misurata	3)	(39)	213	-174
	(Zliten	8)			
	(Sirte	119)			
Gebel Gharbi	(Garian	16)	(18)	149	-131
	(Mizdah	1)			
	(Nalut	13)			
	(Yefren	26)			
	(Ghadames	23)			
Benghazi	(Benghazi City	254)	(162)	42	+120
	(Benghazi Dist.	69)			
	(Agedabia	61)			
	(Kufra	8)			
Derna	(Derna Town	156)	(103)	107	- 4
	(Derna District	31)			
	(Tobruk Town	211)			
	(Tobruk District	34)			
Gebel Akhdar	(Beida Town	369)	(129)	116	+ 13
	(Beida District	69)			
	(Marj District	53)			
	(Marj Town	233)			
Sebha	(Sebha	219)	(92)	155	- 63
	(El Shati	19)			
	(El Jufra	40)			
Ubari	(Ubari	24)	(13)	88	- 75
	(Murzuk	11)			
	(Ghat	8)			
	(Oragen	-)			

Source: Ministry of Economy & Trade, Libya Gen. Pop. Census, 1964.

Table 17 Measures of "Absent" Population, Western Tripolitania, 1966

Mudiriah	"Absent"	Total Population 1966	% Absent
Bir el Ghanem	2785	7,116	39.1
Sorman	182	23,557	0.8
Sabratha	1045	24,280	4.3
Ajelat	2300	25,956	8.9
El Assa	9960	16,240	61.3
Regdaleen	1430	14,500	9.9
Zuara	2910	15,004	19.4
El Assaba	1745	12,680	13.8
El Orban	380	6,460	5.9
Kikla	2000	10,420	19.2
Ben Khalifa	1275	14,108	9.0
Beni Daud	1450	12,675	11.4
El Gwassem	300	10,058	3.0
Beni Nsir	500	5,955	8.4
Cabao	2400	6,000	40.0
Giosc	1800	10,225	17.6
El Harabah	1570	6,755	23.2
El Moshashia	1353	7,256	18.6
Aw. Bu Seif	1263	5,909	21.4
El Mgarha	1525	4,634	32.9
Gantrar	390	3,002	13.0
El Rhibat	1145	5,674	20.2
El Zintan	1078	9,871	10.9
El Riayna	1275	5,396	23.6
Yefren	4842	14,663	33.0
El Rujban	2605	5,900	44.2
Jado	1848	8,983	20.6
Ghadames	151	2,681	5.6
Eoughas	200	650	30.8

Source: Ministry of Planning and Development, Libya. Planning Consultant Reports, Tripoli, (1967)

Table 18 Place of Residence of Libyan Citizen Migrants by Mutassarrifia

Mutassarrifia	Total lifetime In-Migration	% of total In-migration	% of total 1964 population of Mutassarrifia
Tripoli	73,145	35.0	34
Suk el Giuma	24,265	11.5	15
Zawia	15,682	7.4	14
Sabratha	1,506	.7	4
Zuara	1,005	.7	3
Homs	1,525	.7	2
Tarhuna	334	.2	.7
Beni Ulid	328	.2	1
Misurata	2,655	1.3	4
Zliten	465	.2	1
Sirte	3,866	1.8	13
Garian	2,217	1.1	4
Mizdah	40	.1	.2
Nalut	1,113	.5	3
Yefren	2,237	1.1	4
Ghadames	228	.2	4
Tripolitania	130,611	62.4	13
Benghazi City	42,156	20.2	31
Benghazi Dist.	6,438	3.1	7
Agedabia	4,151	2.0	9
Kufra	408	.2	5
Derna	4,416	2.1	10
Tobruk	5,055	2.4	13
Beida	7,622	3.6	16
Marj	4, 296	2.1	11
Cyrenaica	74,542	35.6	17
Sebha	2,653	1.3	17
El Shati	303	.1	2
El Jufra	591	.3	5
Ubari	116	.1	1
Murzuk	265	.1	2
Ghat	103	.1	4
Fezzan	4,031	2.0	5
Libya	209,184	100.	13.4

Source: Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

Table 19 Sex Ratios of Out-Migrants, 1964

Place of Birth	To (rest of) Tripolitania	To (rest of) Cyrenaica	To (rest of) Fezzan
Tripoli	1076	1400	1244
Zawia	1139	1611	1500
Homs	1247	1570	1438
Misurata	1478	1471	1286
Gebel Gharbi	1286	1847	1438
Benghazi	1128	1026	958
Derna	1593	1186	2455
Gebel Akhdar	1000	1125	1304
Sebha	2017	2397	1120
Ubari	1389	4981	1192

Source: Ministry of Economy and Trade, Libya, General Population Census 1964, Tripoli, (1966)

Table 20 Sex Ratios of Migrants, 1964

Place of present residence		Born in same	Born in (rest of)	Born in (rest of)	Born in (rest of)
Muqataa	Mutassarrifia	Muqataa	Tripolitania	Cyrenaica	Fezzan
Tripoli	(Tripoli	1007	1274	1205	2075
	(Suk el Giuma	1081	1197	1149	1587
Zawia	(Zawia	1060	1142	2176	3133
	(Sabratha	1057	1161	1156	556
	(Zuara	1113	1081	1087	1000
Homs	(Homs	1088	905	812	867
	(Tarhuna	1086	589	1462	333
	(Beni Ulid	1111	965	1300	2000
Misurata	(Misurata	1096	1235	1081	963
	(Zliten	1096	887	706	1444
	(Sirte	1019	1234	992	1135
Gebel Gharbi	(Garian	1086	911	1316	1176
	(Mizdah	959	-	600	9000
	(Nalut	1102	1066	773	333
	(Yefren	1104	1083	2000	1471
	(Ghadames	1009	3111	1174	3000
Benghazi	(Benghazi Town	1070	1507	1162	2894
	(Benghazi Dist.	1160	1341	1246	1913
	(Agedabia	979	1180	1175	1829
	(Kufra	1026	955	833	1500
Gebel Akhdar	(Beida Town	959	1915	1134	2150
	(Beida Dist.	1007	2028	1115	1957
	(Marj Town	992	1322	906	1370
	(Marj Dist.	1025	1842	1055	3600
Derna	(Derna Town	1070	1389	1009	1527
	(Derna Dist.	1006	2477	897	2000
	(Tobruk Town	1092	1833	1160	5667
	(Tobruk Dist.	1005	2319	1075	1429
Sebha	(Sebha	1080	1374	1346	1195
	(El Shati	1026	1238	750	843
	(El Jufra	1058	1054	963	1909
Ubari	(Ubari	954	2375	-	1145
	(Murzuk	959	2071	833	1196
	(Ghat	938	3750	-	667
	(Oragen	1020	-	-	-

Source: Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966)

Table 21. Distribution of Economically Active[1] Libyan Population (aged over 5 years)[2] by sex, 1954 and 1964

		1954			1964		
	Age (in years)	Male	Female	Total	Male	Female	Total
Citizens	5 - 14	11, 388	4, 833	16, 221	4, 217	654	4, 871
	15 - 64	267, 920	34, 272	302, 192	318, 194	9, 449	327, 643
	65+				22, 103	430	22, 533
	all ages	279, 308	39, 105	39, 105	344, 514	10, 533	355, 047
Aliens	all ages	16, 740	2, 491	19, 231	14, 533	3, 026	17, 559
Total Libyan	all ages	296, 048	41, 596	337, 644	359,047	13, 559	372, 606

(1) Economically Active defined as: Employers, Workers on own account, Employees and Unemployed. Economically Inactive Population defined as rest of population, including students not classified by status, and unpaid family workers.

(2) 1964 data related to age groups over 6 years

Sources: (a) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), pp. 231-4
(b) Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966) pp. 35-7

Table 22. Total Citizen Population (aged 5 years and over[1]) by Economic Status, 1954 and 1964

	1954				1964			
	under 15 years		over 15 years		under 15 years		over 15 years	
	number	%	number	%	number	%	number	%
Employers	29	<0.1	2,483	0.4	-	-	3,210	0.3
Own Account Workers	2,364	1.0	144,104	22.5	484	0.2	125,383	14.8
Employees	6,059	2.5	103,676	16.2	1,965	0.6	190,409	22.5
Unemployed or seeking work	7,769	3.1	51,929	8.1	2,422	0.7	31,174	3.7
Total Economically Active	16,221	6.6	302,192	47.2	4,871	1.5	350,176	41.3
Total Economically Inactive(2)	231,000	93.4	338,552	52.8	329,268	98.5	497,879	58.7
Total Citizen Population	247,221	100.0	640,744	100.0	334,139	100.0	848,055	100.0

(1) 1964 data relates to age groups over 6 years.
(2) Includes student, unpaid family workers and unclassified persons by economic status.

Sources: (a) Ministry of National Economy, Libya. General Population Census, 1954, Tripoli, (1959) p. 231

(b) Ministry of Economy and Trade, Libya. General Population Census, 1964, Tripoli, (1966), p.35

Table 23 Gross Domestic Product 1958-64, and Male Employment, by Industrial Origin, 1954-64

	Gross Domestic Product (gross value added in £L million)				Economically Active Male Citizens (6 years plus)			
	1958		1964		1954		1964	
	Amount	%*	Amount	%*	Number	%	Number	%
Agriculture	13.6	28.1	24.5	14.4	212.0	63.2	140.5	43.2
Mining & Quarrying	3.6	-	165.9	-	0.4	0.1	11.6	3.5
Manufacturing	6.0	12.4	12.4	7.4	14.4	4.3	18.8	5.8
Construction	1.8	3.7	11.6	6.9	7.2	2.2	29.9	9.2
Electricity Water & Gas	0.8	1.6	1.3	0.8	0.8	0.2	5.6	1.7
Transport	2.9	6.0	14.4	8.5	7.6	2.3	21.5	6.6
Wholesale, retail, storage trade	7.2	14.8	27.3	16.2	16.9	5.0	24.6	7.6
Banking and insurance	1.3	2.7	5.0	3.0				
Public admin and government services.	6.7	13.8	38.0	22.6	76.2	22.7	73.0	22.4
Other Services	8.2	16.9	34.0	20.2				
Gross Domestic Product	52.1	100.0	334.4	100.0	335.5			
Total Employment					335.5	100.0	325.4	100.0

* Percentages exclude the Mining and Quarrying Activities which dominate the Gross Domestic Product.

Sources: (a) Lasserre, M. Monograph for a Seminar on Housing Statistics and Programmes in Libya, Economic Commission for Africa Tripoli, (1966), p.4

(b) Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), p.233.

(c) Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966), p.55.

Table 24 Per cent Economically Active Citizens (aged 6 years and over) by Occupational Division and Number of Years Experience (1) in 1964

Occupational Division	over 10 yrs experience number	over 10 yrs experience % workers in each occupation	5-9 years experience number	5-9 years experience %	0-4 years experience number	0-4 years experience %	Total economically active citizens
1. Professional, technical and related workers	2611	24	3198	29	5139	45	11, 830
2. Administrative, Executive and Managerial	2326	46	1109	22	1613	32	5, 420
3. Clerical	2964	18	4795	29	8853	53	18, 481
4. Sales	8897	43	4921	23	7193	34	23, 291
5. Farmers	83853	71	15931	14	17875	15	145, 459
6. Miners	353	6	965	17	4514	77	6, 925
7. Transport	3791	22	4414	25	9459	53	19, 676
8. Craftsmen	18706	30	14783	24	28840	46	72, 457
9. Services	8183	23	9392	27	17776	50	39, 095
10. Others	2115	26	2122	26	3980	48	45, 065
Total	133,799	44	61,530	21	105,242	35	387, 699

(1) not including "not stated" experience.

Source: Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966), p. 63.

Table 25 Crude Fertility Ratios in Libya Mutassarrifia, 1954-64

(Fertility ratio = $\frac{\text{citizen children under 5 years}}{\text{citizen women aged 15-44 years}} \times 100$)

Mutassarrifia	1954	1964	Mutassarrifia	1954	1964
Tripoli City	72.1	95.6	Benghazi City	69.1	98.6
Suk el Giuma	76.7	104.1	Benghazi Dist.	74.7	77.2
Zawia, Sabratha	68.2	100.0	Agedabia	67.9	79.6
			Kufra	67.5	76.2
Garian, Mizdah	80.9	100.0	Beida	75.7	95.6
			Marj	74.5	83.2
Nalut	61.1	92.4	Derna	81.6	90.0
Yefren	68.2	96.3	Tobruk	77.0	89.6
Ghadames	67.8	92.2	Sebha, Ubari, Oragen	64.8	93.7
Homs	77.0	86.8			
Tarhuna	77.9	87.0			
Beni Ulid	81.7	83.7	El Shati	63.4	92.2
Misurata	76.7	94.7	Murzuk	62.2	89.3
Zliten	71.3	78.0	El Jufra	72.2	101.5
Sirte	82.2	91.2	Ghat	47.8	78.9
Zuara	71.3	89.3	Libya	72. 0	93.0

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966)

Table 26 Distribution of Medical Facilities and Personnel in Libya, 1966

Region	Hospitals[1] number	Hospitals[1] rate/00's persons	Hospital Beds number	Hospital Beds rate/00's persons	Health Estabs.[2] number	Health Estabs.[2] rate/00's persons	Doctors[3] number	Doctors[3] rate/00's persons	Para-Medical Personnel[4] number	Para-Medical Personnel[4] rate/00's persons	Total Population
Tripoli Muqataa	10	380	2418	1.6	162	23.5	325	11.7	762	5.0	379,925
Rest of Tripolitania	16	409	682	9.6	112	58.4	63	103.8	344	19.0	654,164
Benghazi Muqataa	5	558	789	3.5	114	24.5	156	17.9	570	4.9	278,826
Rest of Cyrenaica	6	287	1039	1.7	67	25.7	61	28.2	488	3.5	172,128
Fezzan	45	159	289	2.7	74	10.7	31	25.6	265	3.0	79,326
Total Libya	42	372	5213	3.0	529	2957	636	24.6	2389	6.6	1,564,369

(1) Includes General, Tuberculosis, Psychiatric, Leprosy, Obstetric and other Surgeon Hospitals, and Medical Centres.
(2) Includes Dispensaries, Preventive Health Centres, Maternal & Child Health Centres, Anti-Tuberculosis Centres, Anti-trachomia centres, Mobile clinics, Private Practitioners clinic, Private Pharmacies and training institutes.
(3) Includes pharmacists, dentists and physicians.
(4) Includes midwives, nurses, assistant pharmacists and technicians.

Source: Ministry of Health, Libya. Statistical Section, Tripoli, (1967).

Table 27

*Results of Food Consumption Survey 1957**

Locality	Economic Status		Calories	A Total Protein	A Animal Protein	A Veg. Protein	A Fats	B Calories	B Total Protein	B Animal Protein	B Veg. Protein	B Fats
Tripolitania												
Suk el Giuma	Middle	Required	1930	52	10	42	35	1970	55	11	44	38
		Consumed	1819					1838				
	Low	Required	2040	42	6	37	19	-	-	-		
		Consumed	1350					2060				
Coastal Belt	Middle	Required	2180	74	2	72	41	2180	84	4	79	56
		Consumed	2642					2898				
	Low	Required	2100	52	3	49	24	2070	62	4	58	27
		Consumed	1710					1960				
Gebel	Middle	Required	2060	84	5	79	75	2060	93	8	84	69
		Consumed	2855					3088				
	Low	Required	2070	52	5	47	32	2100	67	5	61	40
		Consumed	1770					2090				
Cyrenaica												
Coastal Belt	Middle	Required	2090	63	7	56	32	2040	76	5	71	64
		Consumed	2315					2877				
	Low	Required	1860	29	4	25	14	2080	57	6	51	29
		Consumed	1150					1920				
Gebel	Middle	Required	1950	70	11	59	59	1950	94	8	86	63
		Consumed	2560					3130				
	Low+	Required	2410	-	-	-	-	2721	(84)	(1)	(83)	(27)
		Consumed	-					(2686)				
Fezzan	Middle	Required	2170	106	11	85	48	2175	89	11	78	55
		Consumed	2633					2344				
	Low	Required	2190	64	2	62	24	2320	59	6	53	26
		Consumed	1400					1720				

* Sample of 154 families with 745 members

A - Food consumption during preceding day

B - Average daily food consumption on basis of monthly purchases

\+ - Only two families

Table 28 Citizen Population by Sex and Age Groups 1954-64, and Hypotheses concerning Underenumeration and Immigration

Male Citizens Age Groups 1954	1964	Population Difference 54-64	Hypothesis I (1) under enumeration	Hypothesis I (1) net immigration	Hypothesis II (2) under enumbe	Hypothesis II (2) net immig.
0-4	10-14	+8,444	20,000	-	43,000	
5-9	15-19	-9,216	-	-		
10-14	20-24	+2,458				
15-19	25-29	+14,750	-	25,000		
20-24	30-34	+2,985				
25-29	35-39	- 674				
30-34	40-44	- 410				
35-44	45-54	- 618	-	3,000		60,000
45-54	55-64	-6,602				
55-64	65-74	-6,911	-	-		
65+	75+	-15,398	-	-		
	Total	+28,637	20,000	28,000	43,000	60,000
Female Citizens						
0-4	10-14	-4,150	8,000	-	30,000	
5-9	15-19	-9,693	-	-		
10-14	20-24	+7,157	9, 600	-	9, 600	9,000
15-19	25-29	+19,146	20,400	-	17,400	3,000
20-25	30-34	+5,970	1,000	6,000	-	
25-29	35-39	-3,659	-	-	-	7,000
30-34	40-44	-1,215	-	-	-	
35-44	45-54	-6,619	-	-	-	
45-54	55-64	-10,021	-	-	-	
55-64	65-74	-5,097	-	-	-	
65+	75+	-16,696	-	-	-	
		+32,273	38,600	6,000	57,000	10,000
Both Sexes		+60,910	58,600	34,000	100,000	70,000

(1) Low Infant Mortality: 150 per 1,000 persons aged 0-4 years in 1954
(2) High Infant Mortality: 300 per 1,000 persons aged 0-10 years in 1954

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959) and Ministry of Economy and Trade, Libya. General Population Census, 1964, Tripoli, (1966).

Table 29 Percentage Increase in Population by Mutassarrifia, 1954-64

Mutassarrifia	Population 1954 Census	Population 1964 Census	Increase 1954-64	% Increase 1954-64	% Increase per year
Benghazi City	69, 718	137, 295	67, 577	97	7.0
Tobruk	19, 891	38, 923	19, 032	96	6.9
Yefren	32, 255	60,074	27, 819	86	6.4
Nalut	20, 857	35, 512	14, 655	70	5.3
Tripoli City	129, 728	213,506	83, 778	65	5.1
Sirte	18, 264	29,957	11, 693	64	5.1
Agedabia	27, 694	44, 164	16, 470	59	4.8
Sebha	17, 830	28, 511	10, 681	60	4.8
Beida	30, 994	48,019	17, 025	55	4.5
Garian	40, 240	61, 151	20, 911	52	4.3
Suk el Giuma	110, 419	166, 419	56, 000	51	4.2
Sabratha	30, 285	42,634	12, 349	41	3.6
Benghazi Dist.	64, 866	89, 866	25, 447	40	3.5
Zawia	82, 438	111, 734	29, 296	36	3.1
El Jufra	9, 715	12, 501	2, 786	29	2.6
Derna	35, 886	45, 189	9, 303	26	2.3
Murzuk	11, 971	14, 999	3, 028	25	2.3
Misurata	56, 902	70, 381	13, 479	24	2.2
Tarhuna	40, 189	48, 495	8, 308	21	1.9
Kufra	6, 231	7, 501	1, 270	20	1.8
El Shati	15, 870	18,876	3, 006	19	1.7
Zuara	30, 634	36, 340	5, 706	19	1.7
Mizdah	15, 716	18, 194	2, 478	16	1.5
Ghadames	5, 146	5, 952	806	16	1.5
Ghat	3, 929	4,439	510	13	1.2
Zliten	41, 066	45, 556	4, 490	11	1.1
Marj	36, 403	49, 997	3, 594	10	1.0
Homs	62, 272	65,988	3, 716	6	0.6
Beni Ulid	21, 929	22, 196	67, 67	1	0.1
	1, 088, 889	1, 564, 369	474, 480	44	365

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli (1966).

Table 30 Linear Population Projections (based on increases between official censuses 1954 and 1964)

	Projected population (mid-year)		
	1962	1967	1972
Tripoli (City)	196, 750	238, 639	280, 528
Suk el Giuma	155, 219	183, 219	211, 219
Garian	56, 968	67, 424	77, 879
Mizdah	17, 700	18, 938	20, 178
Yefren	54, 511	68, 511	82, 330
Nalut	32, 585	39, 910	47, 240
Ghadames	5, 794	6, 195	6, 600
Zawia	105, 878	120,524	135, 174
Sabratha	40, 165	46, 339	52, 514
Zuara	35, 202	38, 053	40, 908
Homs	65, 248	67, 104	68, 964
Tarhuna	46, 835	50, 988	55, 143
Beni Ulid	21, 985	22, 217	22, 252
Misurata	67, 686	74, 425	81, 165
Zliten	44, 658	46, 903	49, 148
Sirte	37, 616	33, 464	49, 309
Sebha	26, 374	31, 715	37, 055
El Shati	18, 270	19, 776	21, 276
El Jufra	11, 947	13, 338	14, 733
Murzuk	14, 395	15, 908	17, 423
Ghat	4, 337	4, 592	4, 847
Benghazi (City)	208, 556	255, 068	191, 357
Benghazi (Dist.)			110, 220
Agedabia	40, 870	49, 105	57, 340
Kufra	7, 247	7, 882	8, 517
Derna	43, 326	47, 979	52, 629
Tobruk	35, 115	44, 632	54, 147
Beida	44, 618	53, 128	61, 643
Marj	39, 275	41, 074	42, 869
Total	1, 469, 130	1, 706, 959	1, 944, 607

Sources: Ministry of National Economy, Libya. General Population Census 1954, Tripoli, (1959), and Ministry of Economy and Trade, Libya. General Population Census 1964, Tripoli, (1966).

BIBLIOGRAPHY

Although no direct reference has been made to them the following sources also proved useful.

Ahmad, Q. Indian Cities. Characteristics and Correlates, Research Paper No. 102, Chicago, Illinois. (1965).

Barbour, N. (ed) A Survey of North West Africa, (The Maghrib), Oxford University Press, (1962).

Barbour, K.M. and Prothero, R.M. (eds), Essays on African Population, Routledge and Kegan Paul, London, (1961).

Barclay, G.W. Techniques of Population Analysis, John Wiley and Sons, Inc., New York, (1958).

Berger, Monroe. (ed.) The New Metropolis in the Arab World, New Delhi, (1961).

Breese, G. Urbanization in Newly Developing Countries, Prentice-Hall, Inc., New Jersey, (1966).

Brown, C. State and Society in Independent North Africa, Middle East Institute, Washington, (1966).

Clarke, C. Population Growth and Land Use, Macmillan, London, (1967)

Clarke, J.I. Population Geography, Pergamon Press, London, (1965).

Coale, A.J. and Hoover, E.M. Population Growth and Economic Development in Low-Income Countries; a case study of India's prospects, Princeton University Press, New Jersey, (1958).

Duncan, O.D., Cuzzort, R.P. and Duncan, B. Statistical Geography; Problems in analysing areal data, Glencoe, Illinois, (1961).

Ginsburg, N.S. Atlas of economic development, Chicago, (1961).

Haggett, P. Locational Analysis in Human Geography, Edward Arnold, London, (1965).

Hajjaji, S.A. The New Libya, Government Printing Press, Tripoli, (1967)

Harbison, F. Manpower and Education, McGraw Hill, (1965).

Hauser, P.M. and Duncan, O.D. (eds) The Study of Population, University of Chicago Press, Illinois, (1959).

Herrick, B. H. Urban Migration and Economic Development in Chile, The M.I.T. Press, Massachusetts, (1965).

Higgins,, B. The Economic and Social Development of Libya, New York, United Nations Technical Assistance Programme, (1953).

Higgins, B. Economic Development Problems, principles and policies, London, (1959).

Hoselitz, B. Sociological Aspects of Economic Growth, Glencoe, Illinois, (1960).

International Labour Office. Labour Survey of North Africa, Geneva, (1960).

International Bank for Reconstruction and Development. The Economic Development of Libya, The Johns Hopkins Press, Baltimore, (1960).

Kanter, H. Libyen: eine geographisch-medizinische Landeskunde, Springer-Verlag, Berlin, (1967).

Kubbah, A.A.Q. Libya: its oil industry and economic system, Rihani Press, Beirut, (1964).

Meier, G.M. Leading Issues in Development Economics, Oxford University Press, New York, (1964).

Rostow, W.W. The Stages of Economic Growth, Cambridge, (1960).

Schiffers, H. Libyen und die Sahara, Kurt Schroeder, Bonn, (1962).

United Nations. A General Economic Appraisal of Libya, Technical Assistance Administration, New York, (1952).

United Nations. The Determinants and Consequences of Population Trends, New York, (1953).

Villard, H. S. Libya: The New Arab Kingdom in North Africa, Cornell University Press, (1956).

Warriner, D. Land Reform and Development in the Middle East, A Study of Egypt, Syria and Iraq, Oxford University Press, (1962).

Zelinsky, W. A Prologue to Population Geography, Prentice-Hall, Inc., New Jersey, (1966).

Ziadeh, N.A. The Modern History of Libya, Weidenfeld and Nicholson, (1967).

ARTICLES

Abu-Lughod, J. "Migrant adjustment to city life: the Egyptian Case, American Journal of Sociology, Vol. 67, (1961), pp.23.-32.

Abu-Lughod, J. "Rural-Urban Differences as a Function of the Demographi Transition : Egyptian Data and Analytical Model", American Journal of Sociology. Vol. 69, (1963), pp. 476-49

Abu-Lughod, J. "Urbanization in Egypt : present state and future prospects Economic Development and Cultural Change (E.D.C.C.), Vol.13, (April 1965), pp.313-343.

Ackerman, E.A. "Italian Colonization in Libya", Geographical Review, Vol. 30, (1940), pp. 684-6.

Ackerman, E.A. "Geography and Demography", in P.M. Hauser and O.D. Duncan (eds.), Study of Population, Chicago University Press, Chicago, Illinois, (1964), pp.717-727.

Adams, D. "Current Population Problems of Iraq", Middle East Journal, Vol.10, (1956), pp. 151-164.

Amiran, D.H.K. and Shahar, A. "The Towns of Israel-Principles of their Urban Geography", Geog. Review, Vol. 51, (1961), pp. 348-369.

Awah, H. "Morocco's expanding towns". Geographical Journal Vol.130, (1964), pp. 49-65.

Azeez, M.M. Geographical Aspects of Rural Migration from Amara Province, Iraq, 1955-64, unpublished Ph.D. thesis, University of Durham, (1968).

Berry, B.J.L. Simmons, J. W. Tennant, R. J. "Urban Population Densities Structure and Change, " Geog. Review, Vol. 53, (July 1963), pp. 389-405.

Bogue, D. J. "Internal Migration", in P.M. Hauser and O.D. Duncan (eds.). The Study of Population, Chicago University Press, Chicago, Illinois, (1964), pp. 486-509.

Bottomley, A. "The Effect of the Common Ownership of Land upon Resource Allocation in Tripolitania, " Land Economics Vol. 39, No. 1, (Feb.1963), pp. 91-95.

Bottomley, A. "Stability of Income and Employment in an Underveloped Semi-Desert Community", Economia Internazionale, Vol. 17, No. 2, (1964), pp.3-18.

Bright, M.L., and Thomas, D.S. "Interstate Migration and Intervening Opportunities", American Sociological Review, Vol.6, (1941), pp. 773-783.

Brown, R. W. "Geographic Factors in the Construction and Operation of Libyan Petroleum Ports, "Libyan Economic and Business Review, Vol. 2, No. 2, (1966), pp.27-56.

Clark, C. "Urban Population Densities", Journal Royal Statistical Society, Vol. 114, (1951), pp. 490-6.

Clarke, J.I. "The Population of Tunisia : an example of contact between Modern Civilization and the Moslem World, " Economic Geography, Vol. 28, No. 4, (Oct. 1952), pp. 364-71.

Clarke, J. I. "Emigration from Southern Tunisia," Geography, Vol. 42, (1957), pp. 96-104.

Clarke, J. I. "Oil in Libya : some implications," Economic Geography, Vol. 39, No. 1, (Jan. 1963), pp. 40-59.

Davis, K. "The Origin and Growth of Urbanism in the World", American Journal of Sociology, Vol. 60, No. 5, (1955).

Davis, K. and Golden, H. "Urbanisation and the development of pre-industrial areas," Econ. Dev. and Cult. Change, Vol. 3, (Oct. 1954), pp. 6-27.

Dewey, R. "The Rural-Urban Continuum", American Journal of Sociology, Vol. 66, (1960), pp. 60-66.

Dresch, J. D. "Utilization and Human Geography of the Deserts", Transactions of the Institute of British Geographers, Publication No. 40, (1966), pp. 1-10.

El-Badry, M.A. "Some Aspects of Fertility in Egypt", Millbank Memorial Fund Quarterly, Vol. 34, (1956), pp. 22-43.

El-Badry, M. A. "Trends in the Components of Population Growth in the Arab Countries of the Middle East. A Survey of Present Information", Demography, Vol. 2, (1965), pp. 140-187.

Fisher, W.B. "Agriculture in Modern Libya," Geographical Magazine, Vol, 25, (Aug. 1952), pp. 184-194.

Hamilton, C. H. "Population Pressure and Other Factors affecting net Rural-Urban Migration", in J. J. Spengler and O. D. Duncan (eds), Demographic Analysis, Vol. 3, (1956), pp. 419-424.

Hamilton, C. H. "Effects of Census Errors on the Measurements of Net Migration", Demography, Vol. 3, (1966), pp. 393-415.

Hamilton, C. H. "Some Problems of Method in Internal Migration Research" Population Index, Vol. 27, (1961), pp. 297-307.

Harrison, R. S. "Migrants in the City of Tripoli", Libya", Geographical Review, Vol. 57, 1967, pp. 397-423.

Hoselitz, B. "Generative and Parasitic Cities", Econ. Dev. and Cult. Change, Vol. 3, (April, 1955), pp. 278-94.

Hunter, J. M. "Ascertaining Population Carrying Capacity Under Traditional Systems of Agriculture in Developing Countries" Professional Geographer, Vol. 18, (1966), pp. 151-154.

International Labour Office, "Manpower and Employment Problems in Libya", International Labour Review, Vol. 85, (1962) pp. 30-40.

Islam, N. "Concepts and Measurement of Unemployment and Under-employment in developing economies", International Labour Review, No. 89, (1964), p. 240.

Jagielski, A. "Population in North Africa in the 20th Century : A Geographical Survey", Acta Universitatis Wratislaviensis, Wroclaw, No. 41, (1966), pp. 145-7.

Kariel, H. G. "Selective Factors Areally Associated with Population Growth due to Net Migration" Annals of the Association of American Geographers, Vol. 53, (1963), pp. 210-223.

Kirk, D. and Nortman, D. "Population Policies in Developing Countries", Econ. Dev. and Cult. Changes, Vol. 15, No. 2, (Jan, 1967), pp. 129-142.

Lee, E. S. "A Theory of Migration" Demography, Vol. 3, No. 1, (1966), pp. 47-57.

Legg, H. J. Libya Economic and Commercial Conditions, Overseas Economic Surveys, H. M. S. O., (1952).

Margaret, L. B. and Thomas, D. S. "Interstate Migration and Intervening Opportunities", American Sociological Review, Vol. 6, (1941), pp. 773-783.

Mather, D. B. 'Migration in the Sudan", In R. W. Steeleand C. A. Fisher (eds). Geographical Essays on British Tropical Lands, George Philips and Son, London, (1956), pp. 115-143.

McLoughlin, P. F. M. "The Sudan's Three Towns : A Demographic and Economic Profile of an African Urban Complex" Econ. Dev. and Cult. Change, Vod. 12, No. 1. (Oct. 1963) pp. 70-83.

Mehta, S. K. "Some Demographic and Economic Correlates of Primate Cities" ; A case for Re-evaluation", Demography, Vol. 1 No. 1. (1964), pp. 136-

Meliczek, H. "Socio-Economic Conditions of A Libyan Village and Proposal for Future Development", Institute of Foreign Agriculture, Berlin, (1964).

Miner, H. "The Folk-Urban Continuum", American Sociological Review, Vol. 17, (1952) pp. 529-537.

National Bank of Libya, "Inflation in Libya", The Economic Research Dept., Tripoli, (March, 1961).

Nixon, J. W. "Classification of the Population by Economic Activities" Journal of the Royal Statistical Society, Vol. 124, (1961), pp. 526-543.

Olsson, G. "Distance and Human Interaction . A Migration Study", Geographiska Annaler, Vol. 47, (1965), pp. 3-43.

Pan, C. L. "The Population of Libya", Population Studies, Vol. 3, No. 1, (June, 1949), pp. 100-125.

Percil, D. A. "Some Features of A Peasant Population in the Middle East", Population Studies, Vol. 3, (1949), pp. 192-204.

Peters, E. L. "The Sociology of the Bedouin of Cyrenaica, Ph.D. thesis, Lincoln College, Oxford, (1950).

Peterson, W. "A General Typology of Migration", American Sociological Review, Vol. 23, (1958), pp. 256-266.

Phillips, R. "Italy's Mass Colonization of Libya," Journal Royal African Society, Vol. 39, No. 155, (April 1940), pp. 129-133.

Pollak, A.N. "Agrarian Problems of the Middle East," Middle Eastern Affairs, Vol. 3, (1952), pp. 165-170.

Prothero, R.M. "Continuity and Change in African Population Mobility" in R.W. Steel and R.M. Prothero (eds): Geographers and the Tropics : Liverpool Essays, (1964), pp. 189-211.

Prothero, R.M. "Socio-Economic Aspects of Rural-Urban Migration in Africa South of the Sahara", Scientia, Vol. 59, (1965), pp. 1-7.

Pullen, G. "Some Problems of Rapid Urbanization in Lagos, Nigeria, Journal of Tropical Geography, Vol. 23, (1966), pp. 55-61.

Reddaway, W.B. "Economics of Underdeveloped Countries", Advancement of Science, Vol. 19, (1962-63).

Rose, A.M. "Distance of Migration and Socio-Economic Status of Migrants", American Sociological Review, Vol. 23, (1958),

Rose, A.M. and Warshay, L. "The adjustment of migrants to cities," Social Forces, Vol. 26, (1957), pp. 72-76.

Royal Institute of International Affairs. Libya: A brief Political and Economic Survey, (May, 1957). Prepared by the Information Dept. of the R.I.I.A. of Chatham House, London.

Schore, L.F. "Urbanisation and Economic Development: the demographic contribution," American Journal of Economics and Sociology, Vol. 23, No. 1, (Jan 1964).

Stampolis, A. "Libyan Population Trends," Libyan Economic and Business Review, Vol. 1, No. 1, (1965), pp. 57-65.

Stauffer, M. A. "Intervening Opportunities: The Theory Relating Mobility and Distance, American Sociological Review, Vol. 5, (1940), pp. 845-867.

Stauffer, T. B. "The Industrial Worker", in S.N. Fisher (ed). Social Forces in the Middle East, (1955), pp. 83-98.

Stewart, C. "Migration as a Function of Population and Distance" American Sociological Review, Vol. 25 (1960), pp. 347-356.

Stewart, J.Q. and Warntz, W. "Physics of Population Distribution" Journal of Regional Science, Vol. 1, (1958) pp. 99-123.

Szabo, M. L. "Area Differential Productivity of Agricultural Resources" and Off-Farm Migration on the Canadian Praries," Geographical Bulletin, Vol. 8, (1966), pp. 113-133.

Tannous, A.I. "Social Change in an Arab Village", American Sociological Review, Vol. 6, (1941), pp. 650-662.

Thomas, F. C. "The Libyan Oil-Worker", The Middle East Journal, Vol. 15 No. 3, (1961).

Thomas, H.H. "Libya. Economic and Commercial Conditions in Libya." Overseas Economic Surveys, H.M.S.O., (1956).

Toni, Y.T. 'The Population of Cyrenaica" Tijdschrift voor economische en Sociale Geografie, Vol.49, No. 1. (1958) pp.1-18.

Trewartha, G.T. "The Case for Population Geography" Annals of the Association of American Geographers. Vol.43 (1953) pp. 71 - 97.

Ullman, E. L. "Human Geography. Area Research", Annals of the Association of American Geographers. Vol.43, (1953) pp.54-66

Weinryb, B. D. "The Impact of Urbanization in Israel", Middle East Journal, Vol.11 (1957), pp.23-36.

Zachariah, K.C. "Bombay Migration Study : A Pilot Analysis of Migration to an Asian Metropolis" Demography Vol.3 (1966) pp.378-392.

Zimmer, B.G. "Participation of Migrants in Urban Structure", American Sociological Review, Vol.20 (1955) pp.218-224.

BIBLIOGRAPHIES

Alwan, A. S. A Bibliography on Land Tenure and Related Questions in Libya, FAO, Benghazi, (1963).

Evans-Pritchard, E. E. "A select bibliography of the writing on Cyrenaica", African Studies, Part 1, Vol.4, No.3, (1945), Part 11, Vol.5, No. 3, (1946), Part 111, Vol.8, No.2, (1949), Johannesburg, Witwatersrant University Press.

Fuller, G. H. A list of references of the Italian Colonies in Africa (Libya, Eritrea, Italian Somaliland & Ethiopia), Library of Congress, Division of Bibliography, U.S.A. (1942).

Hill, R.W. A Bibliography of Libya, Research papers series No. 1 (1959), Dept. of Geog., Durham Colleges.

Playfair, R.L. "The bibliography of the Barbary States, 1, Tripoli and Cyrenaica," Royal Geographical Society, Supplementary Papers, Vol.2, part 4, pp.559-614, London, (1889)

The Middle East Institute. Current Research on the Middle East, 3 vols. 1955, 1956 and 1957. Libya, Subject Index p.188, (1955) Libya, Subject Index p.85, (1956), Libya, Subject Index p.97, (1957), Washington, D.C.

Varley, D. H. A Bibliography of Italian Colonisation in Africa, London, 1936, Published jointly by the Royal Empire Society and the Royal Institute of International Affairs.

Ward, P. A Survey of Libyan Bibliographical Resources, Libyan Publishing House, Tripoli, (1965)

Woolbert, R. G. "Italian colonial expansion in Africa," (Bibliographical Review article), Journal of Modern History, Chicago, Vol. 4, (Sept. 1932), pp. 430-45.

Zelinsky, W. A. A Bibliographic Guide to Population Geography, University of Chicago, Illinois, (1962).