

Sustaining the Population Growth of Desert Settlements

Case Study: North Sinai, Egypt

Thesis submitted for the degree of
Doctor of Philosophy

By

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Abstract of Thesis Form

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Abstract

Egypt faces ongoing problems in its population distribution. While heavily populated areas of the Nile Valley continue to attract migrants, depopulated areas remain largely empty. In North Sinai, in spite of governmental support represented in new infrastructure and many urban and investment projects, there exists a tremendous under-population problem. In the meantime the urban centres of Egypt are suffering worsening social, economic, infrastructural and environmental problems exacerbated by overpopulation.

This thesis addresses the concept of sustaining population growth of desert settlements. It argues that the socio-economic needs of desert settlements are to a large part overlooked, thus contributing to their failure to attract and retain large numbers of people. Discussion of this subject is structured into three parts, followed by the conclusion and recommendations.

Part One uses extensive literature references to give a comprehensive background to the different features of desert settlements and their social, economic and environmental dimensions. Part Two covers the theoretical approach of sustaining the population growth of desert settlements, especially in peripheral areas. This part ends with a comparative analysis between three desert development experiences; in Egypt, the USA and Israel. These first two parts are targeted to address the indicators of sustaining

population growth. These investigations into the subject area support a view that it is not sufficient for governments only to use economic, employment and infrastructural means to attract people to desert settlements. These do not tackle the problem of public attitudes towards living in remote communities, nor do they provide settlements that are adaptive to the desert environment, which would invite settlers to remain and bring up their families there. These insights construct the analytical background to the field study in Part Three, which outlines the research techniques and the case study, field survey and questionnaire conducted with the assistance of residents of five chosen desert settlements in North Sinai. This analysis examines the attitudes among 'local' and 'new comer' households looking at their residential mobility, the relocation process, and the consequences of the community and prospects for the future.

The findings lead to the conclusion that much of the deviation from achieving national and regional population dispersal policies can be explained through studying the socio-economic and socio-cultural dimensions of desert settlements. They highlight significant differences in values, motivations and interests of both 'local' and 'newcomer' households and explain that these forces should have a major influence in formulating and implementing effective population redistribution policies.

Although the research limits itself to the context of the desert environment, the author suggest that its findings may offer valuable insights to other parts of the world, where national policies are seeking to counter the global problems of rural-urban migration.

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CHAPTER ONE

Introduction

CHAPTER 1:

INTRODUCTION

*'What we observe is not nature itself, but nature
exposed to our method of questioning'*

(W. Heisenberg)

This chapter acts as an introduction to this thesis, explaining the background of Egypt and clarifying the problems inherent in the sustainable settlement of peripheral desert areas to formulate a set of research questions and objectives. The chapter is ended by the methodology and thesis structure.

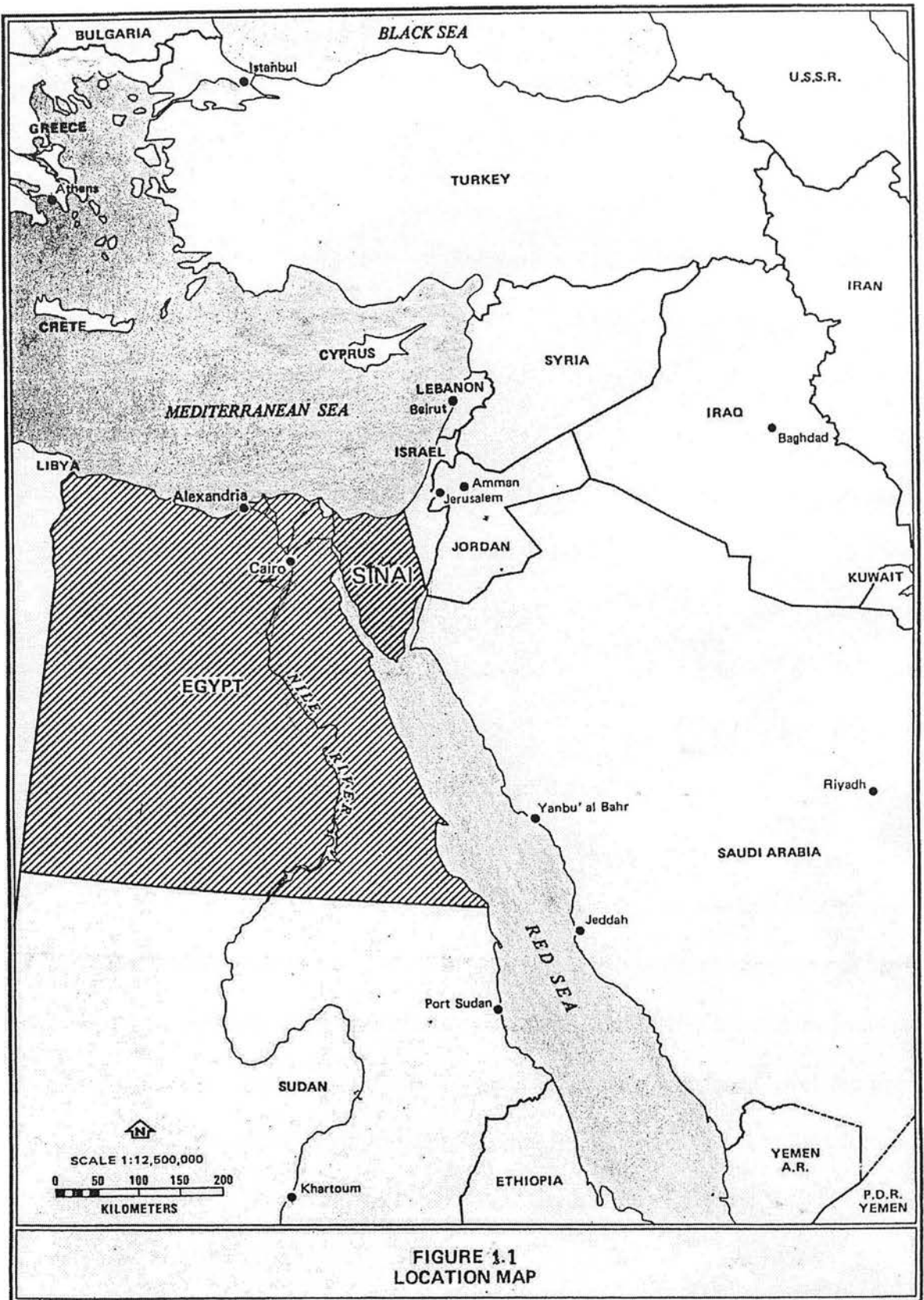
1.1 Preface

1.1.1 Location of Egypt:

Egypt is situated in the north-east of Africa and joins the two continents of Africa and Asia. Its boundaries are the Mediterranean to the north, the Sudan to the south, the Libyan Desert on the west, and the Red Sea, the Gulf of Aqaba and Israel and Palestine to the east (Fig.1).

The area of Egypt is about one million square kilometres. The Nile River flows south to north, crossing the 22° latitude and flowing into the Mediterranean through its two branches at Damietta and Rosetta.

The general geographic pattern of Egypt exhibits four major natural divisions: the Nile Valley and the Delta, the Western Desert, the Eastern Desert and the Sinai Peninsula at the most north-eastern part. In the southern part, the Nile River runs through a very narrow passageway between two plateaus of sandstone until it reaches the city of Esna, and then an area of limestone, northward to Cairo where the river widens onto the Delta.



1.1.2 The Environmental Context:

Geographically speaking, Egypt is unique. Its environment exhibits the paradox of the absolute desert and the fertile river valley, both in their extremes. Generally,

according to climatic criteria, the whole territory of Egypt is absolute desert with an average annual precipitation of 1.0 centimetre, most of which is concentrated in the narrow coastal strips (Fajal, 2002 and Hamdan, 1980). As the Tropic of Cancer cuts across the whole territory parallel to its southern boundary, Egypt lies within the global girdle of extremely arid zones of the middle latitudes, exactly at the eastern fringe of the largest and driest desert in the world, the Sahara.

Egypt typifies the hot arid desert environment. The classification for the whole territory is 'extremely arid' except for the marginal strips of the northern littoral, which is 'arid'. Subsequently, the extreme lack of natural vegetation cover is a persistent feature. The Nile Valley, with only a total area of 33,000 square kilometres, less than 3.5 percent of the Egyptian territory, is merely a scratch on the surface of an extremely arid landscape. Paradoxically, although Egypt along the Nile was one of the earliest and greatest hydraulic and agricultural civilisations of the world, it is statistically the most arid state, not only at the regional level of the arid Middle East, but of the entire globe (Table 1).

Without the Nile, Egypt is but a hot, extremely arid and barren land scarcely capable of supporting a small settlement of people, much less the civilisation it actually did. The Nile, carrying water from the African highlands 6,700 kilometres from the Mediterranean Sea, also deposited rich alluvial sediments which have, over the ages, created the fertile lands of Egypt, or simply created Egypt. This fact is reflected in the famous statement of the first Greek historian, Herodotus, "Egypt is the gift of the Nile"(Hamdan, 1980).

The Egyptian landscape is in fact artificial. Before the development of the primary human settlements and the emergence of organised agriculture, the narrow banks of the Nile were just marshes and swamps that hardly supported a primitive hunting and gathering culture (Hegazy, 2000b). Starting with the very simple and

microscopic pattern of the Valley, the impact of the human interference through an extensive and sophisticated irrigation system was tremendous. Construction of artificial canals, drainage ditches, land levelling and barrages have created a human landscape rather than a natural one.

Table 1.1: Percentage of Arid Land Distribution in the Middle East & North Africa

Area	Arid Lands			Total	Humid Lands
	Extremely Arid	Arid	Semiarid		
Egypt	86	14	-	100	-
Libya	75	23	2	100	-
Algeria	50	38	9	97	3
Sudan	24	34	34	92	8
Israel & Palestine	19	42	15	76	24
Jordan	5	92	3	100	-
Morocco	-	27	53	80	20
Tunis	-	75	14	89	11
Lebanon	-	-	-	-	100
Syria	-	16	73	89	11
Iraq	-	80	16	96	4
Kuwait	-	100	-	100	-
Yemen	-	44	42	86	14
Arabian Peninsula	21	69	10	100	-
Middle East & North Africa	37	43	16	96	4
Global total	4	15	14	33	67

Source: Fahmi (1995) p.12

This characteristic pattern extends invariably throughout the Nile Valley. Homogeneity, constancy and continuity have always been the basic features of the ecosystem. Throughout history, the height of plateaus bordering the narrow Valley, combined with technological constraints as well as cost, have always impeded the potential for expanding the cultivated area further eastward or westward. The pattern of growth, both demographically and economically, in this compressed and limited linear

landscape, has always been to extend vertically rather than horizontally, resulting in densification and intensification.

1.1.3 Population trends:

The nation's settlement and population distribution pattern are strongly reflected by the attributes of Egypt's physical environment. The Egyptian agrarian society throughout history has been largely confined to the Valley. Population growth was accommodated there with resultant higher population densities and, more recently, the development of new techniques of land and water management. This pattern remained stable in spite of the existence of two wide littorals on the Mediterranean and the Red Sea. The coastal settlements were characteristically marginal until recent times, with the exception of Alexandria that has experienced long ages of decay. In addition, the desert prevented the expansion of settlements into the landscape. The great contrast between the two environments - the desert and the town; the vast desolate tracts and the densely inhabited Valley- has been deeply rooted in the psychosocial and cultural patterns.

Throughout history, there exist a kind of ecological balance among population size, inhabited territory and natural resources. However, the demographic transition beginning in the second half of the nineteenth century has brought about new forces of imbalance. The Egyptian population jumped from 9,749 million in 1897 to 69,228 million in 2001, i.e seven times in less than 100 years, with an increase of the annual growth rate from 1.34 to 2.31 percent. Currently Egypt doubles its population every twenty-five years or less (Abo Zied, 1996). One projection of population growth estimates an increment of 50 million by the year 2020 (Fahmi, 1995).

Egypt is considered overpopulated as measured against various socio-economic indicators. However, such a perception inherently overlooks many variables that exacerbate social problems, and subsequently underestimates many alternative

development approaches (Fahmi, 1995).

Overpopulation is a relative state of affairs. Sheer population increase does not by itself impede economic development. Population base, resource availability, efficiency of resource use and the nature of income distribution, among others, must also be considered.

1.1.4 Settlement Pattern:

Given the various factors that influence the well-being and economic development of a society, attention in this research is focused on the population dispersion pattern to which the economic and social development of a nation is organically linked. The make up of the spatial arrangements of population distribution, resource utilisation and investment allocations constitute the instruments of any development policy.

One of the basic arguments of this research is that the current settlement pattern of Egypt impedes the functioning of social and economic systems and greatly amplifies existing pressures. This peculiar pattern can be detected at two different levels. The first relates to the ratio of the total inhabited area to the whole national territory. The second level is related to population distribution within the inhabited area, where the pattern of population concentration is drastically intensified. The dynamics of urbanisation is the major factor behind this distribution.

Egypt has witnessed a very peculiar pattern of urban population growth with an annual rate that is more than twice that of the national growth rate. The urban population increased from 19 percent of the total in 1907 to 55 percent in 1996. The growth rate has been too fast to match the slow rate of economic development. Urbanization without modernization allowed only a cancerous and parasitic growth of cities that have become incapable of efficiently assimilating the new waves of migration

into their socio-economic systems. The result is the transplanting to the cities of large numbers of rural migrants unprepared for urban life, causing diseconomies of scale, failure of services, and a variety of social problems.

The size hierarchy of the Egyptian cities explicitly contradicts any healthy and balanced pattern. The two primary cities, Cairo and Alexandria, with about 28 percent of the Egyptian population and over 56 percent of the urban population, have monopolized all services, investments and capital allocation. The parasitic growth of big cities has increased the gap of unbalanced development between them, on one side, and small cities and rural settlements on the other side.

However, even the broad range of economic externalities of size in large cities leads to fluctuation and shrinkage due to the impact of congestion, infrastructure deterioration, pollution, waste and other difficulties of management and control.

The economics of uncontrolled and unplanned urban growth in the extremely narrow valley has brought about a predicament in the relationship between people and the ecosystem. The outward sprawl of large urban centres has exhausted large areas of the most precious cultivated land. In spite of the great schemes of land reclamation in the last 80 years, the increase of cultivated land has not kept pace with population growth.

As a result, the need to induce major changes in the current settlement pattern is critical in any process of social and economic development. Most of the Egyptian cities have old, deteriorating physical structures; they have surpassed the optimum size of efficient functioning. The realization of this fact, in combination with the expected population growth, renders the demand for new and viable human settlements critical and urgent. More important is the establishment of new regional structures that are well defined, internally integrated and balanced. Stable economic development can only function through a balanced structure of competitively and cooperatively interacting,

self-sustaining economic entities or units.

1.1.5 Needs and Potentials:

The vast desert lands of Egypt represent the most available and feasible location for new human settlements. The demographic, geographic, economic and social conditions of Egypt today allow no other alternative. It seems that the current problems of Egypt and the viability of social and economic development schemes depend dramatically on the nature of response to this challenge. The following are comments that reflect the interaction between needs and potentials:

- Due to the excessive size and the lack of planning and management in big urban centres in Egypt today, they suffer from many economic and social disruptions. New desert settlements could be the key factor in the development of a national policy for population and urban dispersal.
- New desert settlements would allow for balanced assimilation of the expected population increment through new, full-fledged, viable communities with high quality economic performance and stable social environment through which Egyptians can attain a better quality of life.
- While the process of emigration from Egypt to Arab oil countries and other parts of the world, whether temporary or permanent, has provided temporary economic relief,¹ it has also induced adverse effects. Successful new desert settlements with an enlarged potential for employment could attract internal migration and gradually decrease external migration. This, subsequently will mitigate the adverse phenomena of "brain drain," vulnerability to economic and

¹ In 1989 the remittances of Egyptians working abroad were approximately equal to the total income of Suez Canal and tourism together, and exceeded income generated from agricultural and industrial production. Remittances in the 70's have become the second largest item (after oil export) in GNP. In the 80's, with decreasing demand and prices of oil, they could be considered the biggest item in GNP (Hamdan, 1984 and Fahmi, 1995).

political changes at the regional level, and transplanted inflation and modes of wasteful consumption that have perturbed the Egyptian society.

- The urban expansion and industrial growth in the Valley during the last few decades have caused a considerable loss of the arable land that had already been exploited to the last inch. Allocating land in new desert areas for new industries and even relocating old ones in new parks will help to save Egypt's precious resource of the fertile land of the Valley. Industrial processing of desert raw materials could take place in desert areas rather than in the Valley². Such centres could serve as nuclei for new regions.
- The year-round warmth, dryness and air quality of the desert environment make it an attraction for a winter resort industry. These amenity resources are underdeveloped and entirely underutilized. The same situation prevails in the very attractive coastal areas of the Mediterranean and the Red Sea. While the tourism industry in Spain provides about 10 percent of its national income, tourism in Egypt, with larger resources and higher potential, contributes an equivalent of less than 1.0 percent to the national income. New desert settlements could provide viable centres for an active tourism and resort industry.
- A major under-utilised resource of desert areas is the high level of solar energy, which these areas receive on a daily basis. An economically viable technology for the conversion of this energy into immediately usable forms (such as electricity and industrial heat) may not be available at present, but with the drain on petroleum resources and continued high demand for energy, this situation could change. Egypt's desert areas could then contribute much needed energy

² A prominent example of dislocation is the transporting of iron ore from Al Baharia oasis in the Western Desert and Aswan to the industrial park of Helwan, a suburb of Cairo.

resources for both domestic and international consumption. This could do much to make desert settlements a reality.

- The current social problems in Egypt today have undoubtedly stimulated many sectors of society to aspire to and dream of a new stable and viable society. The conceptualization of such a new society and the associated energies necessary to build it are always depressed by the deteriorating physical and institutional structures in the decaying urban centres. As the gap between the dream and the reality widens, more depression, desperation, social disruption and violence are the predictable outcome. The visionary and pioneering transformation of desert into thriving human settlements can help in recovering from this psychosocial ailment. It can absorb forces of rejection; it can stimulate, organize and utilize the fragmented energies of all of those who dream of a new society. Social adjustment and recovery sometimes require a new and almost separated environment if reform is to be accomplished and the society is to stabilize. Planning and building the new communities could be an exercise in “miniature nation building” (Ibrahim, M. 1992).
- New desert settlements can ultimately lead to successful integration of important, though small, sectors of the Egyptian population. The nomadic, semi-nomadic and sedentary populations of the oases still represent, to some extent, heterogeneous components in the Egyptian society.
- Throughout history, the desert has served as a formidable natural barrier or a buffer zone against external military attacks. This defence advantage has been lost and has even become a disadvantage with modern technology. The sparsely inhabited and uninhabited deserts are now highly vulnerable to invasion by hostile military forces. This was demonstrated in the 1956 and 1967 wars with Israel. Settling the desert of Egypt, especially the core and boundary zones,

according to specific regional plans to establish high population densities could enhance the prospects of national defence. Furthermore, a redistribution of the population is in keeping with the strategic concept of decreasing the national vulnerability to military strikes by avoiding large population concentrations.

1.2 Objectives of the Study:

The Egyptian experience of desert development is a very recent one; it was instigated only in the second half of the 20th century. Three phases can be identified in this short history: the first started in the 50's, the second started in the end of 70s and the third started in the 90s. While it is too early to make a complete evaluation of the second and third phases, it may be quite fair to state that the first one, although it has not exhibited complete failure, could be considered far from the aspired success (Abo Zied, 1996; Fahmi, 1995).

Many studies of the situation have referred to reasons for lack of success that lie within the individual disciplines with which they are concerned. However, the defect of the Egyptian experience cannot be attributed to one specific cause. It was a multidimensional phenomenon where various fragmented components interacted and eventually brought about such results. The most common factor of all these components is the lack of knowledge of the human habitat in the context of desert ecosystem.

This analysis raises the need for a more comprehensive understanding of desert settlements as a holistic phenomenon. It seems that their problems do not lie within the boundaries of a specific discipline; rather, they are related to the absence of a "synthetic comprehension" that addresses them as total systems. This situation is accurately reflected in the literature of desert planning. However, there is an extreme lack of interdisciplinary research that deals with human settlements in desert areas. Most authors listed this and the lack of interdisciplinary institutions as the main problems of

desert development (Livi-Bacci, 2001 and Jones, 1990). Golany (1982) observes that:

settlement planning and construction is the area which has been most ignored by researchers; yet for practical planning, it is the most urgently needed body of knowledge. Research on special settlement planning and development of special urban forms for an arid zone has been minimal and disproportionately small compared to the research which has been done in non-arid areas (p. 11).

- **The objectives of this research are therefore:**

1. To attain a comprehensive understanding of human settlements in deserts. This entails a synoptic approach to the impact of the desert context, as a specific environment, on the settlement population across its social, economic and environmental dimensions.
2. To develop a general assessment of the Egyptian experience in establishing desert settlements, especially in North Sinai, the case study. This work is therefore more oriented to a detection of reasons for lack of success rather than drawing up a formal evaluation.
3. To recognise the adaptability of current policies in achieving and sustaining the target population growth of desert settlements.
4. To contribute to the formulation of a new approach in dealing with desert settlements. Such an approach represents a radical change from currently applied concepts.
5. To provide reliable recommendations for planning, policy formulation and decision-making institutions in Egypt.

• *The difficulties which were encountered during this research included:*

- a) A relatively lack of literature concerned with planning and policies of human settlements in the desert.
- b) A severe deficiency of documentation of the Egyptian experience exists.
- c) To study 'human settlements' in the desert means cutting across a broad range of many sciences and disciplines such as urban planning, geography, economics, sociology, cultural ecology, among others. This inherently brings about some difficulties in dealing with, and having adequate access to, many disciplines.

1.3 Research Hypothesis:

The main hypothesis in this research is that: *an actual and balanced approach that integrates the economic, social, cultural, political, spatial and ecological dimensions in the development process is necessary to achieve sustainable population growth in desert settlements.*

Within a fragmented planning process, in which specialised units are concerned with specific aspects in separation from other units, one may lose sight of the broad objectives of the whole process, that of establishing stable and viable new societies. The proposed approach, as it stresses the previously overlooked factors and delineates interactions and interdependencies between different dimensions, produces results that deviate not only from the currently dominant concepts of the Egyptian experience, but from certain aspects of the international experience as well.

1.4 Research Questions:

Following this approach, the research questions relevant to outlining a comprehensive proposal for Egypt address the following questions:

1. What are the main dimensions of sustainable development in desert settlements?
2. Why have the previous and current dispersal policies failed to achieve their population targets?
3. Are there statistical methods that can measure the sustainability of population growth for a certain settlement?
4. Does the viability of new desert settlements depend on the ability to recognise the motivations that inspire people to live in remote areas?
5. What is the best spatial settlement pattern to achieve sustainable population growth in the desert? Is it best met by establishing small or large communities? Should it focus on urban or rural ways of life?
6. What are the characteristics of the migrants of the existing new desert settlements? Why did they migrate? To where did they migrate? And what are the consequences?

1.5 Methodology

The aim of this thesis is twofold: to point out the urban problems and obstacles that have encounter sustaining the population growth in desert communities; and defining aspects to take into consideration that could be used in planning the population policies for new desert communities, especially in North Sinai, Egypt the area of case study.

The research is designed to employ mainly qualitative research methods: a *Literature Review* divided into general theoretical background and the different experiences of desert settlements and its sustainable dimensions; a *Comparative Analysis* of three different experiences representing the three main approaches of planning desert settlements in the world today; and a *Field Study* of five selected

settlements in desert of North Sinai, Egypt. The first two stages are preparatory stages for the field study and are used to guide the researcher in recognising what data and criteria to look for and how this may be elicited.

The *Literature Review* presents an understanding of the general parameters of the subject areas of desert settlements in general, urban requirements and the population dispersal policies. It also investigates the definitions and the new theories that relate to sustaining the population growth. Much literature traces changes that have occurred within the population balance of many countries and to what extent these reflect the government's population policy.

There have been several approaches for evaluating the effects of population policies that look at intended impacts and the cumulative differences between the values of selected measurable indicators (availability of employment or housing, extent of infrastructural development and so on) and the values that would be expected in the absence of policy. From this the researcher was able to explore the different aspects that would express the effects of policy on population growth and dispersal.

The *Comparative Analysis* makes a comparison between the policies that have been applied in three different countries Egypt, USA and Israel. This comparison represents the three main themes of desert settlements in the world today: traditional; liberal economic; and military / ideological.

The information that results from the comparative Analysis has been used to outline criteria of the *Field Study*. This stage takes the form of a questionnaire designed to target two main groups in North Sinai, Egypt: local inhabitants (Bedouins) and the newcomers. Therefore, the researcher conducts interviews of the questionnaire with households from five selected desert settlements in order to develop a more in-depth understanding of their insights, the real interaction between the two groups and the impact of the dispersal population policies on their communities.

1.6 Thesis Structure

The structure of this thesis, as shown in Fig. 1.2, consists of twelve chapters in three main parts.

Chapter One acts as an introduction to the thesis, explaining the background of Egypt and clarifying the problems inherent in the sustainable settlement of peripheral desert areas to formulate a set of research questions and objectives. This chapter ended with the methodology and thesis structure.

Part One of the thesis, ‘Desert Settlements’, looks at the issues that are associated with desert sustainable development dimensions through three chapters:

- Chapter Two, ‘Sustainable environmental dimensions of desert settlements’, concentrates on the environmental conditions that characterise and define the desert context.
- Chapter Three, ‘Sustainable social dimensions of desert settlements’, looks at the range of experiences from around the world to establish the basis for tackling the question: how can societies be adapted to live in arid environments in order to ensure sustainable and viable communities?
- Chapter Four, ‘Sustainable economic dimensions of desert settlements’, looks at various experiences covering a range of countries around the world in order to understand how sustainable economic exploitation of the desert might be realised.

Part Two, ‘Sustaining the population growth’, laid out much of theoretical foundation upon which the viability and sustainability of desert settlements can be assessed. This part consists of three chapters as follows:

- Chapter Five, ‘Sustainability of population growth’, looks at the definitions relevant to sustainable population growth that are necessary to recognise the respective contributions made by migration and natural growth.

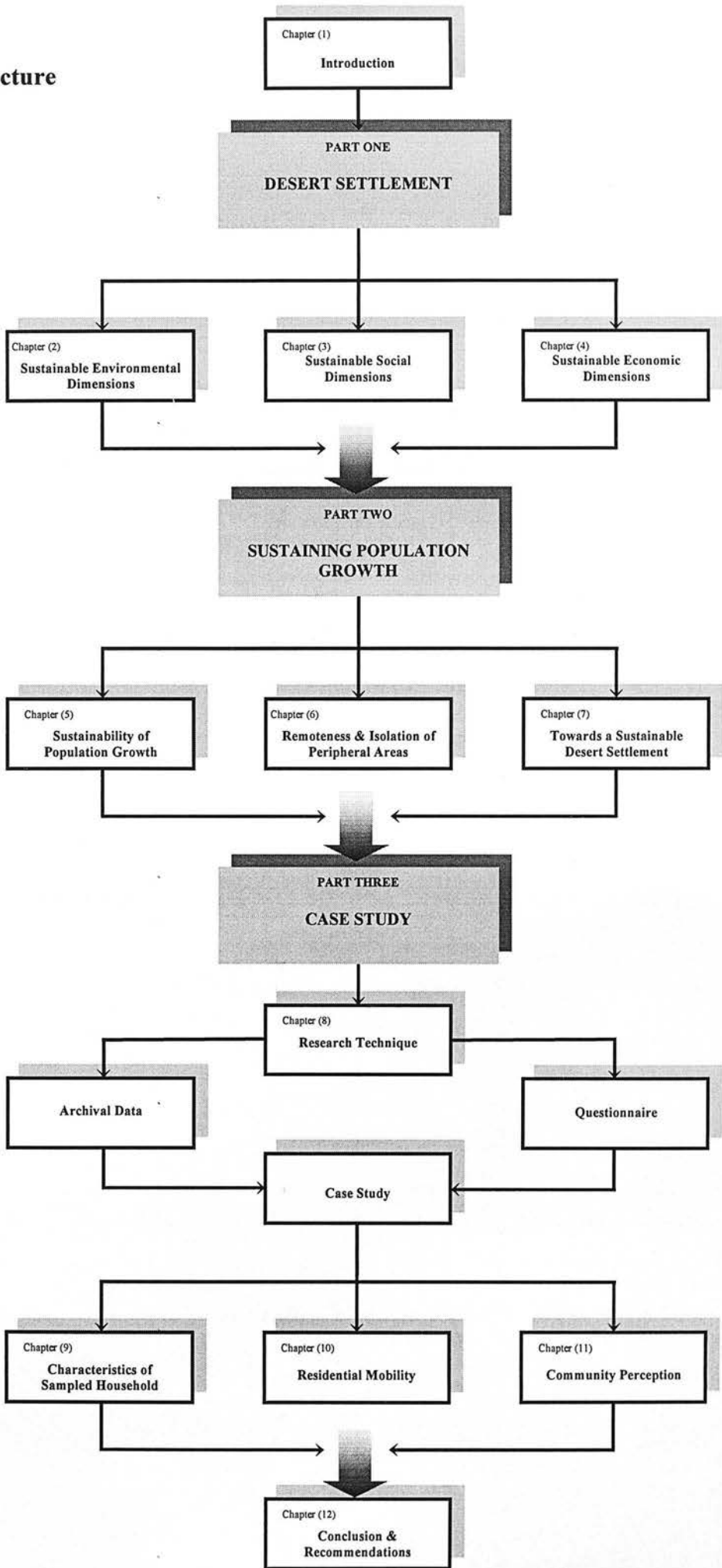
- Chapter Six, 'The Effect of Remoteness and Isolation on development of peripheral Settlements', seeks to establish qualitative and quantitative terms in which remoteness and its effects can be measured and linked to issues of the sustainability of settlements.
- Chapter Seven, 'towards sustainable desert settlements', seeks to establish another theoretical framework by making a comparative analysis of three different experiences representing the three main themes of desert settlements in the world today: traditional; liberal economic; and military / ideological.

Part Three, 'Case study', proposes that four basic questions about desert repopulation must be addressed: Who are the migrants? Why did they migrate?, Where did they migrate? and What are the consequences? That through four chapters:

- Chapter Eight, 'Research Techniques', explains the nature of the survey, selection of the study areas and the questionnaire process.
- Chapter Nine, 'Characteristics of the sampled households', outlines the demographic, socio-economic and residential characteristics of households interviewed in each of the study locations.
- Chapter Ten, 'Residential mobility and the relocation process', focuses primarily on the 'new' households sample and aims to identify the mobility patterns and the processes responsible for population growth within each of the study areas.
- Chapter Eleven, 'Community Perception and Prospects for the Future', reports consequences of the repopulation process. Attention is directed towards the perceived impact of the repopulation of the desert of North Sinai, and the desire by respondents for such processes to continue.

Then the thesis ends with Chapter Twelve, which addresses the main conclusion of the research and recommendations of the study.

Fig. 1.2
Thesis Structure



PART ONE

**Sustainable
Desert Settlements**

CHAPTER TWO

**Sustainable Environmental
Dimensions of Desert Context**



Chapter 2

Sustainable Environmental Dimensions of Desert Context

Part one of the thesis, of which this is the first chapter, looks, as shown in Fig. 2.1, at the issues that are associated with desert repopulation and sustainable development dimensions, as a field of concern in many parts of the world. Its discussions are organised into three chapters covering: *sustainable environmental dimensions of the desert context*; *sustainable social dimensions of desert settlements*; and *sustainable economic dimensions of desert settlements*.

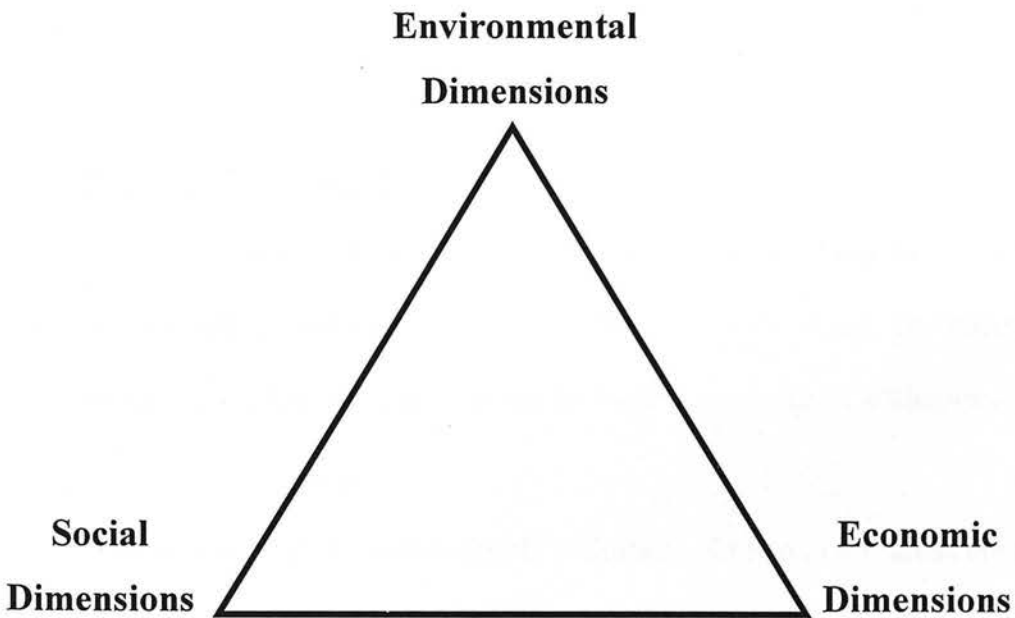


Fig.2.1 Dimensions of sustainable development in desert settlements
(Based on HABITAT definition, 1997)

This chapter therefore concentrates on the environmental conditions that characterise and define the desert context. Inevitably, its principal theme is the range of hardships – predominantly climatic and geological – that must be addressed in the

course of determining any long-term, viable human settlement or intervention in the desert.

2.1 Introduction

Understanding the population-environment interactions in desert areas is an important challenge for contemporary urban and regional planning, since it may lead to the development of more sustainable urban policies for existing desert regions and the areas affected by desertification.

The interactions between man and the desert environment form the main focus of this research work. It considers physical development of desert regions not as an end in itself, but rather as an essential precondition for creating socially attractive and desirable environments for human settlement.

2.2 Problems of Definition

The term 'desert' covers a range of ecosystems. An ecosystem is a production enterprise that appropriates raw materials such as minerals, water, and energy (such as solar energy) from the environment for biological processes (Williamson and Erell, 2001).

The notion of desert defies simple definition. No two desert areas are alike: each has its unique combination of terrain, soil, vegetation and moisture conditions (White, 1973; Fathy, 1986). This situation is further complicated by a lack of adequate data and research (Miller 1978; Meir, 1998). A climate-based definition would differ from one based on soil, vegetation, or land use, although these variations also reflect differences between specific disciplines involved.

This lack of consensus extends to the terminology (Louw and Seely, 1982; Rizk, 1991). Terms such as *extremely arid*, *hyper arid*, *extreme desert*, *total desert* and

absolute desert are used with different and/or overlapping quantitative measures. Qualitatively, any barren land of low carrying capacity for life, including polar zones, could be called a desert. As far back as the 11th century, desert described any area devoid of human habitation and desolation was the major connotation of the word (Thames and Evans, 1981).

2.2.1 Aridity:

There exist four distinctive climatic causes of aridity. These include:

- Widespread, persistent atmospheric subsidence caused by the general circulation of the atmosphere;
- Localised subsidence induced by mountains or other geomorphologic features;
- Absence of rain-inducing disturbances causing dry weather even in areas of moist air; and
- Absence of humid air streams.

It is suggested these four controls are interdependent, but their relative effect depends on the locality. They can variously lead to almost continuously dry climates, leading to desert surface conditions and no season of appreciable rainfall, through semi-arid or arid climates with a short wet season to arid areas in which rainfall is infrequent, but not confined to any special season.

Even within disciplines concerned with one criterion, like precipitation, the boundaries are not entirely agreed upon. Vidal (1982) shows how climatologists and geographers often disagree on the boundary between 'arid' and 'non-arid' areas for the single criterion of precipitation is insufficient to describe the characteristic variations of such lands. Considerable areas of northern Europe, Alaska, Siberia and the Tibetan Plateau, could be considered desert regions (Cloudsley-Thompson and Chadwick, 1964; Rhodes, 1999). However, cold season rainfall is more effective for plant growth, losing

less through evaporation; the shortcoming of the isohyte is that it does not recognise the factor of temperature (UNEP, 1996).

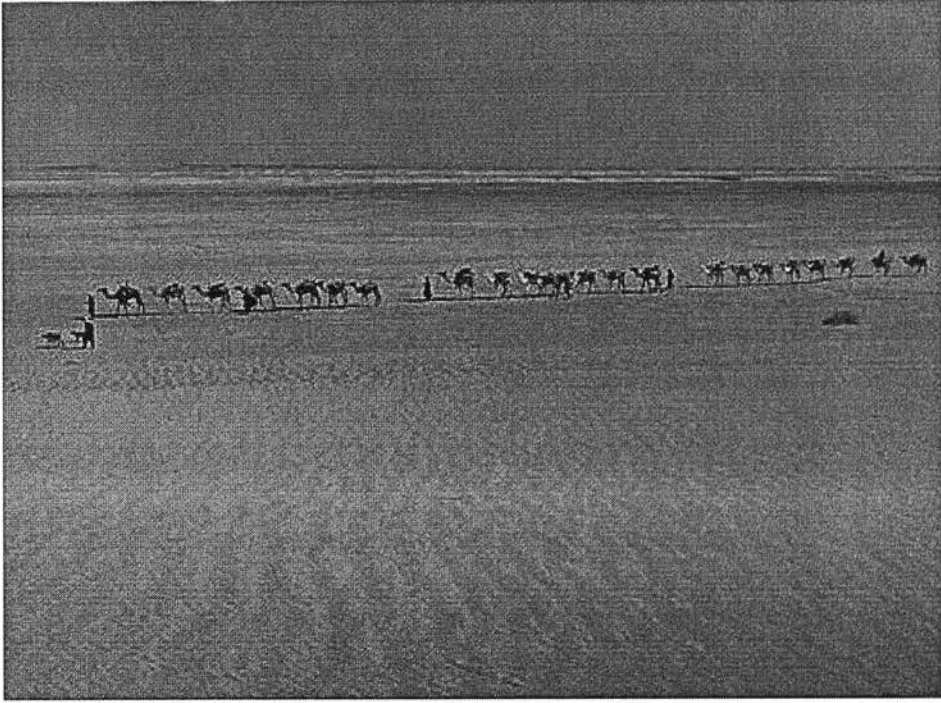


Fig. 2.2 Aridity, absolute desert, Bedouin tribesmen secure their camels in the teeth of a gale, Southern Morocco (Palin, M. 2002).

In 1918 Dr. Köppen of the University of Graz, Austria, developed general climatic indices for all the various ecosystems in the world (Miller, 1978; Pearlmutter and Meir, 1997). The significance of the Köppen indices of aridity is that they establish a functional link between precipitation and temperature patterns in determining the boundaries of aridity. According to Köppen, the boundary between ‘humid’ and ‘semi-arid’ is that point where potential evaporation equals precipitation; the boundary between ‘arid’ and ‘semi-arid’ is the point where evaporation is twice as great as the precipitation (Logan, 1968; Fajal, 2002).

Another concept of aridity takes account of ‘soil moisture deficit’ introduced by Thornthwaite in 1948. This incorporates the factor of plant transpiration in determining the terms of aridity (Walton, 1969), recognising the hypothetical potential evapo-

transpiration values as an accurate guide for defining aridity (Miller, 1978). Arid regions are thus those having precipitation that, much of the time, cannot replenish losses of soil moisture by evaporation, transpiration and other mechanisms (UNEP, 1996). The absence of a pattern or rhythm for precipitation in arid lands is perhaps more important than any general water shortage. While low in absolute terms, it varies drastically in its annual and spatial dispersion, intensity and degree of uncertainty (Heathcote, 1983). Nonetheless, Haughton (1994) explains that these measures are insufficient, for they exclude the human factor that dictates very different definitions of sufficiency between an urban water engineer designing a city's permanent water supply and a nomadic pastoralist searching for temporary water for his livestock.

Areas having equal levels of climatic aridity may exhibit different environmental characteristics. Different physiographic patterns and edaphic conditions induce different patterns of runoff, water holding capacity, evaporation and subsequently, plant and animal life. Desertification is a prime example of how changes to the landscape exacerbate the impact of aridity (Kellogg and Schneider, 1977). As a response, qualitative and descriptive definitions of deserts that take these into account and concern criteria that reflect the response of terrestrial conditions to different levels of aridity are more often used by geographers, ecologists, soil scientists and agrometeorologists (Abo-Zeid, 1996).

Aridity, as the extent of moisture deficit of a place, encompasses the three criteria of precipitation, solar radiation and the collective impact of terrestrial conditions. However, due to the many factors involved in the third criterion and the broad variability of each factor, current indices of aridity focus on how the first two criteria and other climatic forces affect moisture loss.

Much current literature looks to the final conclusions Peveril Meigs made in his 1960 revision to 1952 maps which he had prepared for UNESCO, following the system

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developed by Thornthwaite. As Fajal (2002) explains, giving monthly precipitation that was 'just enough to meet needs' a moisture index of 0, climates with an index between 0 and -20 were considered 'sub-humid', those between -20 and -40 'semi-arid' and those below -40 'arid'.

Accordingly, the arid lands of the world can be classified into: 'semi-arid', 'arid' and 'extremely arid'. 'Extremely arid' applies to any zone which exhibits a high index of aridity, has no seasonal rainfall pattern and has experienced at least twelve consecutive months without recorded rainfall. Thus this classification introduces the factors of seasonal patterns of precipitation and temperature.

Existing definitions also need to be aware that effusive oasis water resources can contradict the definition of an ecosystem as 'arid'. While Egypt is climatically extremely arid, the Nile, an allochthonous river, provides its narrow valley with the equivalent of 180 inches of rain per year.

As a conclusion, the multiplicity and variability of factors responsible for making the desert environment defies its strict definition and classification. Deserts also demonstrate extreme variability in temporal and in spatial terms; an area which qualifies as a desert according to one period may not do so in another (Fajal, 2002), while microclimates can cause such significant modifications that semi-arid zone may include large areas of quite useless deserts, usually with unfavourable relief or litho-logical factors (Goudie and Wilkinson, 1977; Golany, 1980; Meir, 2000).

- **Ekistical Aridity**

This research defines ekistical¹ aridity as the hypothetical demand of the territorial unit measured against all available water resources. 'Demand' here is based upon that of a population estimated using a standard average population density (based

on interdisciplinary data) and a standard average per capita demand (based on extensive statistical studies of global values). Demand should encompass the broad spectrum from food production to industrial and recreational requirements. Indices of ekistical aridity could be based upon a mathematical formula that, besides the usual climatic elements, recognises the following factors:

- *Water availability*: water volume per standard unit of area per year based on the safe yield of renewable resources;
- *Water accessibility*: energy expenditure required to attain a hypothetical pattern of even spatial distribution at an average level of ground surface;
- *Qualitative accessibility*: total energy expenditure required to attain a hypothetical average quality; and
- *Depletion factor*: expenditure of non-renewable resources.

The significance of these indices is that they address the interactions between aridity and habitation but their usefulness is mainly for comparative settlement studies and in determining the various development potentials of nominated regions. Furthermore, factors of water quality need to be integrated into any final definition of aridity in the context of human requirements.

- **Measuring Aridity**

The reasons for aridity are not straightforward and there is little agreement about these. The climatologist Köppen devised one of the most commonly used classification methods for desert in 1918 (Fahmi, 1995), defining a desert as a region where potential

¹ The term 'ekistic' was introduced by Doxiadis (1968) as a name for a new discipline of human settlements.

moisture evaporation is at least double the actual precipitation. Vast areas of California, Arizona and Northern Mexico are so dry that this ratio exceeds 100:1.

According to another index developed in 1948 by Thornthwaite, deserts can be classified on a scale that defines their index of moisture deficit as follows:

$$I_m = 100 (P / PET - 1)$$

(I_m = Index of moisture; P = Precipitation, and PET = Potential Evapo-Transpiration)

If the annual precipitation exactly equals the maximum potential evapotranspiration (evaporation plus all other moisture loss), then $I_m = 0$.

While precipitation data for Thornthwaite's formula are widely available, the values of PET require some calculation. A practical approach suggested by Thornthwaite uses the empirical relationship between measured PET and the more readily accessed environmental variables of mean monthly temperature and the average number of daylight hours per month (Fajal, 2002). Using this method, Meigs mapped for UNESCO the arid lands of the world, putting the extent of the world's semi-arid lands at 20.5 million km², its arid lands at 21 million km² its extremely arid lands at 5.5 million km². The total (47 million km²) is nearly one-third of the earth's land surface. These estimations do not, however, include cold deserts.

Although Penman's and Thornthwaite's methods are based on somewhat different research techniques and different sets of data, the geographic limits of arid zones produced by these two techniques exhibit, in general, considerable similarities (Fajal, 2002).

2.2.2 Solar Radiation:

Solar radiation is a highly important climatic factor. At the macro level it determines all patterns of temperature, pressure, air mass movements and other major

synoptic phenomena. Zones located in the low latitudes of the tropics receive abundant and prolonged incoming radiation (insolation). In regions of the Northern Sahara, it may average 4000 hours per year, with a radiation level as high as 540 cal/cm day (Abo-Zeid, 1996) and a substantially high illumination level.

The total level of radiation depends also upon the rate of depletion or scattering of insolation by air molecules, water vapour, water droplets, dust and other atmospheric particulate. Excessively arid desert regions have very little cloud cover; that of the Sahara, for example, is only 10 percent in winter and less than 4 percent in summer (Cloudsley-Thompson, 1965). This, with the moisture deficit in the atmosphere, substantially decreases depletion and scattering to about 10 percent, mainly relying on dust and dispersed clouds. In an average humid region, 20 percent is deflected by clouds, 10 percent by dust and 30 percent by water surfaces and vegetation (Williamson and Erell, 2001).

These same atmospheric conditions enhance the long-wave terrestrial radiation from earth to sky. During the night time, such radiation releases up to 90 percent of the accumulated heat to the upper air. In contrast, vegetation cover and water surfaces in humid regions retain much of the received solar radiation and, with about 30 percent of terrestrial radiation reflected back by cloud cover and atmospheric moisture, only about half of the radiation received escapes to the upper air. This explains the diurnal and seasonal stability of temperature and humidity in humid regions in comparison to the broad fluctuation of desert regions.

2.2.3 Temperature:

Temperature largely relates to solar and terrestrial radiation and the physical characteristics of the radiated and radiating surfaces (Fajal, 2002). Ambient temperatures in desert regions can soar to extreme levels. In the Sahara, 50°C in the

shade and 70°C in the sun have been recorded. A maximum shade temperature of 58°C, under standard meteorological conditions, has been recorded at El Azizia, Libya and San Luizi Potosi, Mexico. It is also likely that the lack of meteorological facilities in many desert regions has left even higher temperatures unrecorded (Cloudsley-Thompson, 1977 and Hegazy, 2000b).

High temperature extremes form a common and persistent pattern in desert regions. The hot arid regions of the Saharan, Libyan, Arabian and Great Australian deserts have an annual average temperature above 18°C. Over wide areas temperatures of 38-41°C persist for long periods. For example, a record 38°C was maintained for 64 consecutive days, and of 32°C for 150 days in the Western Australian Desert (Fahmi, 1995).

Huge diurnal temperature fluctuations are also characteristic of desert regions. In Death Valley, California, in August, the mean diurnal range is 35°C, whereas the maximum is 41°C. In southern Tripolitania, Libya, a range of 38°C – from -0.5°C to 37.5°C – was recorded within 24 hours (Cloudsley-Thompson, 1977 and Abo-Zeid, 1996).

Desert regions, therefore, experience very low and even freezing nocturnal temperatures. Winter frosts can be as much a stress as the summer heat (Heathcote 1983). Given extremes, mean annual temperatures are of little significance in formulating the true thermal condition of a desert locale.

Desert soils, having poor heat conductivity and small heat capacity, attain much higher temperature levels than the air. Since the air is transparent to radiation, soil is critical in determining the thermal pattern in desert environment. Air temperature is then related to soil temperature through conduction, radiation and convection, and decreases relative to an increase in altitude.

- **Precipitation:**

Although extreme, average annual rates of precipitation in desert regions mask the drastic fluctuations that have vital significance for human occupation. The absence of regularity in rainfall massively exaggerates the adverse impact of aridity. Even within any recognised seasonal pattern, precipitation can be unpredictable. Helwan, a Cairo suburb, received only 10mm over three consecutive years; nine years later it received 125mm. Alexandria, Egypt, received 271mm in the year 1919-20 while the annual amount in 1935-36 was only 83mm (Cloudsley-Thompson and Chadwick, 1964). In 1889, Yuma, Arizona, recorded 24mm of rainfall; six years later 270mm fell (Walton, 1969).

Rainfall in arid and extremely arid regions often arrives as short convectional and torrential downpours of limited area. Cairo, Egypt, with an annual average of 28mm, had precipitation in only 13 of the 30 years from 1890 to 1919; then 43mm fell in one day in 1919. It is said that more people have drowned in desert rivers than perished from thirst (Fajal, 2002).

2.2.4 Humidity:

Humidity is defined as the amount of moisture in the air relative to saturation. As the water-holding capacity of air rises with temperature, desert regions can have a higher vapour pressure than Polar Regions (Meir, 1991).

Very low relative humidity caused by lack of precipitation and high temperatures, is considered one of the main features of deserts. Neither soil nor plants can maintain high moisture content in the dry air that accelerates the evaporation process. The combination of intense heat and low humidity that ensues is the main stress of the desert environment. The relative humidity of the Sahara, usually about 23 percent at 1800 hours, can drop to zero at times. The lows of 4 percent to 21 percent

recorded at Tamanrasset in the Sahara contrast enormously with those of London that range from 73 percent to 86 percent (Fahmi, 1995). The atmospheric vapour pressure, a more accurate measure of humidity, averages 10-15 Hg in the Sahara. In extremely arid locales, it may drop to below 1 Hg.

Although relative humidity varies widely over the year due to temperature variations, its diurnal range is more remarkable. During the day, when the air is heated and more moisture is required to saturate a given volume, the saturation deficit becomes very high, indicating low relative humidity. With night cooling, even with the same moisture content, the relative humidity rises so much that it may even reach the dew point.

2.2.5 Air Movement:

Air movement mainly manifests the pressure patterns of the earth's lower atmosphere. Meir (1991) considers it at two distinct levels: primary – the general circulation of the atmosphere; and secondary-local winds.

While the wind system in desert regions is generally considered local, it is frequently associated with major disturbances of the general circulation system (Cloudsley-Thompson, 1977) and is greatly related to temperature patterns. Intensely heated land leads to the rising warm air currents and pressure variations that stimulate air movement. The highest wind velocities occur at noontime, at the peak of the diurnal temperature range. The estimated average wind velocities of the Sahara are 10-15mph although velocities of 20-30mph (close to the gale level of 32mph) have been recorded (Fajal, 2002).

As an environmental feature, air movement is no more prominent in deserts than in more humid regions. However, its broad impact stems from its interactions with other environmental factors – heat, bare soil and so on. Along with intensified evaporation

and soil dryness, wind patterns limit the spatial niches available to desert biota (Meir,1991).

Sandstorms and dust-storms are typical in any desert environment. The *Khamasin* of Egypt, the result of cyclonic disturbances, is but one local example. The whirlwind ('dust devil') caused by a sudden irregular rush of heated air on a still day can carry columns of sand and dust to a height of 4.0 kilometres.

Winds are major agents of soil erosion and sedimentation. Moving sand dunes and desert encroachment are typical. Fahmi (1995) who sees the desert wind as contributing highly to mainly physical but also chemical pollution introduced a new environmental definition for deserts.

Desert wind systems may be insignificant as a climatic phenomenon but this hides their enormous impact within the environmental complex. As Heathcote (1983) concludes, the wind gives form to the desert. It carries soil and dust particles, ventilates buildings and creates stressful atmospheric conditions with low relative humidity and high static electricity. Nonetheless, it is also a positive force, a source of energy for water pumps, electricity generators and sailing vessels along arid coasts.

2.2.6 Microclimates:

Microclimates are very local conditions which deviate from the general climatic pattern due to the special features of the landscape. The term can apply to conditions for a small burrowing animal to those of an urban environment.

Minor variations in altitude, relief, aspect, humidity and so on can cause varying local conditions (Walton, 1969 and Meir, 1996), amplifying or ameliorating the general pattern. Such phenomena are ultimately critical for desert biota and human habitat. An oasis environment, with its landscape of irrigated fields, creates a distinctive

microclimate in the extreme desert core. The Nile Valley, for instance, albeit on the eastern fringe of the Sahara, exhibits its own peculiar microclimate.

2.2.7 The Natural Landscape:

The geo-system of desert regions is a controversial scientific issue. The concepts of ‘cycles of erosion’ and ‘dynamic equilibrium’ differently explain the processes through which the existing geomorphic pattern evolved. However, the different approaches stress the substantial role of the physiographic processes of weathering, erosion and deposition shaped by arid climatic conditions.

Two types of desert can be distinguished: the mountainous desert, and the plain desert (Hamdan, 1983). The former is usually a depression or lowland surrounded by a mountain ridge that holds the area in its rain shadow. Torrential mountain rain reaches the plains laden with huge amounts of debris leaving what are known as ‘alluvial fans’ by which running water becomes the most important sculptor of the landscape in lands that lack water (Macphail, 1963). In these places rainwater creates saline lakes and eventually evaporates to leave salt flats, or ‘playa’ (Fajal, 2002).

On the other hand, the plain desert is lowland with basins, sub-basins, troughs and plains that are generally broad, shallow and with imperceptible margins (Grainger, 1990). In this type of ‘hamada and erg’ (cliffs and sand) desert, aeolian (airborne) rather than fluvial (waterborne) erosion takes place, enhanced, in exposed land devoid of vegetation, by chemical processes and temperature fluctuations. Sand is considered the final product of a very long-term weathering of rock cliffs. An intermediate phase, where the land surface is covered with varying sizes of gravel (‘desert pavement’), is termed as ‘reg’.

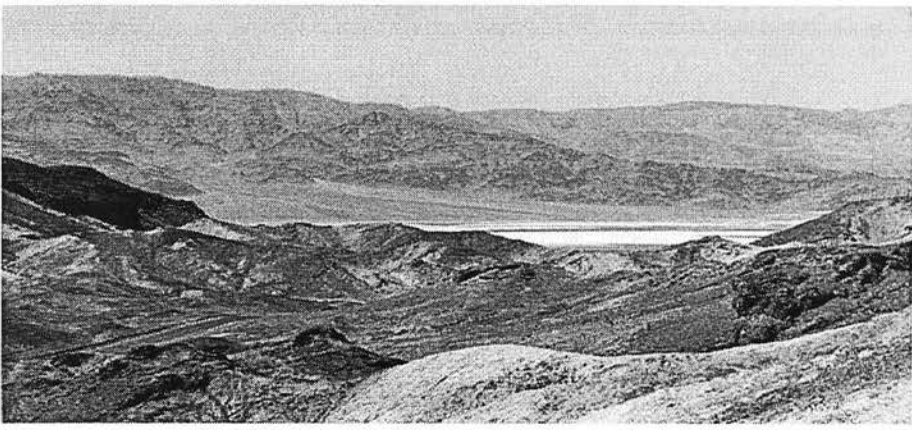


Fig. 2.3 Arizona Desert, USA, an example for the mountainous desert.

Recent research indicating global cycles of dry and wet climates over ancient geological ages (El-Baz, 1984) attributes the evolution of desert zones mainly to water erosion and sets a marginal role for aeolian processes. In this context hamada and erg deserts are the evolutionary endpoint of the mountain deserts (Hamdan, 1983).

2.2.8 Vegetation:

Desert regions can also be classified by their vegetation. In 1992, Selman suggested that all desert plants could either be characterised as xerophytes, those adapted to dry conditions, or as short-lived annuals. He argued that the presence of these plants to the exclusion of others, indicated aridity. Furthermore, deserts could also be partially defined based on soil types, specifically by the presence of pedocals (soil with dry sub-soil), although these conditions can also produce fragile but rich grasslands.

2.2.9 The Changeable Geographical Extent of Deserts:

The boundaries of the world's dry lands are not fixed. There is evidence that the African Sahel reached much further southwards some 20,000 years ago (UNCOD, 1977) and that, some 8,000 years ago, the Rajasthan region in India was 1500 km East of the arid zone. Five major current desert belts can be singled out:

- 1) The Sonoran desert of Mexico and its continuation in the desert basins of the South-western United States;
- 2) The Atacama desert running West of the Andes from Ecuador into Chile, the dry climate of which extends Eastwards into Patagonia;
- 3) A vast belt running from the Atlantic Ocean to China including the deserts of the Sahara, Arabia, Iran, Turkmenistan, Tajikistan and the Rajasthan of Pakistan and India, to the Takia-Makan and Gobi deserts of China and Mongolia;
- 4) The Kalahari and its surrounding arid lands in southern Africa; and
- 5) Most of the continent of Australia.

There are also isolated areas of arid lands in other parts of the world, such as the Guajira peninsula in Colombia, South-western Madagascar, North-eastern Brazil, and pockets of cold deserts in Russian Siberia.

The rate of land degradation has increased significantly during the last decades. According to some estimation, desertification affects at least 50,000km² per year, primarily in the developing world (UNEP, 1996).

The immediate and well-known causes of desertification in developing countries include overgrazing, tree felling, water logging, salinisation and inferior agricultural practices (Cloudsley & Thompson, 1986). Desertification is neither a mysterious nor a detached technological problem. Grainger (1990) suggests that it often indicates that existing development is failing to provide people with a non-destructive way to make a living.

2.3 Current extent of desert regions

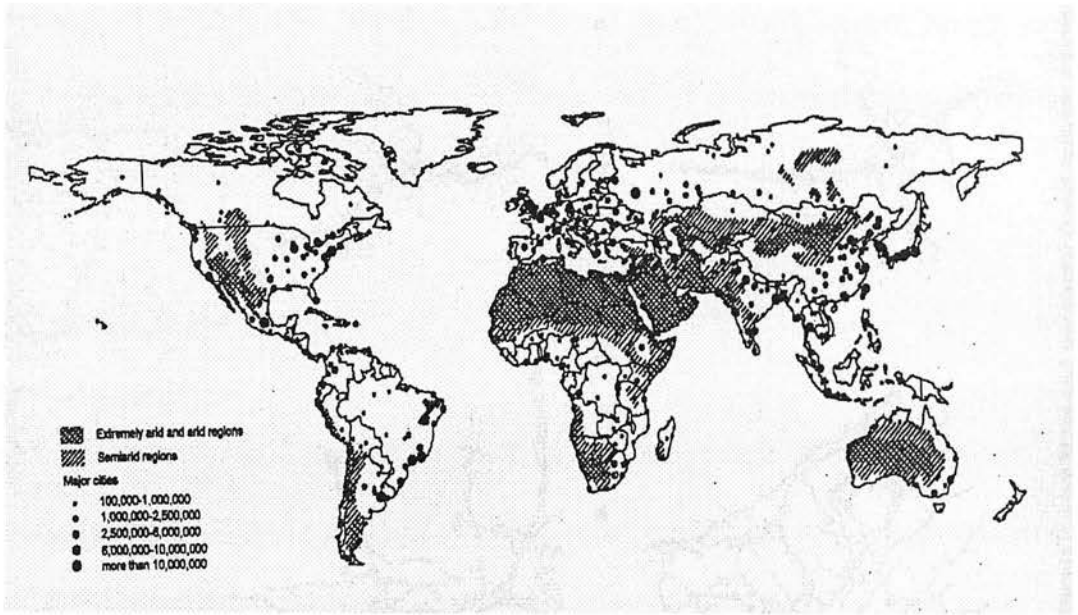


Fig. 2.4 Arid regions and major population centres of the world

(UNEP, 1996)

In general, deserts characterise the earth's subtropical zones. Global patterns of air-circulation force the subtropical air to subside. When air subsides it warms up and its capacity to hold moisture increases, inhibiting the likelihood of rain. Yet dry climates can extent into other latitudes, caused by additional factors, such as distance from the oceans, the seasonal high-pressure of large continental masses or the presence of mountain barriers that create massive rain shadows.

Aridity zone	Africa	Asia	Australia	Europe	North America	South America	Total
Cold	0.0	10.8	0.0	0.3	6.2	0.4	17.7
Humid	10.1	12.2	2.2	6.2	8.4	11.9	51.0
Dry sub-humid	2.7	3.5	0.5	1.8	2.3	2.1	12.9
Semiarid	5.1	6.9	3.1	1.1	4.2	2.7	23.1
Arid	5.0	6.3	3.0	0.1	0.8	0.4	15.6
Hyper-arid	6.7	2.8	0.0	0.0	0.0	0.3	9.8
Total	29.6	42.5	8.8	9.4	21.9	17.8	130.1

Table 2.1 Aridity zones by region (million km²) (Source: Fajal, 2002)

There are also isolated areas of arid lands in other parts of the world, such as the Guajira peninsula in Colombia, South-western Madagascar, North-eastern Brazil, and pockets of cold deserts in Russian Siberia. The extent of desert regions is shown in Table 2.1.

2.4 Settlements in the Desert

2.4.1 Introduction:

People have lived in arid lands since prehistoric times, always experiencing deserts and droughts. But only recently has man-desert interaction led to such dramatic social and environmental consequences as those witnessed during the Sahel droughts of 1968-73 and 1982-85 (Cloudsley-Thompson 1986). These droughts wrecked the agricultural base of five countries (Mauritania, Upper Volta, Niger, Mali and Chad), among poorest nations in the world, and severely damaged those of Senegal and Gambia (UNCOD 1977). By some estimation, between 100,000 and 250,000 died as a result of the drought and many refugees never returned to their homelands. The Sahelian droughts focused world attention on the problem of desertification and became an immediate stimulus for international action.

In 1974 the United Nations General Assembly passed a resolution calling for an international conference on desertification to be held in 1977. Areas vulnerable to desertification needed to be identified, all variable information on desertification and its consequences for development should be gathered and assessed and a plan of action combating desertification should be prepared with emphasis on developing indigenous science and technology (UNEP, 1996).

The report prepared for the 1977 United Nation Conference on Desertification (UNCOD) showed that, in the mid-1970s, about 14 per cent of the world's population, 628 million people, lived in areas at risk from desertification. Of these 72 per cent, lived

within semi-arid zones, 27 per cent in arid zones, and 1 per cent in extremely arid regions.

More recent assessments show that in the early 1990s, more than 61 million km², nearly 40 per cent of the earth's land area, was parched, of which about 9 million km² were hyper-arid deserts. The remaining 52 million km² were arid, semi-arid and dry sub-humid lands, part of which have become desert as a result of human activity. These lands are the habitat and the source of livelihood for about one fifth of the world's population (UNEP, 1996). The extent of desertification varies in each continent. In the Mediterranean Basin, Asia, and the Pacific, almost 500 million people are affected.

Region	Overall population (millions of people)	Upper-based population (millions of people)
Sub-Saharan Africa	75.5	11.7 (15%)
North and South America	68.1	33.7 (50%)
Mediterranean Basin	106.	42.0 (39%)
Asia and the Pacific	378.0	106.8 (28%)
Total	628.4	194.2 (31%)

Table 2.2 Population estimates of desert regions (millions of residents).
(Source: UNEP, 1996)

Semi-arid zones, with relatively adequate water resources, have been able throughout history to support an evenly distributed settlement pattern. However, this pattern has always been subject to drastic shifts back and forth due to the inherent instability of the ecosystem (Amiran, 1977). The current experience of drought, desertification and subsequent massive population shifts in Africa is a spectacular example (Wijkman and Timberlake, 1984). Many areas in the west of Sudan, which were densely settled and cultivated one hundred years ago, are now an absolute and desolate desert (Cloudsley-Thompson, 1977). The question of whether these shifts are due to major climatic and environmental changes or to the cumulative effect of natural resource abuse has become a very controversial issue in the last two decades.

2.4.2 The Oasis Ecosystem:

In comparison to semi-arid, arid and extremely arid zones exhibit a much more stable and balanced ecosystem (Fahmi, 1995). With the extreme lack or even complete absence of precipitation, the settlement pattern is liberated from the direct impact of the spatial component of the climatic phenomenon; instead it depends upon the 'oasis' phenomenon.



Fig. 2.5 Oasis-settlement phenomenon: 'dispersion' and 'polarisation'.

Northern Dakar, Senegal (Palin, 2002).

The oasis ecosystem is a 'hybrid'. It occurs where an effusive water resource is introduced into an arid environment. Water availability due to rivers, underground aquifers and man-made water transfer schemes determines the pattern of population concentration, its size and spatial distribution.

The oasis-settlement phenomenon has given human habitation in arid and extremely arid environments its two main characteristics: 'dispersion' and 'polarisation'. 'Dispersion' refers to the sporadic nature and lack of an orderly pattern

within sparsely distributed settlements. This pattern is distinctive when compared to settlement patterns in humid regions, where they comprise a continuous web of clear structural and hierarchical order. 'Polarisation' refers to the intrinsic tendency, due to environmental constraints, to concentrate and be dispersed among only a few centres.

Human settlements, in the oasis pattern, are scattered spots of high density on an entirely void and uninhabited landscape. Egypt's settlement landscape does not deviate from this pattern. The dense clustering along the Nile comprises a large longitudinal oasis where any potential dispersion is inhibited and where 'polarisation' realises its full expression.



Fig. 2.6 Ancient Aït Benhaddou, Morocco, Impressive and elegant towers below but the neglected old fortification at the top of the hill is half reduced to ruin by rain and wind (Palin, M. 2002).

Historically, dry-land settlements have served as commercial and administrative centres, or grown up around mines or other local amenities (Golany, 1978; Saini 1980 and Fajal, 2002), or were established as strategic outposts in response to various geopolitical and security considerations (Fig 2.6). Today, desert settlements function as irrigation centres (including oasis settlements), garrisons and communications centres,

and political administrative and regional centres. They also may be focused on tourism, recreation, mining or other industries.

2.4.3 Deserts and Urbanism:

The agricultural potential of deserts is extremely limited. Without enough rain to support sustainable agriculture (possible in arid regions only with special adaptations), most deserts will remain sparsely populated (UNCOD, 1977).

Population densities in desert areas vary according to the productivity of the local environment, but they generally remain below 15 people per km² in extremely arid zones, up to 20 persons per km² in the arid zones and up to 70 persons per km² in semi-arid zones (Ward, 1994). Except for arid areas of Mexico, Northwest Africa, Spain, the Fertile Crescent and much of western Iran, there are few arid lands with population densities of 100-250, the densities common in adjoining humid and sub-humid regions. Aridity stimulates the spatially isolated settlements since their necessary supports, such as water and agricultural land, tend to be very localised in the desert environment.

Portnov and Erell (1998a) single out six distinctive reasons contributing to the considerable increase in the pace of desert urbanisation in recent years. These are:

- Relocation of territory-consuming industries, military and research installations from overpopulation core regions to underdeveloped peripheral desert areas.
- Mining and power engineering, whose resources are often depleted in traditional mining centres and less remote locations.
- Development of transport infrastructure that extends the commuting frontier of existing population centres into a more remote periphery.
- Development of means of pumping fresh water considerable distances from its natural resources.

- Socio-economic, political and ecological considerations stemming from both overpopulation of the core and underdevelopment of the periphery.
- The acceleration of desertification processes.

2.5 Conclusion

In summary, desert environments are highly variable. Any plan for resource development that fails to take explicit account of tremendous diversity among such environments is likely to go astray.

Aridity is the most limiting factor to productivity in the desert ecosystem. Further factors such as soil quality or environmental stresses on man merely accentuate the problems of desert habitation. There are five desert forces that cause problems to man: heat, sun, aridity, lack of resources and isolation. Any change of these will alter the image of the 'desert environment'. Yet if the problems of how to reconcile and organise the abundant solar radiation and vacant space with water deficiency, and turn it to a social benefit, the desert could be seen as offering up positive benefits.

A critical factor in responding to such a challenge is appreciating the structural differences between arid and humid ecosystems. The experience of desert habitation should be liberated from the indiscriminate transfer of concepts from very different regions.

The peculiar pattern of settlement due to such meagre habitation is further accentuated by a very uneven pattern of population distribution. Three-quarters of the arid land population live in the semi-arid zone with most of the remainder in the arid zone, and a few in the extremely arid zone. Settlement patterns reflect the strong spatial component in the distribution of climatic, hydrologic, and soil parameters in desert.

To insure a reasonable use of arid lands, plans for development should work with their arid or semiarid nature, and not against it. One cannot 'undo' a desert or even

basically change the nature of a semi-arid area. Attempts to do so are generally the result of what has been called the “arid zone inferiority complex”, a psychological disability for which many a population has been made to pay with economic failure and social misery. As stated before, arid lands lack certain basic features of humid areas; in contrast they possess an abundant supply of others.

CHAPTER THREE

Sustainable Social Dimensions of Desert Settlements

The first part of the chapter discusses the social dimensions of sustainable development in desert settlements. It highlights the importance of community participation and the role of local institutions in the development process. The second part of the chapter discusses the social dimensions of sustainable development in desert settlements. It highlights the importance of community participation and the role of local institutions in the development process.

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3.1 Introduction

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Chapter 3

Sustainable Social Dimensions of Desert Settlements

The previous chapter outlined the environmental dimensions of the desert, clearly demonstrating that these regions impose very strict and critical requirements such that any poorly adapted settlement within them will end in failure. It also established that the desert is a fragile yet precious ecosystem, implying not only those inappropriate technologies will lead to unsustainable settlements but also can easily destroy their vulnerable environments.

This chapter develops these findings to look at the range of experiences from around the world where, for various reasons, large-scale national and regional strategies have sought to stimulate or sustain populations within desert areas. It collects insights and criticisms from many writers to establish the basis for tackling the question: how can societies be adapted to live in arid environments in order to ensure sustainable and viable communities?

3.1 General Introduction

Human settlement is structured to modify materials, using various forces, to support a population. In a context of scarcity, social organisation plays a critical role in facilitating the process, setting suitable aims, monitoring the state of the system and introducing the controls and adjustments that maintain a balance between people and resources (Abo-Zeid, 1991; Adams, 1994).

Desert planners, overwhelmed by the physical dimension of development, tend to apply technical solutions to problems that fall within the social domain, although the role of the social dimension in desert development is increasingly evident (Weingrod,

1981;Stearns and Montag, 1974)). The negative impact of social factors is sufficient to suggest that the inability of the planning apparatus to recognise the importance of new institutional arrangements for new desert societies in Egypt has substantially contributed to current problems.

The question here is whether there are specific social features compatible with the desert ecosystem that can be promoted during the planning process. This does not mean that only one set of features could be tenable for all desert locales but that, within the context of each locale and according to its own characteristics, realistic adaptive socio-ecological patterns could be sought for. Responding to this question requires an investigation of at least some of the common features of desert social systems that have evolved and persisted in response to desert ecological factors, although it is inherently risky to isolate them.

Attempts to consider the features typical of traditional desert societies often result in a discussion of issues that are typical of all cities. They lack a reliable theory of how a social ecology forms in the desert. Fahmi (1995) observes that the descriptive literature on social life in the desert is 'meagre', a short note on an oasis town here, the depiction of a rapid growth in a desert town there, and the few attempts at generalisation tend to be cryptic and partial.

Setting a systematic link between certain environmental challenges and specific social features has always been controversial within historical and social studies. Wittfogel's research of 'oriental despotism' is a prominent example (Worster, 1986). It relates autocratic socio-political organisation to traditional irrigation societies in arid lands. What is sought here is a perspective that avoids such determinism, which accepts that different societies may exhibit different responses to similar environments but also that social systems always adapt, actively or passively, to ecological constraints. An adaptive social objective for new desert settlements should be based on a

comprehensive understanding of how traditional desert societies have responded to the limitations of the ecosystem.

3.2 Social Dimensions in the Desert

3.2.1 Traditional Social Organisation

Traditional desert communities of the Middle East maintain a well-defined and rigid social organisation. Historical evidence indicates that social complexity and rigidity have a positive relationship within an ecosystem of resource scarcity; that is, they help societies to apply strict controls over resource use, distribution and conservation. More relaxed social organisation is to be found in places of resource availability. Ibn-Khaldun's description (1958) of the differences between nomadic and sedentary societies and the cycles of invasion and sedentarisation that characterised city formation in the Middle East attests to this fact.

The tribal system of the Middle East in general serves as a strong example of an elaborate social organisation (Silberstein, 2002). While tribalism is associated with nomadic as well as sedentary communities, its historic value stems from two main facts. First, it persisted for many centuries, and is still a salient social feature in many countries (Ibrahim and Cole, 1978). Second, the system induced many self-preserving mechanisms against external social and cultural influences.

The inherent hardships of maintaining a frugal quality of life render the individual dependent upon being well integrated into the community. Such membership served as a mark of identity for each individual. Silberstein (2002) observes that individual Bedouin have little or no personal identity. Rather, identity is recognised within a household, a lineage, a clan and a tribe.

The pattern of extreme cohesion in the hierarchy of social institutions from the household to the tribe is an explicit manifestation of socio-ecological interactions; it is

clearly noticeable in arid zones. The steppes, for instance, though not unlike arid environments, exhibit a social pattern in which the family is the basic independent socio-economic unit. When such a unit outgrows a workable size, a new, fully-fledged, independent unit (rather than subdivision) forms. In contrast, the desert tribe, originating from one family, can experience little growth and remains a basic integrated social unit (Hamdan, 1983).

3.2.2 Forces of Integration and Dispersal in Traditional Desert Societies

The social organisation of desert tribes reflects the interaction between two types of ecosystemic forces; the need for elaborate cooperation and potential conflict (Hegazy, 2000), or the forces of 'integration' and 'dispersal'. While elaborate social organisation and cohesion could be otherwise attributed to spatial proximity, this can hardly be the case in the desert. As scarcity mandates spatial dispersion at the regional level and increases the potential for conflict, even within a single tribe, the forces of diffusion enhance the introversion and individuality of every social sub-unit. Ibrahim and Cole (1978) describe the paradox of collective integration and dispersal that occurs when the tribal structure provides a framework for unity and cooperation but the segmentary nature of Arabian tribes leads to exaggerated individualism and extreme jealousy among different tribal units.

The existence of divergent, socio-economically independent and spatially dispersed social sub-units has been indispensable in mitigating the scarcity of resources. However, such autonomy affects neither the collective integration at the tribal level nor the subordination of every social sub-unit to the authority of the higher level in the social hierarchy.

The pattern of social organisation that is uniquely adaptive to desert ecosystems accommodates the conflicting forces of integration and dispersal. There has always been

a socio-political need for a centralised system of regional decision-making for managing the resource-poor land, controlling internal conflicts and mobilising society against external conflicts, and a decentralised socio-economic pattern the sub-units of which were flexibly autonomous. Such a dichotomy also exists in other social aspects such as the system in which both private ownership, of livestock for example, and public ownership of land, underlie the conditions for resource conservation and social equity. The desert tribal system in general strongly expresses egalitarian ideals and few tendencies to the emergence of distinctive socio-economic classes (Christensen, 1986; Farvaque and McAuslan, 1992).

3.2.3 Environmental Stresses and Social Ideals in the Desert

Environmental stresses, scarcity and isolation have always rendered the desert undesirable for human habitation. Societies cluster in water-rich zones and humid regions while the desert hosts dissident communities and mavericks. Historically, movements to settle in the desert occurred only under the pressure of other forces – negative ones that drive people to use movement to desert as a deviation from the societal mainstream or positive ones that associate the desert with a specific social ideal. Both negative and positive forces can be detected in the history of some settlements of the Middle East. The communities of the Mezab Valley in Northern Algeria give a good example. Mozabites, members of a Muslim sect fleeing persecution in the 11th century and, eager to establish their own society, turned a part of the wilderness into thriving settlements (Briggs, 1960; Fahmi, 1995; Palin, 2002). Their success in taming the desert and maintaining long-term stability compared to neighbouring regions can be attributed to highly introverted social organisation.

Accommodating the environmental stresses of desert has always been associated with ‘mobilising and binding forces’. In such context, individuals, due to a higher

purpose or idealistic belief such as blood affiliation, land affiliation, religious zeal or political ideology, submit voluntarily to special patterns of social organisation. Communities that have successfully penetrated the desert had a social ideal strong enough to overcome the inherent difficulties of establishing a stable human habitat in a place of scarcity. While a social ideal can contribute to the formation of an elaborate social organisation, the two factors of environmental constraints and social ideals produce a kind of 'social identity' implying that the society has developed distinctive social measures compatible to its ecosystem.

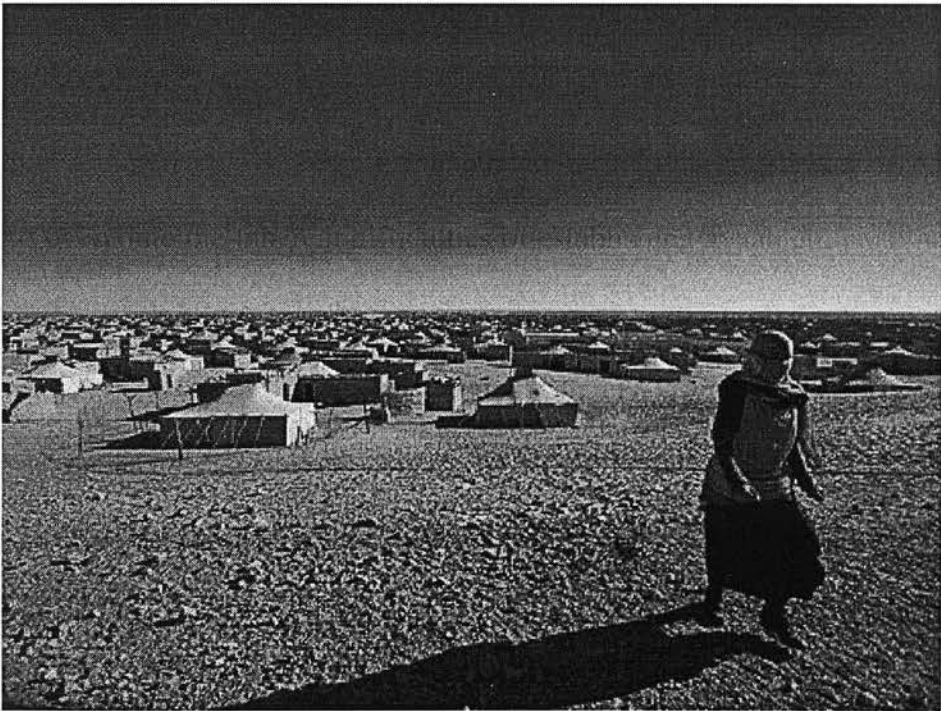


Fig. 3.1 Smara Camp, Algeria. For the last twenty-five years it has been home to 40,000 Saharawi refugees, who left their western Saharan homeland and settle within Moroccan domination (Palin, 2002).

The interrelated social factors of ideals, organisation and identity can be detected in most successful penetrations of desert regions. Mann (1963) cites the experience of the Mormon settlers in the US as a prime example of how social organisation, value system and behavioural pattern can produce effective resource management and social stability. The conscious respect of these communities to resources enabled poor

farmland to support about six times as many people as did earlier farms on the same land, achieving about twenty times the average productivity (Jodha, 2001).

The early phases of the Israeli experience also indicate that innovative patterns of social organisation, motivated by social idealism, are more responsive and compatible to the ecosystem than are any contrived social forms, especially in the primary phases of settlement (Weintraub, Lissak and Azmon, 1969; Fialkoff, 1992).

In summary, history demonstrates that desert settlement can acquire strong internally generated social patterns in response to the hardships imposed by the environment. This suggests that social and economic benefits could well be released by a policy of limited intervention that enables new desert populations to develop informal institutions to support their social idealism.

3.2.4 Community/Settlement Uniformity

Ecosystemic constraints inevitably limit the growth of settlements in the desert. Traditional desert settlements developed a range of social mechanisms to maintain an ecologically balanced size and to induce centrifugal forces to counteract the natural forces of concentration.

One characteristic example of such mechanisms is the striking feature of spontaneous socio-political organisation throughout the history of many desert settlements of the Middle East (Briggs, 1960; Fakhry, 1973; Gugler, 1997). Similar to a two-party political system that divides a community into two, usually conservative and progressive factions, a dichotomous arrangement extends along the economic and social organisations of the entire community. The persistence of such a system over a long time, across a wide geographical area and even within different socio-cultural milieus attests to its ubiquity within desert settlements. This is supported by the notion that membership of such factions is not necessarily hereditary or associated with ethnic

affiliations. Members can, and do, rapidly change sides.

Other socio-ecological instruments can also be used in growth control, ranging from homicide to establishing new distant settlements (Silberstein, 2002). The settlement-seeding mechanism of growth control indicates that social decentralisation at the regional level has been an indispensable response to two pressures: finding a balance between populations and resources and mitigating the socially disorganising phenomenon of excessive community size.

3.2.5 Settlement Size and Cohesion

Various studies indicate that the internal organisation of a group determines the nature of its adaptation to harsh circumstances (Woodbury, 1970). Addressing this desert planning calls for innovative social institutions in which effective public participation and collective responsibility toward the settlement ecosystem naturally develop. It also implies that, unless movement to the desert is organically associated with strong social ideals the stability of new societies will be threatened.

However, social ideals, when related to very general goals, are ineffective as a basis for special patterns of social organisation. Formulating a social identity compatible to the desert ecosystem can only be attained through the agglomeration of individuals and communities within informal institutions around an idea, a concept, a religious ideal, a place etc. In such a context, the local and regional dimension of social organisation should be emphasised above the national level. This could be attained through introverted and local institutions and less national control of supplies, thus enhancing a distinctive and self-contained regional identity. The goal of a rich and uniform nation should be replaced by aspirations of rich, diverse and autonomous regions.

The question of settlement size, from the social point of view, is still

controversial. Large urban centres in the desert are advocated on both economic and social bases (Golany, 1978). Extensive social and physical services and facilities relevant to large size have always been thought of as indispensable to attract people to remote areas. The counter argument is that, the effect of large size is a fragmented and sophisticated institutional structure with a disproportionate ecosystemic impact; the environmental deterioration that accompanies the growth of large metropolises in desert regions of the Middle East and the US is well documented (Heathcote, 1983). However elaborate social organisation, cohesion and concern for resources tend to delimit and reduce settlement size.

While the direct relationship between desert environmental stresses and social problems has not been fully investigated (Heathcote, 1983), Cleland (1978) observes that some features of social pathology such as crime and suicide in Tucson, Arizona are said to be among the highest in the US. Such problems can be related to social instability brought about by rapid growth, large size and ethnic and socio-economic heterogeneity, rather than a specific environmental factor.

Much literature of urban planning, urban sociology and other fields calls strongly for new small cities to solve the current urban crisis (Soleri, 1969; Dantzig and Saaty, 1973; Knox, 1995). The problems that induced such calls are only more exaggerated within a desert context. As Lynch (1981, p. 240) puts it: "The concept of a limited size is of course an integral part of the organic model" and mentions a swathe of physical and environmental disbenefits.

Scarcity and the need for frugality call for the decentralisation of dispersed and self-contained small social units with clear communal and spatial boundaries. The cohesive, well-defined, small community (the 'community concept') is a requisite in the desert. Thus Dowall and Giles (1996) refer to a common feature of most medieval Middle Eastern cities: the city was divided, physically and socially, into 'quarters' that

acted as village-like communities within the urban whole.

3.3 Socio-Cultural Dimensions of Desert Settlements

3.3.1 Preface

Within the broad range of definitions for the term 'culture', only those that include the relationships between man and a series of interwoven milieus, including the natural environment, are of use interpreting cultural phenomena in any locale and at any moment. The cultural complex of a society can support or impede its adaptation to its environmental constraints. A generation of researchers recognises that the dynamics of the rise and decline of civilisations expresses the interplay between natural and man-made factors (Hughes, 1975; Gibson, 1982; Elkin and McLaren, 1991).

Because any planning process intervenes in shaping the cultural complex of desert communities, such intervention should recognise the function of culture as a basic means of adaptation to the desert's environment. Many disciplines are involved in investigating what are the characteristic features of a specific natural environment that enforce responsive patterns of life for individuals and communities (Bechtel, Ittelson and Wheeler, 1978; Dieter, 1986). However, as the cultural phenomenon is basically a local one, even across similar contexts, the main concern here is not related to the morphology of the culture rather to the nature of interplay between culture and the specific context of the desert.

3.3.2 Socio-cultural Traditions and the Desert

1) Distinctiveness and Homogeneity

Desert societies throughout history have adapted cultural patterns to severe environmental stresses that are distinctive from those of less harsh ecological zones. Social uniqueness, rigidity and homogeneity typically have a positive relationship with

environmental deprivation. In an environment that has always been repulsive, rather than absorptive, the assimilation of outsiders has been close to impossible and any breaking of social norms is a destabilising variable. The infiltration of an outside culture and even internal evolutionary change has always been repressed.

The desert has always been the 'land of insolence'. Traditional desert nomadic and semi-nomadic communities have taken unusual pride in their unique self-identity and way of life (Roberts, 1979). Their deep disrespect for peasant or urban life can still be detected, in their high selectivity of occupational and employment patterns, even after their integration into these societies (Ibrahim, 1992). This self-identity, based on a 'belongingness' to the desert, is a socio-psychological mechanism that enhances their endurance and sets strict protective, cultural and social boundaries between their own and non-desert communities, a mechanism that preserves a critically balanced way of life (Spooner, 1972; Silberstein, 2002).



Fig. 3.2 Rush hour at Arrêt TFM, Mauritania. Fight for seats on one of the Sahara's only trains.

Those in Iron Ore class are already in position. (Palin, M, 2002)

Such homogeneity also includes different, even sedentary, forms of desert population. Desert cities have always been, culturally and socially, extremely homogenous with their hinterlands (Abo-Zied, 1991). As Costello (1977) remarks of contemporary desert societies in the Middle East, the significance of nomadism is less the number of people directly involved, which he estimates as being no more than one percent of the population, than for the imprint of nomadic social structures on the present sedentary population.

As desert hinterlands supply urban centres, with continuous waves of sedentarisation, and subsequently cultural flow, scarcity induces centrifugal forces to maintain an appropriate ecological size. Forces of concentration and dispersion sustain a two-directional and continuous transaction between, and therefore homogeneity among, the two cultures. Because the desert cities of the Middle East and Southwest Asia, have a strong urban tradition older than those of the European industrial revolution (Heathcote, 1983), their urban traditions have exhibited characteristics different from those of humid zones.

2) *Rigidity of Social Norms*

As mentioned before, a strict system of norms and codes controlling most of the socio-behavioural patterns is a traditional mechanism for survival in a deprived environment. Ibrahim and Cole (1978) observe that the Bedouins of Saudi Arabia have a complex and sophisticated legal system that has not changed for centuries. Silberstein (2002) comments, on the similar system of the Bedouins of Sinai, where rigid rules governing conduct were formulated in times long past, and have been maintained by tradition. Nowadays this set of values persists even though it is at odds with the modern state's legal code. In other words, despite the fact that this unwritten law was never

formally institutionalised but depended on oral and social transmission from generation to generation, it has remained surprisingly uniform and widespread.

A human community determines its relationship to its natural milieu in many ways. Among the most important is its attitudes toward, knowledge of and understanding of nature's structure and balance, the type of technology, and the social control it can exert over its members (Fajal, 2002). Once it has achieved a stable relationship to a stressful environment, the potentiality of deviation from its norms decreases the more intense the ecological constraints become.



Fig. 3.3 The water shuttle. There is no water at all on the arid, burning cliffs, so Dogon women have to carry it up from the well. Tirelli desert, Mali. (Palin, M., 2002)

3) *Adaptiveness*

In comparison to the current standards of modern urban culture, desert communities have minimal physiological and psychological demands. Their culture is the outcome of long-term realisation of how to fit the Procrustean bed into which environmental circumstances have forced them (Silberstein, 2002). They have a well-formulated and attuned attitude which is transferred from one generation to another,

enabling them to withstand physical discomfort and privation (Hillel, 1982). The pattern of adaptation has always been enhanced by sensitivity to the surrounding ecosystem, its limitations and its potentials.

4) *Continuity*

In an absence of surplus, where much of the cultural system is devoted to maintaining the man-environment balance needed for survival, there is minimum tolerance for cultural diversification and change, especially in isolated settings. However, while continuity has safeguarded traditional desert societies throughout their history, it also limited their evolution to more technologically advanced phases. A traditional or custom-bound society changes slowly; this is both its strength and its weakness (Clawson, 1963).

Within the cultural context, the distinction between continuity/stability and stagnation can be very subtle. The traditional culture of desert people exhibits an inherent tendency to stagnation. Whether stagnation is related to 'environmental determinism' or to local circumstances is debatable. Fahmi (1995) and Silberstein (2002) supports the latter view. Nevertheless, traditional desert culture is more stable, adaptive and compatible with its fragile ecosystem than are cultural patterns transferred from humid regions. While cultures imposed on the desert exhibit a high ability to assimilate rapid changes, they are extremely unstable and induce deleterious long-term impacts upon the ecosystem.

5) *Religiosity*

Judaism, Christianity and Islam all originated with desert people or on desert margins. Fakhry (1973), Hamdan (1983) and Fahmi (1995) comment on the impact of religion in shaping social and cultural systems in most desert oases of the Middle East

until the beginning of the 20th century.

From a point of view of environmental psychology, the overwhelming domination of great desert expanses of minimal landscape diversity bounded by a monotonous skyline and where silence and dry air eliminate the confusion of details, compel dwellers to contemplation and a feeling of submission to a mighty power. Many geographers interested in eco-cultural concepts relate monotheism, especially Islam, to the desert, with Hamdan (1983) linking the geographic distribution of Islam to the boundaries of 10 inches isohyete.

Further evidence suggests that religiously-oriented people, as individuals and groups, exhibit an enhanced ability to withstand environmental stresses. Briggs (1960) observed the role of religiosity in enhancing the stability of the Mozabite settlements in the northern Sahara. The Mormon experience in the US and the Jewish experience in Palestine attest to this fact (Ibrahim, 1992).

The nature of the relationship between religiosity and community life in the desert can be considered in various dimensions:

- People who reject the secularly-oriented culture of cities are often induced to flee to other regions;
- A strong motivation to experiment and practice without interference the spiritual and social implications of a belief, mostly in isolated locations, encourages a higher endurance of harsh conditions;
- Less interest in enjoying secular pleasure and amenities can be observed in religiously oriented individuals and groups. They may thus feel less deprived in the desert than other groups; and
- Religiosity works as a unifying social force that therefore helps substantially mitigate the stresses of desert life.

6) *High Density*

Most desert cities are characterised by high population density compared to those of non-arid regions. This intensifies social interactions. The spatial and social demands for individuality and privacy are at lower levels in the desert culture.

High density can be explained along physical/spatial bases such as space economy, minimised walking distances in stressful conditions or the advantages of proximate buildings in protecting against harsh climatic conditions. However, it may also be a responsive cultural mechanism to living in isolated settings, as other evidence indicates that intensive social proximity and interaction can actively counter the isolation and environmental hardships of the desert. The inadequacies of the harsh environment as a place for leisure and as an extension to indoor life limit the living zone and induce cultural patterns that intensify social interactions.



Fig. 3.4 The skyline in Benghazi, Libya's second city, shows plenty of new and unmemorable modern buildings that form a high density pattern. (Palin, M., 2002)

Bechtel, Ittleson and Wheeler (1978) observe that visiting relatives was found to be the most important form of recreation within some communities in Tehran; it is even more so in smaller and more isolated settlements. Another study of the non-traditional society of ARAMCO employees in Dharan, Saudi Arabia also ranked visiting as the primary recreational activity. Adults reported spending 660 hours per year visiting (Ibrahim, 1992).

7) *Psychological Factors of Adaptation*

The response of people to desert conditions varies dramatically from one individual to another, involving many variables. Researchers commonly identify these variables in two major categories, physiological and psychological, stressing the first. However, the most striking factors in adjustment mechanisms of desert people are primarily cultural/psychological.

The human body needs make only a few physiological adjustments to desert conditions. The inability to cope with environmental stresses with no direct physiological basis have been variously described as tropical neurosis, tropical debility, tropical fatigue and tropical neurasthenia (UNEP, 1996). These many terms reveal uncertainty over the nature of the disorder that seems to be only indirectly related to physical conditions. It could be argued that the intensity of physiological discomfort follows the mechanism of psychological stress.

The psychological factors of adaptation cannot be considered separately from the context of individual experience and group culture. The variables of adaptability to stressful conditions can be categorised into three overlapping and interacting aspects: attitude, enculturation and motivation (Portnov, 1998a).

Attitude affects the experience of stress and largely determines the level of behaviour in the hierarchy of: surrender, avoidance, aggressive response, psychological

adaptation and constructive behaviour. It has a remarkable impact upon tolerance and performance. The positive attitude of desert settlers as a group has far-reaching consequences on their social viability and economic performance.

Enculturation is the process by which an individual learns the traditional content of a culture and assimilates its practices and values. However, while it greatly enhances the adaptability of an individual, especially in the case of the desert's indigenous populations, at the same time it limits individual initiative and the development of new adaptations, especially as the social, economic, or physical environment changes (Hegazy, 2000b).

Motivation can raise the level of adaptability and quality of performance. A highly motivated individual, whatever the incentive may be, will frequently be able to operate under conditions which the poorly motivated person may consider unacceptable.

The adaptability of Egyptian labour to work in desert development projects in rich Arab states under conditions which would be unacceptable at home has been highly rated (Ibrahim, 1982). The motivation generated by financial reward is the most evident factor in overriding otherwise intolerable conditions.

Motivation, whether economic, ideological, spiritual or other, seems a most important mechanism within the process of adaptation. It can stimulate very strong feed-back loops to attitude and accelerate the process of enculturation in response to a different environmental context.

3.3.3 Features of new Socio-culture

1) *Cultural Transfer and Planning*

Migrants to new desert regions transfer their own cultural systems to the new habitat. Many of its manifestations – house design, eating habits, health practices, clothing etc. – are unlikely to fit the new environment. The process of shedding

previous cultural patterns and developing adaptive ones, and the making of behavioural and institutional changes through trial and error, usually occurs very slowly or may never occur due to strong retardant factors (Portnov & Pearlmutter, 1997). The urban culture of the US Southwest merely expands the rural and urban cultures of the humid Northeast. The superficial cultural changes that have taken place in the last two centuries do not represent a significant metamorphosis toward truly distinctive patterns. Such nonadaptive patterns can be absorbed in a rich economy, but they can induce massive environmental costs and adverse economic and social conditions in a poor, underdeveloped economy.

There is strong evidence that the planning of desert settlements in many Middle East countries has been captive to cultural patterns transferred from humid western societies. Architectural and urban design are explicit examples. The failure of these imported designs to accommodate environmental and social needs is well-documented (Fathy, 1973; Fathy, 1979, El-Wakil and Serag, 1985).

Any process of planned settlement in desert involves an interface among three different cultural spheres: the local/indigenous, the urban/national and the western/international. As the second is always reflective of the third, the interface between the first and the second is of great significance here. Most desert settlement schemes involve a segment of the indigenous population, the interface between the incoming (technological but nonadaptive) and the indigenous (adaptive but stagnant) cultures creating socio-cultural tensions.

If the cultural transfer between the two cultures, the modern/international and the indigenous, always flows from the former to the latter, the dissolution of the traditional culture inherently destroys a distinctive base of cultural adaptation to the environment (Fajal, 2002). Hillel (1982) says:

“Cannot the Bedouin’s previous conditions of poverty be alleviated without so radical a change in their way of life? Must their remarkable and ancient culture, so finely tuned to their unique environment, necessarily be destroyed so that the Bedouin, like so many other reluctant peoples, are pushed into the last decades of the twentieth century “for their own good” as perceived by others?” (p. 214)

Fusing aspects of desert culture and modern urban culture into an adaptive hybrid, although not a new challenge has yet to present a comprehensive solution. Bourgeois and Pelos (1983) describe the various approaches as falling between one extreme, where development seeks to elevate the backward societies into the modern world and the other extreme of seeking to insulate the richness of cultural diversity against the spread of homogenising materialism. They advocate that the responsible course is the middle one of ‘integration’.

Cultural systems of new desert societies do not easily succumb to planned intervention. Physical planning does not create new cultural systems, as desert planners may imagine but may enhance or suppress an existing cultural system. Whether or not the eventual cultural synthesis is adaptive to the desert depends on the size and strength of the three components involved in the interaction: the existing, the introduced, and the social and spatial factors of the relevant context. However, a planning process that is largely inspired by the local culture can effectively contribute to the formulation of adaptive cultural patterns. This requires a high degree of openness, comprehensiveness and an interdisciplinary approach free from conventional objective concepts, and one that selects features from traditional *and* transferred cultures on the basis of three criteria: adaptability to the desert, susceptibility to technological development, and compatibility with existing social and cultural milieus.

For an arid and fragile ecosystem there is a critical need for a balance between time-proven traditional features and innovative technologies. Heathcote (1983) argues that, while outright rejection of innovation invites social pressures which might destroy the society from within, uncritically incorporating technology for its own sake will destroy the society in any case. The revival of fundamentalist Muslim ideologies in Iran exemplifies the first case, while problems among the Sahel nations illustrate the second.

2) *Cultural Aspects of New Desert Settlements*

Many aspects are implicated in developing a 'desert-friendly' cultural orientation. As already indicated, these involve the acceptance of many patterns – such as of settlement density - that are found in traditional desert cultures. These would need to be supported by an education that gives desert dwelling a specific status as a comprehensive culture in its own right. This chapter closes by discussing in more detail other associated cultural patterns that could be incorporated into new planning approaches: food culture; frugality; architectural identity; the spiritual dimension; and problems of isolation and leisure.

- ***Food culture***

Food culture has profound economic, social and ecological ramifications currently being felt in new desert settlements all over the world. Current desert agriculture is extremely overspecialised and restricted to only a handful of plant species that fall within too narrow a span of ecological tolerance in terms of water requirements and salt tolerance, and thrive best in actual or simulated temperate or tropical environments. In many desert zones, millennia-old, locally adapted techniques for sustained micro-environment exploitation have been lost as a result of the indiscriminate introduction of exotic agriculture (Hinman, 1986). Felger and Nabhan

(1978) introduce a responsive model for diversification of the agro-ecosystem of the American Sonoran Desert that calls for changes in the food culture. They note how diminishing ground water levels and 'skyrocketing' pumping costs have wiped out thousands of hectares of farmlands in southern Arizona, leaving large areas vulnerable to wind erosion and creating a mini dust bowl. They recommend seeding these abandoned fields with native species such as the buffalo gourd, which can form protective ground cover and offer harvestable by-products with little or no irrigation, since they are pre-adapted to aridity.

To increase the number of species that can be harvested as food resources from the broad range of desert adaptive species is a matter of cultural orientation. Addressing this requires emphasis on the factors of self-identity, innovation, and deep knowledge of the ecosystem.

- ***Frugality***

Traditional desert culture reflects the social values of austerity, frugality and resource conservation while much modern urban culture celebrates consumption. The physical implications of a transferred culture of consumption can be seen in US Southwest where water use in agriculture and urban development is exerting massive pressures on the capacity of the ecosystem. Depleted water supplies and air and soil pollution all reflect a 'growth' and 'energy intensive' culture which the desert ecosystem cannot support.

Frugality develops from a complex set of variables that reflect a subjective value system rather than clearly defined or measurable factors. High resource consumption does not automatically raise the quality of life but may cause it to decline (Istock, Rees and Stearns, 1974; Bennett, 1993). In a fragile ecosystem, a formula that emphasises a pleasant, safe and stable physical and social environment can contradict one that

perceives a connection between the quality of life and extravagance, growth and wasteful energy and material consumption.

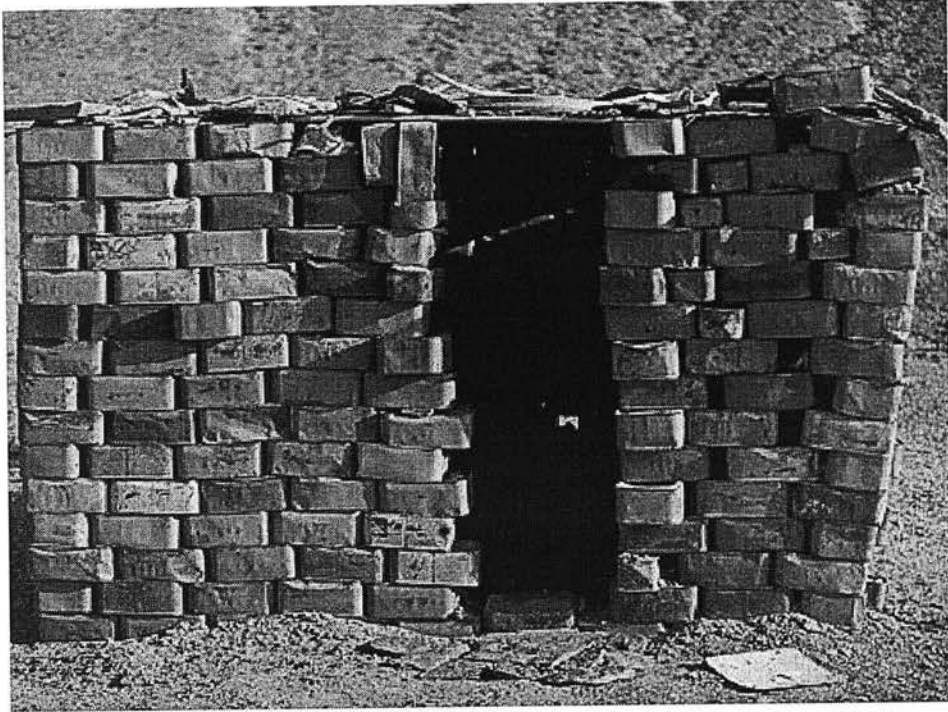


Fig. 3.5 Nothing is wasted in the desert. Empty ammunition cans help solve the housing shortage, Tfariti, Western Sahara. (Palin, M., 2002)

The cultural orientation of new desert settlements should reflect the moral implications of a ‘steady-state’ economy. ‘Living with the desert’ should be substituted for ‘conquering the desert’, which means promoting values that respect the (immediate) desert environment rather than the (distant) urban one.

- ***Cultural Identity***

In new desert settlements a different and distinctive cultural identity that is unique in the cultural mainstream of the society can set clear boundaries between adaptive and nonadaptive values. During the early phases of settlement, when the processes of improvisation, experimentation and innovation are still rudimentary, conserving and reviving the positive aspects of traditional culture can be pivotal in

ensuring a distinctive cultural identity.

Desert vernacular architecture is one among many aspects that could be identified, marked, learned from and revived. Bourgeois and Pelos (1983) state that:

“Vernacular architecture’s beauty and ingenuity reminds us that simplicity of means is not poverty of means. Its dignity reassures us that we can learn to overcome our dreams of greed and dominance, that we can grow past our illusion that wealth and power need to conquer nature... But desert vernacular is more than lovely. It is also practical and ethical. With minimal means, it shelters against nature without abusing her” (p. 91).

In contrast, the physical features of new desert settlements in Egypt reflect a pale, unidentifiable cultural pattern in which exotic concepts obliterate traditional local features. Close to the Delta, there is a village that is identified only by serial numbers that indicate the chronological order of its construction (Tadros, 1982). The plan of this and other villages resembles a concentration camp more than a human settlement. Here, cultural degradation, lack of dignity and the feeling of not belonging cannot be addressed separately from the physical dimension.

Retaining a characteristic and distinctive desert culture implies a significant spatial dimension that exerts substantial impact on the pattern and intensity of cultural flows. Retaining a distinctive desert culture can be shown to be more difficult the closer the community is to an influential cultural centre. This is evident in those desert settlements of Egypt closest to metropolitan Cairo.

Old desert oases are the most appropriate places to begin to build communities with a distinctive desert culture. This ‘culturally based approach’ takes the an existing community with its traditional culture as the focal point. Limited size, introversion, homogeneity and a step-by-step approach are basic conditions for the process needed to

develop the existing desert culture into a distinctively modern one. Such an approach parallels the 'oases-type approach' introduced by Fahmi (1982). This opens with an action plan for reviving existing, and establishing new, oases into a network of local points that provide permanent grounds for executing future development programmes and testing and learning from natural resources and new desert technologies.

- *The Spiritual Dimension*

The history of man's migration shows that settling the desert or uninhabited regions was seldom impelled by rational calculation and more by ideas of visionary and religious significance. Planners, enchanted with material and analytical information and methods, have tended to overlook the powerful role of nonrational factors. The very objective political slogan of 'conquering the desert' that accompanied the first phase of the Egyptian experience proved ineffective in instilling any strong motivation or commitment in the Egyptian settler.

The spiritual orientation of new desert settlements cannot be artificially superimposed onto an objective planning approach but would need to be built upon pre-existing socio-cultural features. Islamic revivalism, the friction between religious and secular concepts, and the ideological environment in Egypt today suggests a range of strong and deeply held convictions for inducing a linkage between the desert settlement movement and the stimulus of existing beliefs.

Emphasising the spiritual dimension in desert settlement planning can be a very stabilising factor for new communities on the basis of frugality, communal cooperation and self-help. However, such an approach implies many requisites in planning the physical and institutional structures of new settlements.

- ***Isolation and the Problems of Leisure***

Isolation can render the desert's physical and social environments less attractive for prospective and new settlers and even for the indigenous population. The related problem of boredom can induce many psychological and social problems. To Saini (1970) and Hegazy (2000b), isolation means withdrawing from the world of big stores, museums and theatres. This incurs loneliness among adults that might find expression in aggressive behaviour.

The intensity of – and solution to – the problems presented by isolation depends heavily on the cultural milieu of the desert settlement. An objective cultural orientation could introduce many mechanisms for 'worthy' activities that would not necessarily replicate urban culture. Enabling a nucleus of participatory communal activities around a range of miniaturised social activities is one such mechanism. Opportunities might be offered for productive secondary occupations within a cooperative framework. Settlers could, for instance, construct their own houses, pursue formal and informal education for themselves and their children or create and care for the surrounding environment.

Within the concept of 'regional complementarity', every settlement could develop a specialisation for certain recreational activities. Diverse intra-regional activities would then compensate for shortages at the local level (Portvov, Erell *et al*, 2000).

Promoting various mechanisms of inducing cultural patterns that offset the problems of isolation affects the physical structure. Planning the central service core, its form and growth phases take on a heightened significance. The concept of a communal activity nucleus, for instance, depends heavily on settlement pattern and land use. The intraregional recreation network also relies heavily on spatial linkages at this level.

3.4 Socio-Political Dimensions of Desert Settlements

3.4.1 Preface

In spite of extreme spatial dispersion, traditional desert societies developed unique patterns of political organisation reflecting the nature of desert ecological constraints. Hamdan (1983) describes the three 'seeds' of such patterns as tribe, caravan and oasis, all requiring various levels of social, resource and political leadership and organisation.

Throughout history, abundance and plentiful water resources in humid ecosystems were reflected in the social development of relatively small political units and even distribution of political power. Desert ecosystems experience a continual process of spatial rearrangement between population and scarce resources (Portnov and Etzion, 2000), making of them places of instability in which invasion and political unification are enhanced by the open and unrestricted landscape. Regional and national states, rather than city states, characterise desert regions.

The flow of water in an arid ecosystem shapes the flow of power and the political systems. Throughout Middle Eastern history water, not land, is the constant focal point of socio-political organisation, in contrast to the European situation (Heathcote 1983).

The conceptual systemic linkage of water to politics finds its full expression in Wittfogel's theory of oriental despotism (Wittfogel, 1957). For him the history of Egypt up to the modern era exemplifies an ecological/socio-political interplay in which public management of a profuse but concentrated water resource, produced a political system of autocracy and extreme centralisation. This researcher agrees insofar as accepting that the degree to which power is centralised within the highly extensive spatial boundaries of an arid ecosystem is related to the specific nature of the managerial and spatial aspects of the existing water system. While Allochthonous Rivers relate to stable

systems of centralised power, and large spatial expanses correspond to tightened security measures and managerial requirements, sporadic precipitation and dispersed underground water resources lead to decentralised political systems with little stability and with continually shifting political frontiers. The persistence of the tribe in place of statehood as the main political denominator in the Middle East up to the beginning of the 20th century (Christensen, 1986), reflects this. Egalitarianism, liberty and decentralisation have always been basic political features of the desert.

The provisions of modern technology do not decrease ecological/socio-political interactions. In fact, accelerated resource use only exacerbates the need for a scarcity-conscious politics (Ophlus, 1977). Worster (1986) saw in the socio-political structure of the US Southwest a direct reflection of its natural and man-made hydraulic systems.

A low recognition of ecological and socio-political interactions makes the political institutions of new desert settlements captive to concepts transferred from different environmental contexts and/or the dominant political mentality from their inception. The current problems of the Egyptian experience suggest changing to a more adaptive political structure.

3.4.2 Current Problems in Desert Settlement Experience

1) *Institutional forms*

Desert settlement under modern conditions is a multifaceted process that calls for large-scale national mobilisation of resources. In scale and complexity, it contrasts with other ecological zones, and state sponsorship is a pre-requisite. However, while state-sponsorship can offer extensive financial and organisational support, it is also a point of weakness. State schemes, usually developed without spontaneous public initiative or participation, are prone to produce deficient institutional forms, especially within the desert environment.

Cohen (1977) proposes a remarkable typology for the settlement of new regions based upon the variables of cultural orientation and social organisation:

Social Organisation	Cultural Orientation	
	Instrumental	Visionary
Spontaneous	1. Adaptive Penetration	2. Pioneering Settlements
Sponsored	3. Planned Development	4. Visionary Transformation

Table 3.1 A Typology of Settlement Process of New Regions (Cohen 1977, p. 233)

While the four settlement types above are theoretical, interconnected and overlap greatly, they and their relevant institutional forms can be identified within the different experiences of desert settlement.

The American experience, with spontaneous social organisation but instrumental cultural orientation, could be placed under ‘adaptive penetration’ for, while the institutional forms were transferred from the north-east, the pattern of decentralised democratic institutions has accomplished an unprecedented rate of penetration, settlement and growth. It has also allowed maximum integration of individual initiatives, flexibility in accommodating new conditions, and self-perpetuating mechanisms of development. However, the negative impact of such institutional forms on the fragile ecosystem is well-known.

The Israeli experience could be termed ‘visionary transformation’. While it has been entirely sponsored and planned, even before the establishment of the state, spontaneous visionary components were strong enough to bring about innovative institutional forms. Local democratic institutions, adequate public input and effective regional organisation have substantially mitigated the impacts of centralised control.

However, development and growth are always tied to the mode and nature of governmental intervention.

The Egyptian experience, entirely sponsored and instrumental, could come under 'planned development'. It produces institutional forms typical of state-controlled schemes in the desert environment.

2) *Centrality of Power and Decision-making*

Regardless of the political ideology, desert regions tend to be administrated by distant government departments. This is largely because the population densities and tax base are low. To govern the thinly-spread population of Australia, as Heathcote (1983) observes, centralised authorities imposed geographically arbitrary boundaries demarcating regions within the arid interior.

Such arbitrary boundary lines, fragmented jurisdictions and responsibilities and the lack of appropriate local institutions are exacerbated in Egypt due to an excessively over-centralised traditional bureaucracy. Inflexible decision-making and management have been the predictable outcome. The absence of public participation only further incapacitates the performance of local institutions.

Political leaders most usually design any society's institutions with a limited number of goals in mind (Hegazy, 2000b); their structures inevitably incorporate the leaders' ideological and cultural biases. In any desert settlement process, even those based on long-term rational planning, the outcome is always skewed by temporary political contingencies and orientations (Gibson, 1982). An example is the form given to desert settlements by the after the 1949 revolution in China. The quasi-military organisation of 'production divisions', 'production battalions' and even 'state farms', illustrates a dramatised attempt to break from a traditional belief in living in harmony

with nature (Chang, 1982). 'Conquering nature' became the main theme influencing these institutional forms.

Though less extreme than the Chinese experience, the socialist concepts accompanying the first phase of the Egyptian experience contributed to giving new settlements rigid institutional forms with many shortcomings. While they exhibited promising performance at the start, their efficiency eroded rapidly with time. They became intrinsically stagnant, concerned with maintaining the status quo and unable to develop organically. Economic and social degradation were then attributed to many different causes, but never to the institutional forms.

Creating new settlements in a desert requires a substantial input of free choice, motivation, vision and creative improvisation. Flexible institutions that can assimilate the different perceptions and aspirations of individuals and nurture improvisation, innovation and experimentation are critical in coping with scarcity and spatial isolation. Sponsored desert settlements can benefit substantially by borrowing or simulating the institutional forms of spontaneous settlement and this points to strong, locally-oriented and autonomous democratic institutions.

3) *Transfer of Unadaptive Institutional Forms*

Most desert settlement experiences that involved a population shift from humid to arid regions, even in those that were more spontaneous and less sponsored, as in the US, have encountered the transfer problem.

In the Egyptian experience, the administrative structure which evolved in the Nile Valley ecosystem proved incompatible in the desert's spatial and environmental context. While the traditional centralisation of power was balanced against extreme spatial proximity and continuity of the whole settlement web, when replicated in remote desert regions, its weak institutions at the local level were incapacitated by weak spatial

linkages to the now remote political centres.

3.4.3 Analysing Socio-Political Dimensions of Desert Settlements

1) *Institutional Boundaries and Political Decentralisation.*

The capabilities of political institutions in general are defined by their area of responsibility, authority, scale, resources and links with other institutions. Problem-solving and response require an interdisciplinary process across the subsystems of the settlement. In centralised government, specialised departments approach only that portion of the problem that falls within their remit. Despite the large efforts made, these methods prove ineffective if the overall problem is never co-ordinated at any scale. Heathcote (1983) argues that the tendency for governments to prefer highly bureaucratic approaches blinkers both the perception of and reactions to problems of resource management. He argues that it can impose a generalising strait-jacket on the regional distinctiveness of many resource-management problems and he thus favours isolated uncoordinated projects above a more regional and comprehensive planning.

The establishment of broad-purpose local/regional political institutions calls for a different distribution of power at the national level. It mandates political decentralisation in which many of the policy mechanisms are operated at the local level. Democratically based, semi-autonomous regional governments with broad and interdisciplinary jurisdictional boundaries then replace specialised central departments. The efficiency of such a system ultimately depends upon the range and authority delegated to it from the centre or acquired through constitutional rights. This becomes fundamentally related to the question of 'regionalism': whether to have a national system of regional subsystems or to devise more efficient forms of the existing institutional hierarchy (Hamdan, 1977; Ibrahim, 1992).

Paddison (1983), commenting on Australian regionalism, puts the focus on the issue of the status of the regional bodies. He questions whether these represent an attempt to implant a fourth tier of government or if the regional bodies were merely intended to have an administrative role unlikely to threaten existing, local power bases. Either outcome would turn 'regionalism' into a centralising strategy, rather than a real attempt at decentralisation.

As differential development and growth strongly reflect the spatial organisation of decision-making (Ortolano, 2000), a shift to a more balanced pattern of political decentralisation ultimately brings about positive forces to the form and pace of desert development.. Adequate (informed) and fair (political rather than administrative) access to the national resource allocation process is an essential characteristic of positive and genuine political decentralisation. Furthermore, political decentralisation and pluralism also seem compatible with the approaches of self-sufficiency, self-containment and the objectives of creating a distinctive socio-cultural identity adaptive to its ecological context.

2) Fusion of Formal and Informal Institutions

To Fahmi (1995) the characteristic need for patterns of public participation within the different institutions of a desert settlement in Egypt is evident. He notes many indications that modern technologies and expert opinions have not ensured long-term success, and that the cooperation of local inhabitants has been granted an insufficient role in the execution of these costly efforts.

While democratic, interdisciplinary political institutions would be adept at assimilating real public participation, they might be overwhelmed by the complexity of broadened responsibilities and jurisdictions. A responsive and innovative approach is to encourage informal institutions to participate effectively in several management

activities, especially during the early phases of settlement. They can be overseen through an organised fusion of formal and informal institutions, involving a major shift from hierarchical, product-oriented organisations to more informal, process-oriented, and socially structured ones.

There may, however, be a negative relationship between the size of political units and the effectiveness, or even the possibility, of such a set-up. The unfortunate paradox is that the move towards larger and more centralised units of government in the name of efficiency, good management and speed of political decision-making inevitably moves the government away from the people that “the very scale of the new structure makes it more intimidating and hence more remote” (Burghardt, 1983).

While the Israeli Kibbutz could be considered as a crude prototype of fused formal and informal institutions, its approach does not necessarily include extreme communality or public empowerment. The formal and informal institutions are fused as the only available means to keep a critical balance between the ‘sponsored’ and the ‘spontaneous’ in desert settlement to maximise their positive aspects. The problems of some settlement schemes in the Negev desert of Israel were attributed to a rigid institutionalisation incompatible with the spontaneous ways of the early inhabitants based upon their pioneering spirit and visionary enthusiasm, as Portnov (1999) observes. He adds that, once such settlements became fashionable to groups that would not have joined otherwise, some of the original founders, having lost their initial sense of challenge and fascination, departed.

3) *Water Resources and the Spatial Boundaries of Political Units*

Water is the constant, overriding concern in any desert settlement process. Control of the supply, distribution and use of scarce water resources should be the focus

of the development of political institutions in the desert. Local, broad-purpose, political institutions should be structurally and spatially built around this function.

The interactions between water, land and social institutions have special significance in the desert. Design of political institutions should directly reflect the territorial aspects of natural and man-made water systems. Their spatial and jurisdictional boundaries should coincide with those of water development schemes. Problems that arise from incompatibility between political boundaries and water regimes are well documented and typified in the regional conflicts centred on scarce water resources in the US Southwest.

4) *Political Pressures towards Conserving Fragile Ecosystems*

The challenge in designing institutional forms adaptive to the desert ecosystem lies in finding a political ideology compatible to the contradictory requirements of rapid development and conservation in a fragile ecosystem. While informal institutions with minimal control over individual initiative can substantially enhance the former, they can also jeopardise the latter. The opposite is the case in rigid institutional structures that entail complete control over resource use and management.

Nevertheless, in the context of scarcity and a vulnerable ecosystem, aiming for a steady-state ultimately implies shifting towards a kind of 'communalism' in which the traditional primacy of the community over the individual is restored (Jodha, 2001). Such an approach does not entail rigid restrictions on private ownership nor individual initiative but does require the public monitoring and control of the quality and the viability of the ecosystem. Political institutions of desert regions should be structurally capable of fulfilling this function.

3.5 Conclusion

Addressing the above mentioned social requisites of desert life has strong implications for both physical and social planning. Introducing distinctive adaptive forms ultimately serves the establishment of a unique, introverted society free to develop its own identity and internal structure. Creating a viable, 'organic' social environment in a remote setting can only be realised by providing versatile and diverse physical structures. The need for high level of social proximity, intensive social interactions, and well-defined physical boundaries of social life mandates compatible characteristics in the physical structure.

3.5.1 The Social Dimension

- Desert settlement will continue to suffer more lapses unless they become a broad social movement that enjoys wide and spontaneous public participation. Shortcomings in establishing adaptive social institutional arrangements that can respond to such a movement can drastically offset costly technical and physical accomplishments.
- The historical evidence is quite sufficient to hypothesise that the complexity and rigidity of a social organisation have a positive relationship with the level of aridity and resource scarcity. The need for developing elaborate patterns of social organisation is critically needed for new desert settlements.
- Communities that have successfully penetrated the desert were those that had a social ideal strong enough to recharge their energies for overcoming the inherent difficulties of initiating and stabilizing new habitats in the desert. Fusion of formal and informal institutions is also necessary to sustain a higher level of public participation and collective responsibility.
- Formulating a social identity compatible to the desert ecosystem can only be

attained through the integration of individuals and communities within informal institutions around an idea, a concept, an ideal value, a place, etc. In this context, the local and regional dimensions of social organisation should be emphasised much more than national dimensions.

- Elaborate social organisation, cohesion and control over resource use exhibited a negative relationship to the growth of settlement size. Traditional desert settlements practised many social mechanisms of growth control (centrifugal forces of diffusion). Establishing new settlements was the main mechanism of maintaining an appropriate ecological size. Planning new desert settlements should address the strong calls of the many disciplines (city planning, urban planning, urban sociology, etc.) for social decentralisation and establishing small-scale social units with clear communal and spatial boundaries that reflect the objectives of maintaining community spirit and social integration. Dispersed, small-scale desert settlements can fulfil these requisites.

3.5.2 The Socio-Cultural Dimension

- Remoteness, isolation, the lack of interurban amenities and social/recreational out-door activities exacerbate the need for social proximity and intensive social interactions. A compact physical structure with relatively high population density is a critical factor in the desert context.
- Cultural patterns that have been transferred to desert from non-arid environments are nearly always un-adaptive. They imply a high social cost of development and a long-term detrimental impact upon the ecosystem. While rich economies can, to a great extent, absorb the incompatibility between the environmental context and the cultural complex, it can adversely impact poor economies.

- The "cultural base concept" (capitalising on the existing adaptive cultural patterns) of the currently inhabited desert oases is spatially and socially the ideal base of desert social and economic development.
- The cultural orientation of new desert settlements should reflect the different measures of frugality, austerity and the moral implications of a steady state society. Living with the desert adaptively and accommodating to its limitations should substitute for "conquering the desert," which means transplanting and imposing a cultural complex that cannot be ecologically assimilated.
- Emphasising the spiritual dimension in building the cultural orientation can be a very stabilising factor for new communities in the desert because of the related features of frugality, communal co-operation and self-help.

3.5.3 The Socio-Political Dimension

- The methods by which desert problems are undertaken by the national bureaucracy are extremely deficient in spite of the large costs and efforts involved. Specialised departments of the central government tend to approach only the portion of the problem that falls within their particular jurisdiction. As a result, the overall problems are never co-ordinated at any scale. There is a critical need for establishing broad purposes and effective political institutions at the local and regional levels. However, this implies structural changes in the pattern of power distribution at the national level. It mandates a process of political decentralisation in which a large part of policy initiation, decision-making and control mechanisms are kept at the local levels. Democratically based, semi-autonomous governments at the regional level with broad and interdisciplinary jurisdictional boundaries should replace the specialised departments of the central government. Political decentralisation is also a

compatible approach to self-sufficiency, self-containment, distinctive socio-cultural identity and is a critical component of successful regionalism.

- Desert settlement is necessarily a government “sponsored” process. However maximising the positive aspects of “spontaneous” processes should be reflected in innovative political institutions at the local level that can allow for maximum public participation.
- In the context of scarcity and vulnerability of the ecosystem, opting for a steady state will ultimately imply some shifts toward a kind of "communalism" in which the traditional primacy of the community over the individual would be restored. Through effective public participation, political institutions of desert regions should be structurally able to accommodate the function of public monitoring and controlling of the quality and viability of the ecosystem.
- Problems of the incompatibility between socio-political boundaries and water regimes are well documented. The interactions between water, land and social institutions have an intensified significance in the desert ecosystem. Design of the spatial boundaries of political institutions should reflect the territorial aspects of natural and man-made water systems.

Sustainable Economic Dimensions of Desert Settlements

The economic sustainability of desert settlements is a complex issue that involves a range of factors, including the availability of resources, the quality of infrastructure, and the ability of the community to adapt to changing conditions. In this chapter, we will explore the economic dimensions of desert settlements and discuss the challenges and opportunities that they face. We will also examine the role of government and the private sector in promoting sustainable economic development in these areas.

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4.1 The Economic Dimensions of Desert Settlements

The economic dimensions of desert settlements are a complex and multifaceted issue. It involves a range of factors, including the availability of resources, the quality of infrastructure, and the ability of the community to adapt to changing conditions. In this section, we will explore the economic dimensions of desert settlements and discuss the challenges and opportunities that they face. We will also examine the role of government and the private sector in promoting sustainable economic development in these areas.

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Chapter 4

Sustainable Economic Dimensions of Desert Settlements

Whereas the previous chapter looked at general issues related to social existence within the desert, its implicit and underlying theme, without which there is little cause for humans to seek to live in these hostile environments, is that the desert represents economic benefit, both to their resident communities and, more significantly, to their nations as a whole. This underlies the urgency of many governments to encourage people to settle in the desert areas and transform them from 'wasteland' to 'resource'.

This chapter therefore looks at various experiences around the world in order to understand how sustainable economic exploitation of the desert might be realised. As before, it studies literature covering a range of countries, establishing how each of them have been prompted by very different economic pressures, traditions and intentions, into seeking a repopulation of their remote desert areas.

4.1 The Economic Base of Traditional Desert Settlements

The study of traditional desert societies is too recent to provide comprehensive and reliable models of their social and economic systems (Gugler, 1997; Fajal, 2002). Their perception as marginal contradicts evidence of their past as thriving economies and politically and militarily powerful desert societies that often dominated their sedentary neighbours (Joekes, Singer and Swift, 1982).

Nomadic pastoralism has been mistakenly considered as the characteristic base of the desert economy (Hamdan, 1983) but this applies only to the semi-arid environments where taking advantage of natural vegetation over a huge area is the most practical means of subsistence (Clawson, 1963). The vegetation cover in deserts is too

sparse to sustain grazing animals and, subsequently, a livestock economy. However, because desert animals are relatively salt tolerant, economical in water demand and can feed on the water-efficient vegetation, herding has long been practised by desert communities (Goudie and Wilkinson, 1977).

Across the world, less populated desert tracts have been natural barriers separating more humid, resource-rich and densely populated regions. Due to this, desert settlements accrued a significant economic basis as service stations along caravan routes, becoming vigorous centres for interregional and international commerce (Wellard, 1965; Ibrahim, 1992). Urban centres of the Sahara from the 11th to the 18th centuries were typical examples of such service economies. Most, if not all Middle East settlements were first developed as places of trade (Costello, 1977).

As human populations in deserts clustered around local water resources, most desert settlements had an agricultural origin. However, the environmental constraints never legitimised agriculture as a single economic basis except in the large river systems of Egypt and Mesopotamia. With production closely balancing with local demand, agriculture had only a limited role in desert economies.

Salt mining and production was a basic activity for some traditional settlements in the Sahara. In addition, Yazd in Iran, Sanaa in Yemen, Donkola and Al-Obaid in Sudan and Timbuctu are old centres of the textile industry. The carpet industry, universally linked to dry salty pastures, such as in the Navajo settlements in the American Southwest, provided a significant economic base. Isfahan in Iran is a prime example from the Middle East (Hamdan, 1983).

A fact overlooked in many historical studies is that the economy of the traditional desert settlement was never unidimensional. Resource scarcity and limitations on productivity did not allow for specialised economies. Multiplicity and diversity incorporating trade, religious, political and administrative services, pasture,

agriculture, industry, and sometimes even plundering, were the means to avoid the deficiencies of a single economic base, supporting a sizeable sedentary population within a low-resource. Diversity was also necessary because of the spatial dispersion of settlements and their isolation from other ecological zones. Self-sufficiency and self-containment have been intrinsic to isolated desert settlements. Equally, because arid land at best provides a very low return per unit area, urban centres are few and far between and, where they do occur, they combine many functions which, in more productive environments, would be spread among several complementary centres (Heathcote 1983).

4.2 Decline of the Traditional Desert Economy

Since the 18th century, the Sahara region and the Middle East have witnessed a major decline of settlements which had been sizeable population centres. As modern transportation and communication bypassed desert regions, these settlements lost many of their economic functions and became marginal to their nation states (Joekes, Singer and Swift, 1982). Different socio-political factors, population loss to major urban centres and uneven investment allocation, also contributed to this pattern of decline. Desert-edge agricultural land has now been reoriented to urban growth and many desert regions have become suppliers of unskilled labour, cheap raw materials and sometimes livestock.

Desert economies have always been vulnerable to adverse changes. Drought has always threatened a pasture economy and, coupled with land deterioration, the entire agricultural economy (Grainger, 1990). Wars, political disruption, demand decline, etc. have also damaged trade and service economies, leaving many ghost towns in arid zones (Rizk, 1992). History indicates that those settlements that were able to widen their economic base, and that were socio-culturally capable of substituting a new function for

a declining one, have survived and grown (Portnov, 1998b).

4.3 Natural Resources in the Desert Economy

Devising an economic system adaptable to desert conditions requires an overview of the impacts induced by ecological forces. The characteristics of natural resources in a desert economy typify the nature of such impacts and their sustainable use depends on adapting to responsive settlement morphologies.

4.3.1 The Resource of Water:

Scarcity of water is a fundamental limitation. It imposes severe limits on the availability and utilisation of other resources and is a massive disadvantage to crop production and animal rearing. Edwards B. (1998) says:

‘Yet water is arguably more important than energy, especially for biodiversity, food production and public health. And, like energy, water supplies are finite, promising long-term stress as demand increases’.

A responsive objective would shift the economy away from a single, water-intensive base to one that involves less water-dependent services and industries. At the ecosystemic level, ‘interdisciplinary land use planning’ and ‘multiple use of land and water resources’; are new comprehensive approaches to accommodate resource scarcity through diversified and mutual use.

4.3.2 The Human Resource:

Resource utilisation in a desert requires a high degree of human effort, reflected in high economic and social costs for the development, stabilisation, management and recovery of resources. Agriculture calls for grandiose schemes of land reclamation, water transfer, irrigation and drainage, protection from erosion and sand drift, and sophisticated management techniques to avoid land deterioration. Animal husbandry, even a subsistence level, can work only through transhumance or extremely dispersed

spatial patterns.

The significant obstacle in desert planning is the sizeable investment, with long delayed revenues, needed for establishing a regional infrastructure. The cost of priming the economy not only deters ambitious plans but increases the risk. A responsive objective should relate to the factor of size of the economic unit or the settlement and consider advantages of scale and levels of capital allocation.

4.3.3 The Spatial Resource:

A strong spatial component in natural resource distribution also affects desert environments. The use of water resources in regions with relatively low ecological aridity can be greatly restricted by extreme dispersion of resource units within the region. Large-scale, especially water-intensive schemes, or projects which concentrate people, are far from appropriate. Projects conceived on a grand scale run the risk of resource exhaustion, as has occurred in some areas of the American Southwest or in other expensive, environmentally insensitive water transfer schemes.

An adaptive objective can be characterised as small-scale human settlements that spatially match the natural distribution of resources. Most of the resistance to such an approach relates to socio-cultural factors, value systems and preferences. The Israeli experience provides a significant demonstration of small economies dispersed in an arid environment (see chapter 7).

4.3.4 The Balance of Natural Resources:

The spectrum of natural resources in a desert exhibits a unique pattern of type, volume, surpluses and deficits. An extreme water deficit is balanced by an abundance of solar energy.

An adaptive objective, subsequently, should emphasise the conservation of resources in short supply and wise use of those which are surplus. A special criterion of selectivity should be set for the type of production (crop, commodity or service)

envisaged. For instance, an agricultural crop should have low water demand, high tolerance of heat and salinity, and constant marketability.

Successful long-term natural resource utilisation in a desert environment is elusive. Desert land exhibits a promising absorption capacity in the short term, both in size and intensity, while in the long term the adverse impact of gradually accumulating changes in the ecosystem could be irreversible.

4.3.5 Susceptibility to Fluctuations:

The intensity of resource use not only has a low ceiling, this upper limit is also highly sensitive to management techniques and to external fluctuations. Such problems have become evident in many desert development experiences in the western desert of Egypt, in Iraq, and in the American Southwest (Johnson, 1982; Fahmi, 1995).

4.3.6 Interdependencies:

Interdependencies between economic and social systems are especially important in the desert economy. The fragility of desert ecosystems accentuates the role of resource management ('management' here covers all social, socio-cultural and socio-political factors that impact on resource use). An adaptive objective should functionally integrate non-economic variables like social organisation, values, incentives, attitudes, beliefs and other cultural factors.

4.4 The Spatial Dimension in an Ecosystemic Economy: Nomadism

For large areas in arid and extremely arid zones, nomadism is probably the only lifestyle that can produce anything of economic value (Jodha, 2001). Pastoral nomadism is a typical, if crude, example of an economy adapted to severe ecosystemic constraints by extreme dispersion.

Understanding nomadism as an economic phenomenon is a pre-requisite in devising an adaptive desert economy. Historically and functionally, pastoral nomadism

is a specialised off-shoot of agriculture that developed along the dry margins of rainfall cultivation. Until the mid-nineteenth century it was widely held that pastoral nomadism was a half-way step from hunting-gathering to agriculture but there is little evidence of livestock domestication as part of the development of agriculture (Heathcote 1983). The same source indicates that a switch to agriculture was the answer to increasing aridity, eventually leading to the creation of pastoral nomadism.



Fig. 4.1 In the absence of building material in this arid corner of Tunisia, early settlers dug into the soft earth to make living space that was warm in winter and cool in summer. But the government is keen to resettle people in modern homes on the surface, which is far from their environmental needs.

(Palin, M., 2002)

Recent studies of movement patterns of nomadic communities show a well-defined territorial structure in which every economic unit, the family, the group, and eventually the tribe, has a 'vital zone' (Silberstein, 2002). Any restriction to movement patterns diminishes the vital zones which, in turn, jeopardise the balance between people and resources. Massive desertification in Africa has been substantially

accelerated since nation states established boundaries where nomadic and semi-nomadic communities formerly enjoyed free movement. These pressures for sedentarisation and concentration became too stressful for the fragile ecosystems.

In conclusion, the carrying capacity of a resource-poor environment could be increased, to a certain limit, if a pattern of functional spatial distribution recognises that resources are essentially dispersed. Seeking the artificial concentration of one may destabilise the economic and ecological balance.

4.5 Water in the Desert Settlement Economy

The history of desert regions is of a series of social and economic mechanisms engendered to conserve water and improve its use. In the deserts of Sahara and Arabia, the ownership of water expressed wealth and power. Water scarcity is considered the prime factor limiting economic growth in deserts (Fahmi, 1995), either because of extreme scarcity or cost. However, price structure could be a misleading indicator of scarcity (Simon, 1981). 'Scarcity' is a relative term that varies substantially according to the balance between supply and demand. For a fixed supply, the variables of demand type and intensity, management and rationality of use, and the potential for a decrease in demand due to substitutions or technological change, make the difference between real scarcity and pseudo-scarcity.

Desert planners tend to estimate water scarcity by applying measures used in more humid contexts. Their estimates of resource capacity, based on exaggerated demand, can be so low as to undermine the feasibility of a prospective settlement. A pseudo-shortage is a persistent feature in current desert planning.



Fig. 4.2 Camel driven irrigation system at the oasis of Tabelot, Niger. (Palin, M., 2002)

Hegazy (2000b) lists four elements that, from an economic point of view, can increase productivity and subsequently the carrying capacity of desert regions:

- Increasing the supply of water;
- reducing the cost of controlling the existing supplies;
- increasing the efficiency of the use of available water, and
- increasing the efficiency of the allocation of water among competing demands

The third element relates to technological and management innovations, and economic and socio-cultural mechanisms that can induce a major decrease in water use. For instance, the carrying capacity of the Western Desert of Egypt would hugely increase with a shift from basin irrigation to drip irrigation. The pricing system is another valuable mechanism for the relationalisation of water use in the desert. Paradoxically, throughout large sectors of arid zones, initial water rights are acquired at nominal charges, and no tax is levied on water holding or use (Kaiser *et al*, 1995). In Egypt the absence of a pricing system for irrigation water provides ample explanation

for the highest levels of waste in water use.

Subsidies to bring water to new desert settlements, a much-touted incentive system, can induce adverse long-term consequences, as recent USA experience attests (see chapter 7). A stable economy requires that the cost of water use should reflect the economic structure. It requires desert planners to formulate adaptive water institutions and pricing systems. The introduction of a pricing system for irrigation water for Israeli settlements shows the validity of such a mechanism for reducing water consumption and waste (see chapter 7).

Clawson's fourth element is of greater significance. Attaining an optimum economic allocation of water resources is a key factor in designing the economic base of new desert settlements. Contemporary experiences are typically associated with irrigated agriculture. However, water allocation to large agricultural sectors has become questionable. Johnson (1982) observes that, for some irrigated portions of Arizona and California deserts to have been able to comprise some the most productive land in the USA they have needed to rely on a far from economically efficient use of water.

In fact, water could go much farther in supporting an increased population and thus maximise its social return if it were not used for irrigated agriculture (Wilson, 1973). However, water allocation cuts across socio-cultural and socio-political structures. Instigating radical shifts to achieve an optimum allocation of water creates major conflicts with existing traditional institutions and modes.

This pseudo-shortage of water complicates desert settlement schemes, the socio-political dimension of the problem surpassing its natural dimension. Politically it is easier to bring in ever more water than to alter deeply rooted and inefficient irrigation and other practices. Even in desert regions with relative water abundance, a distorted view of the role of water in the economy stultifies the potential of developing an appropriate economic structure.

In summary, the conceptualisation of the problem of water scarcity as a limiting factor for economies of new desert settlements should be reviewed. Many elements of the problem lie in received concepts of water allocation and management techniques. The capacity of a small resource unit can be enlarged through manipulation of these variables. Such an approach opens new vistas for putting dispersed and small resource units in desert regions to economic use within human settlement schemes.

4.6 The Role of Agriculture in the Economic Base

The large water demand and inefficiencies of irrigation exaggerate the vulnerability of agriculture in desert regions. The pattern of water use in Iran exemplifies the general case. Here the water lost by evaporation in agricultural irrigation is equivalent to 44% of the total water used by agriculture and industry, or 22% of that available for human use (Jodha, 2001).

Historical and contemporary experiences show that the response of the desert ecosystem to agricultural development includes rapid deterioration and/or sudden failure. Desert soils are produced almost entirely by physical weathering; they contain scarcely any organic matter (Evenari, 1981) and are characterised by low water holding capacity, deterioration of structure and surface crusting when irrigated, and other adverse properties. Their irrigation efficiency is low; rapid loss of water by evaporation and drainage create problems of salination and waterlogging (Heathcote, 1983). The intensive use of agricultural chemicals introduces a further significant environmental crisis. Clawson (1963) refers to pollution as the most challenging problem facing agricultural economies in the American Southwest where Johnson (1982) points out that irrigation contributed to desertification via its consumption of scarce water supplies, salination of soil and, occasionally, the return of agricultural lands to barren wastelands. Even large, ancient oases cannot escape this.

In addition to irrigation problems, the initial investment needed for agricultural development is huge. High initial and maintenance costs overshadow any development.

The high value of water to non-agricultural sectors renders the option of agricultural development far from an optimal allocation. Industry in Albuquerque, New Mexico, can produce one percent of the total community's income using half a percent of the total water resources, about 178 times less than agriculture. Agricultural water usage in Tucson, Arizona, returns a product value eleven times lower than water put to other economic uses (Nir, 1974). For every agricultural worker supported by irrigation in Arizona sixty to seventy industrial workers could be supported by its industrial use (Heathcote, 1983). While the challenge of the desert in the past was met in the arena of crops and animal husbandry, future projects may need to concentrate on other solutions (Godha, 2001).

4.7 The Role of Industry in Developing the Desert

The desert offers several economic advantages for an industrial economy. It offers ample low-cost space, a dry climate and waste disposal with minimum adverse environmental consequences. At the social level, an industrial base can serve as a tool for long-term modernisation and technological development.

However, this raises the issue of food supply. Food imports in most arid countries are rising rapidly, exhausting a substantial portion of foreign exchange and export revenues. It has been estimated that up to half of Egypt's food demand is met by imports (Abo-Zeid, 1996). As the gap between world food demand and production widens, the costs of importing food will eventually jeopardise desert developments, especially remote ones. A strategy for new desert settlements should deal with the question of food production at the local level.

The trend of industrial development as a primary economic base for new desert

settlements has been criticised on many different fronts. Joeques, Singer and Swift (1982) refer to some case studies on employment and income that favoured agro-economic investment. Shelton and Pratt (1982) derive their analysis from the following 'classical' model of where the development of a strong agricultural base first supports an expanding population so as to free an increasing number of people to pursue industrially oriented tasks. In other words, a priori availability of food supports the development of industry rather than the presence of industry generating the food supply.

Within the desert context the applicability of this 'classical' model, which undoubtedly applies to humid ecosystems, is questionable. Even the 'classical' historic model of village-to-city evolution has been disputed (Jacobs, 1984) as it does not fit with many settlements in arid zones. The economic base of Tucson, Arizona, for example, is supported by a resort industry, motion picture production, an Air Force base, a university and agriculture.

It is difficult for a much dispersed agrarian economy to develop the maturity necessary to permit taking structural shifts towards secondary and tertiary industries, especially in poor and semi-controlled economies. On the contrary, a high income service economy can create demand for locally produced, even technologically expensive, crops.

In conclusion, in an environment where it is inappropriate to consider agriculture for the primary use of land, a successful desert settlement is more likely to be urban and industrial (Hillel, 1978). An agricultural export sector as a main economic base for new desert settlements would not be an adaptive structural model, as it would ignore that: a) demand exhibits high income elasticity; b) production should exhibit extensive forward and backward linkages to other local industries; and c) producers should generate local income through their demand for local goods and services. Most agricultural products, especially the so-called 'staples', rank low according to these criteria. As it lacks the

ability shift production to off-season and speciality products, the agricultural production of 'staples' is not a growth stimulator (Fahmi, 1995).

Therefore, agricultural production in new desert settlements should be substantially dedicated to providing a stable, diverse and low cost food supply. Such production is better suited to specialised, controlled facilities rather than to the open field. Agriculture within an adaptive economic objective would be a limited sector positively interacting with industrial and service activities rather than trying to establish a sole economic base. This pattern of diversity should be stressed from the very early stages.

4.8 The Dimension of Dependency

The direct link between aridity and low-level development is hard to prove although global patterns explicitly reflect such a linkage (Ortolano, 2000). The more arid land a country has, the more likely it is to have a lower per capita income¹ (Golany, 1978). Most desert regions of the world face severe restraints on their ability to break into self-generating economic growth (Kelso, 1970). At all levels of the regional hierarchy, within and beyond the national level, there is a sizeable gap between desert and non-desert regions, which perpetuates a persistent pattern of dependency. Although the American Southwest is something of an exception (Hodge, 1963), along with Israel. Matlock (1982) gives the example of Arizona, where the economy would fail without the outside revenues brought in by tourists, Federal subsidies and grants, and retirement income. Israel's economy has survived mainly by courtesy of vast amounts of US and

¹ Exceptions are some oil exporting countries and others such as Arizona and Israel that have higher per capita income.

European capital, while other, less fortunate, arid lands have had to turn to the international donor community for financial as well as technical assistance.

Financial and technical aid is critical for priming the economy of new desert settlements. However, the problem is that structural and behavioural deficiencies create conditions that perpetuate dependency upon such external support. Aid, if not adequately assimilated in an adaptive structure, could partially alleviate poverty but seldom enhance development. The huge investments wasted in the Egyptian experience did not induce self-sustained growth.

The importing of technologies is another factor that significantly increases dependency. It also brings about development models that do not fit the desert's environmental, economic and social contexts.

There are major differences between desert development mechanisms in advanced rich economies and in poor economies. In the advanced economies, desert exploitation consists essentially in the application of existing and extensive capacities for research into and production of technological fixes for arid regions. The problem is just one of the spatial extension of the apparatus of production, which can be initiated once the economic or political value of the desert is high enough (Zuno 1982).

Developing economies cannot afford such a model. Opting for quantum leaps in economic growth, planners adopt grandiose schemes (usually financed by international loans) with capital-intensive imported technology, perpetuating dependency, increasing the risk level due to size, and depriving other local industrial and technological sectors of the opportunity to participate and shape the development (Ortolano, 2000).

In summary, for a stable and balanced long-term development, the economy of new desert settlements should avoid the dependency cycle from the earliest stages. An adaptive objective should induce major shifts from large-scale, externally financed enterprises to incremental, small-scale private enterprises using local technology. With

incremental growth of locally generated capital, even at a slow rate, a pattern of self-sustaining growth could be attained within a framework of diversity and self-sufficiency.

4.9 An Approach for a Diversified Economy

The limited range of resources in desert regions can encourage settlements to focus on single activities (Fathy, 1986; Fajal, 2002), rendering them highly vulnerable to decline given even slight adversity unless other activities can be rapidly substituted. The consequent creation of ghost towns can devastate a developing economy.

While the proximity of non-arid settlements supports the development of inter-urban economic activities and services, more isolated desert settlements cannot attain such a pattern of complementarity. Thus they should gear their economic base to promote maximum diversity (Golany, 1978) as a structurally adaptive model for a fragile desert ecosystem. To Heathcote (1983) the bulk of evidence suggests that in any long-term approach that has served the needs of more than one generation, the resource-management systems have always been sufficiently flexible to accommodate fluctuations in resource availability. These include retaining surpluses from the good years or allowing deficits in one place to be compensated by surpluses in another.

Service activity can play a major role, especially as a leading function, in the very early phases. Activities based on amenity resources, such as the resort industry, or on the availability of open space for activities such as military bases, can be strong growth stimulators. Australian studies suggest that one tourist dollar generates \$4.4 worth of business to the community (Heathcote, 1983). Some settlements of the American Southwest, such as Phoenix and Tucson, exemplify this pattern of development. Ennifar (1982) refers to such pattern in the Tunisian experience as a major contributor to the development of a region which had few possibilities for the

implementation of agriculture or industry. Service activities, provided that adequate demand and infrastructure exist, have a tendency to engender a rapid economic response. With adequate planning, the economic base can expand to a broader spectrum to include activities such as education and research centres and high technology industries, among others. To Saini (1973) the possibility in the long run is that, as remote regions experience economic growth, population expansion will take place with increased local income and expenditure, making possible an increase in local manufacturing activity. This could lead to the expansion of local service establishments, such as light engineering works, that do not rely heavily on freight, water and power .

Allocation of land to various uses should be considered to assure economic benefits while keeping in mind an understanding of the real functions of pilot human settlements on a new frontier (Baepler, 1979). In the context of social and economic development, a 'service' settlement is one designed to serve a certain economic objective such as mining or agriculture and that is functionally linked to the advantage of a specific location. A 'dynamic' settlement is one that can play a pioneering and catalytic role in opening up a new frontier (CHBP, UN, 1982). It can work as a staging point for further expansion and diffusion, a role that goes beyond a simple economic function.

The importance of the dynamic intention means that it should be prominent in the conceptualisation and planning of settlement structure. The economic base follows accordingly. A classic example is the development of the city of Brasilia, the new capital of Brazil. Relocating the central government facilities created an economic base strong enough to stimulate further service activities, although many problems were encountered in establishing the new city. An effort on such a scale depends substantially upon the commitment of the government and its ability to dedicate its natural, human and financial resources towards the deliberate development of new regions (CHBP, UN,

1982).

The current experience of desert settlement planning in developing countries indicates that in most of them the dynamic element is secondary, as in the new settlements of the Western Desert of Egypt. There the focus was on providing services for the expansion of the agricultural sector rather than as nuclei for viable and stable regions. In other words, the settlements only had a supporting role. Too often, the physical and social aspects of a new community were ignored in the initial planning. This handicaps the settlement's long-term development and diversification towards becoming a dynamic community.

In conclusion, there is a need for radical changes of current planning concepts. The ambitious and dynamic role which these communities can play must be integrated in planning the settlement structure at the earliest phases of implementation. However, this type of role cannot be imposed randomly. It is necessary to examine all the available options and to appraise the spatio-economic linkages with other locations that could be forged as the settlement grows.

The growth of human settlements, to some extent, even with a high degree of intervention, follows an unpredictable course. Elaborate planning of their physical and non-physical structure can help sow the seeds of diversity and enhance the potential of future expansion to other economic functions (Mega, 2000).

A diverse economic base is essential for long-term economic stability. A prominent example of high vulnerability due to imbalanced growth can be found in some oil boom countries such as in the desert settlements of Libya, where neither secondary nor primary sectors have benefited substantially from voluminous oil revenues (Despois, 1973). The excessive attention to servicing one sector also left some potential natural resources only partially developed. Consequently, dwindling oil revenues in the 90s jeopardised the whole economy (Abo-Zeid, 1996).

4.10 An Approach for Self-Sufficiency

Factors essential for a region's economic development are investment, innovation and natural resources. Natural resources, especially in the early stages, are of great importance, and their exploitation will often lead eventually to a scale of activities that is mainly determined by extra-regional demand.

However, the applicability of this model is tied to a number of preconditions which should lead to an absolute, rather than a comparative, advantage over other suppliers that sell similar products. Such an advantage is based on the structure of demand, the accessibility of resources and the availability and quality of factors of production. Generally there should be a socio-economic structure that can stimulate interregional trade (Hilhorst, 1971; Portnov, 1998a). Such a case could hardly fit a resource-poor desert region.

Current trends in planning desert economies are oriented towards an export model. The model largely fits locales endowed with a resource base (such as oil) that has a large, constant demand and a relatively high income (Hewings, 1977). This model is far less reliable for a resource-poor region, making its economy reflect the dynamics and fluctuations of the external economy rather than its own internal resources. The region then becomes a passive hostage to forces unleashed in distant regions and markets. Eventually, the economy of an export-led desert settlement may respond to local calls towards diversified production but will have been subjected in its early phase to many factors which impeded such a transformation.

Many ecological, spatial and socio-political factors condemn new desert settlements, which have only unidimensional economies, to self-perpetuating patterns of backwardness and stagnation (Silberstein, 2002). Such economies would lose the ability to build a competitive and well-rounded export economy which would engender progress toward a balanced structure of primary, secondary and tertiary activities.

Separating social considerations from economic planning severely limits the range of available choices and their potential. Projections which, from the very start, call for internally balanced, socially and economically viable regions rather than the expansion of any one sector, require an entirely different planning orientation that promotes a diversified and self-sufficient economy.

Remoteness and isolation are good reasons to prioritise self-sufficiency in social and economic concerns (Portnov, 2000a). Transportation levies a double expense, adding to cost of imported commodities and reducing the competitiveness of exported ones. In this context, the reduction of import dependency should be deliberately integrated at the very early phases into the economic structure. While importation and incremental technological innovations needed for such functions are closely related to social and institutional factors, they also have great bearing on the primary design of the economic structure. Golany (1978) makes the point that the vast distances between settlements in arid zones increase transportation expenses, especially for building materials. Such costs imply that any new arid zone settlement must encompass its own production and provision to meet most daily needs, with self-sufficiency as its goal. Large tracts of undeveloped land could stimulate such industrial development and, in generating some level of self-sufficiency, may acquire regional functions such as services as motels and restaurants, shops, repair facilities and storage areas.

Even in resource-rich desert regions characterised by income flows large enough to finance the growth of large diverse sectors, the absence of a symbiotic structure of interacting economic units meeting local needs retards the process of development. The complete factories that were imported to promote the economic development of Iran, financed by oil, did nothing to increase its capacity to enhance versatile and productive city and regional economies (Jacobs, 1984). Gradually replacing imports, apart from having direct practical advantages, also fosters a state of mind essential to economic

development.

In many respects the functioning of a given natural ecosystem is similar to that of human economies. There, the more niches that are filled, the more efficiently it uses the energy available to support different life forms. Economies diversely meeting local needs are better prepared than specialised economies that contain few niches for people of differing skills, interests and imaginations.

In conclusion, an early shift towards a diversified and self-sufficient economic structure is a structurally adaptive objective. Concentration on the broad range of intra-regional demand is a key factor in such an approach.

At the behavioural level, aiming for local substitutions of external supplies, an adaptive objective will greatly influence innovation in technology and management by providing the adequate institutional framework for positive improvisation and experimentation. Self-sufficiency has been one of the basic ideological principles in microplanning in Israeli (Arnon, 1979), demonstrating the significance of consecutive technological and management innovations in desert agriculture as a strong feedback loop to resource-poor regions.

Achieving diversity and self-sufficiency at an early stage by addressing the structure of the local demand implies a deviation from economies of scale and capital-intensive technology (Pearlmutter, 2000). A slower rate of growth may also be experienced. However, economies of scale, in such a context, cannot be attained through creating huge organisations, but through a symbiotic web of mutually interacting small enterprises. A gradual decrease of dependency upon external supplies eventually induces a substantial, positive impact on the regional economy. For instance, investment in diverse food production, at a scale proportionate to the local demand, should be integral to the economies of settlements and regions.

4.11 Desert Economy and Settlement Size

Desert ecosystems may be heavily damaged by patterns of intensive resource use or excessive external impacts. Such changes are hardly recognised in the early phases of settlement.

Overgrazing, overuse of groundwater, and soil and air pollution all reflect an imbalanced relationship between the human habitation and the absorptive capacity of the local environment. Desert ecosystems limits-to-growth mean that economic enterprises, and subsequently human settlements, should be of a small size. Nevertheless, as Heathcote (1983) observes, by the early 1970s at least 89 cities of over 100,000 population were spread through the arid lands, 37 of them on the coasts. Nine of these had over 900,000 inhabitants. Some, such as Cairo, counted as early cities, others such as Tehran (founded 1788) and Phoenix (incorporated 1881) being more recent.

However, many of these cities have started to develop severe economic and environmental problems. Their size reflects a pattern of parasitic growth (due to many socio-political factors) that substantially dims the prospects of development for other locales or regions. Environmental problems, such as air pollution in Cairo and Los Angeles, have been detrimental to their amenity. Water shortages, waste disposal problems and soil damage in these cities and their regions generate substantial costs. Furthermore, intensive resource use of large population concentrations in desert settlements may ultimately lead to drastic environmental changes.

An approach that checks excessive size must confront the tendency for populations and economic activities to concentrate. Even within the planning process, conflicts will arise between ecological (long-term and comprehensive) and economic planning. For instance, the growth pole concept (Glasson, 1974), if adopted, would emphasise large desert settlements as growth centres. While such centres can expand

rapidly, the trickle-down effect to other sub-regions may be slight in a desert environment because of remoteness. The final outcome of such a policy is an uneven pattern of development where few centres exert tremendous polarisation, monopolise most investment allocations and exhibit accelerated, mostly parasitic, growth that leads to diseconomies of scale which further constrain the trickle-down effect.

In conclusion, the issue of optimum size is very complex. The ecological consequences of large population concentrations in the desert environment are evident. A shift to a more even and dispersed pattern of distribution of development activities and delineation of clear environmental criteria for economic growth is thus implied. A behavioural objective is related to a 'gradual-experimental' approach in development planning. Against the uncertainty of desert development, such an approach can provide a safeguard against irreversible damage. Commenting on the Egyptian experience, Fahmi (1995) notices that it becomes necessary to look for a step-by-step approach because in this way the present day techniques for big ventures in the desert can be checked, at least until more safe and realistic procedures are tested.

4.12 The Spatial Component in the Desert Economy

Moving towards a pattern of self-sufficiency requires a broad distribution of the economic functions of settlements and sub-regions in order to intensify regional complementarity. Every settlement, according to its natural resource endowment, locational advantage, etc., will develop a semi-specialised function that enjoys the relatively stable market of other settlements in the sub-regional or regional levels.

This pattern creates its own internal balances (price structures, characteristic demand patterns, etc.). At the same time, it becomes vulnerable to competition with other extra-regional production centres. While remoteness from other extra-regional centres provides a natural protection, it may not be sufficient to guarantee immunity

against already developed centres, themselves sometimes amplified by governmental intervention. In Siwa Oasis in the Western Desert of Egypt, applying price controls and food subsidy programmes has accelerated desertification, shrinkage in local food production and brought an end to the pattern of self-sufficiency that had existed before, increasing the dependency upon food from the Nile Valley (Ghonaim and Gabriel, 1980). Subsidising intra-regional rather than inter-regional transportation may overcome this type of problem. Incentives involving tax exemptions on imported goods for industrial and other activities, might also be of value in shielding the new area from extra-regional competition.

Intensive intra-regional complementarity and distribution of functions between settlements, in combination with spatial dispersion, give strength to the regional clustering of economically integrated and mutually interdependent settlements. Dispersion within the regional clustering engenders some positive forces that allow an efficient utilisation of unexploited, dispersed resource units (Portnov, Erell *et al*, 2000).

The main problem of economic planning in the desert is the reconciliation between the natural forces of dispersion and economic forces of concentration. The forces of dispersion in the desert do not entirely yield to the concept of a growth pole. Accommodating the forces of dispersion requires an adaptive objective in which there is a partial deviation from concentrating investment and development activities in one growth centre to a more even and balanced pattern. Formulating the regional growth on multi-centre bases and stressing interregional links would help the whole structure to work as one growth pole that is spatially and economically distinctive from other regions.

4.13 Economic Institutions – Government and Private Roles

In the past, moving in and settling in the desert has depended heavily on a

pioneering spirit. However, the situation is entirely different for people today, accustomed to modern facilities and technologies. These require the establishment of compatible infrastructure networks of energy, transportation, communication, utilities, etc. beyond the scope of private enterprise. Subsequently, the role of national governments to plan, finance and manage is indispensable. Enterprise requires large quantities of money up-front for developing infrastructure, without which privately financed industrial development will not proceed (Golany 1978). It is a responsibility, then, for the public purse to secure such an advance payment.

Even in advanced capitalist economies, where private enterprise has a basic role, a governmental role still exists. In underdeveloped economies with a small industrial class and where inflation leads mainly to speculation in land and commodities and hoarding of foreign exchange, venturing into desert development is undesirable unless adequate infrastructure and a strong incentive structure already exist.

In a developing economy, many problems stem from misunderstanding the appropriate boundaries of the government's role. Public funds are often provided to areas where private enterprise could more efficiently take over. For instance, in the Egyptian experience, the governmental sector has been responsible for the construction of most of the housing projects, a burden that substantially limited its capacity to meet infrastructure needs that could not otherwise be met (Rizk, 2002).

In the desert, flexibility, self-correcting mechanisms and innovative adaptations are critical requisites for an economy and these can hardly be performed by central government actions. The participation of private enterprise, stimulated by strong progressive incentive systems from the start, can substantially vitalise the economy and help create a viable social environment. Individual motivation also plays a crucial role in overcoming the problems of initiation and stabilisation.

Minimising the governmental role does not mean giving the private sector an

open door in resource use and growth. The American experience shows how private enterprises have an intrinsic tendency, due to short-term interests, to practice a pattern of intensive uses that may even exhaust the ecosystem. The existence of comprehensive planning and a well-defined structure of controls over resource use and environmental quality can only be performed by governmental institutions. However, in later phases, when local socio-political institutions reach maturity, some of this governmental role could be delegated to the private sector.

In conclusion, the extreme case of total governmental control is structurally non-adaptive to desert environmental and social contexts, even with advanced levels of comprehensive planning. To Heathcote (1983) the existence of elaborate national planning is, in itself, no guarantee of good planning, even if designed to realise the maximum benefit. Instead, he endorses a balance between tradition, innovative management strategies, individual initiative and social control.

For a broad range of reasons related to the social environment in which the desert economy functions, there is a need for a clear definition of the governmental role (Rizk, 2002). Within a framework of an adaptive objective, the governmental role could be limited to the following general functions:

- Compiling an inventory of all potential resources;
- Instigating comprehensive regional planning;
- Establishing and maintaining the regional infrastructure;
- Establishing a strong incentive structure for investors, developers and different types of labour forces;
- Providing technical and managerial assistance in labour training;
- Helping in coordination of inter-regional trade; and
- Developing a system of regulations and controls over natural resource use and environmental quality.

4.14 Conclusion

The desert context exerts strong limitations on the size of the economic unit, intensity of resource use and spatial concentration. A responsive objective is a highly diversified and self-sufficient economy with a major shift from dependency upon natural resources to purely economic activities. Adaptive concepts should be liberated from considering irrigated agriculture as the only potential for development schemes.

The spatial concentration, fragility, vulnerability, lack of synoptic knowledge and subsequently, the high level of uncertainty in a desert ecosystem, requires reorientation toward the objectives of maintaining a 'steady-state' economy throughout a preliminary 'gradual-experimental' phase.

While public finance is indispensable for the initiation of desert development, only the small-scale initiative of private enterprises is able to vitalise desert economy and flexibly accommodate the preliminary phase of experimentation and innovation. The shift from governmental to individual enterprise is also critical for advancing a viable social environment. The success of the Israeli collective settlements (as mentioned in chapter 7) can be attributed to such national and local factors.

Economic development of desert regions cannot be fully advanced unless it is integrated within a broad social goal of creating new self-contained regions. In such a context, a diverse economic base has a far-reaching positive impact upon social stability. The objectives of diversity and self-sufficiency lead to the goals of creating a new full-fledged society. On the other hand, accommodating the intrinsic problems of desert economies requires a carefully planned pattern of social organisation and adaptation.

Desert economies will always be impaired by the political marginality of their regions. Their development is structurally tied to the relative political leverage of such regions within the realm of national politics. Loose, imperceptible political structures

with negligible bargaining power do not induce adequate participation in the resource allocation process at the national level. Subsequently, they are always at the end of the list of fiercely competing priorities. A shift toward establishing a clearly defined, independent (spatially and administratively) and mature political structure in new desert regions is a prerequisite for economic development and stability.

The selection of appropriate, simple to intermediate, technologies is an adequate response to investment limitations in poor economies. Subsequently, desert economies are distinctively dependent upon the development of a society-wide knowledge base.

Thinly distributed resources in desert regions require a pattern of settlement dispersion. Regional clustering that contains many dispersed, small-scale settlements with adequately planned economic complementarity and strong intra-regional links is a compatible response. Such a pattern has many requisites in the socio-demographic features of new desert settlements.

Economic activities of a settlement influence the pattern of its physical structure. However, physical structure also can be a catalyst or retardant to its economic viability, especially with a shift to service economies. A diversified economy has many bearings on the adequacy of the physical structure. Planning the central service core and its growth phases has an organic relationship to the economic functioning of the whole settlement. Functionally, desert settlements should be planned as urban settlements with sufficient agricultural activity to ensure the local food supply.

The rate of private construction may be used in the analysis of peripheral urban settlements as a general indicator of socio-economic development. This indicator will be supplemented with the unemployment rate commonly considered one of the most inclusive and easily available development data. Taken together, these indicators – private construction and unemployment – can provide a useful base for the analysis of the overall socio-economic development of peripheral urban settlements.

PART TWO

Sustaining the Population Growth

Sustainability of Population Growth

The World Commission on Environment and Development (WCED) (1987) defines sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This definition is widely cited and has become a cornerstone of the sustainability discourse. It emphasizes the need to balance economic, social, and environmental concerns. The WCED report, 'Our Common Future', highlighted the urgent need for global action to address environmental degradation and social inequality. It called for a paradigm shift in development thinking, moving away from a focus on economic growth alone to a more holistic approach that considers the well-being of all people and the health of the planet. The report also introduced the concept of 'common but differentiated responsibilities', recognizing that developed and developing countries have different roles to play in addressing global environmental challenges. This concept has been influential in shaping international environmental agreements and policies.

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As the world population continues to grow, the need for sustainable development becomes increasingly urgent. The WCED (1987) report states that 'development has been defined too long and too narrowly as economic growth. We need to broaden the definition to include the well-being of all people and the health of the planet. This is the essence of sustainable development.' The report also emphasizes that 'development is not possible without environmental protection. The environment is the basis of all development, and we must ensure that it is protected for the benefit of all people. This is the essence of sustainable development.' The WCED report has been influential in shaping international environmental agreements and policies, and it continues to be a key reference point for scholars and policymakers alike.

Chapter 5:

Sustainability of Population Growth

5.1. Introduction to Sustainability

Sustainability is a holistic concept with a world-wide scale of reference. The concept of sustainable development has received recognition by the 'collective' global community through a number of international forums and reports since the late eighties (WCED, 1987; UNCED, 1992; EGUE, 1994; EEA, 1995, UNCHS, 1996, WSSD, 2002). The main principles of sustainable development outlined by these forums are:

- a need to consider, in an integrated way, the wider economic, social and environmental implications of our decisions and actions;
- a need to take a long-term rather than a short-term view when taking decisions and actions;
- a need to provide information for all citizens and the opportunity for them to participate in decision-making processes.

The World Commission on Environment and Development *Brundtland Report* (WCED, 1987) - gave the benchmark definition of sustainable development as *meeting the needs of the present generation without compromising the ability of future generations to meet their own needs*.

As the notion gains recognition, many are offering definitions or characterisations of it either explicitly or implicitly. Implicit characterisation of sustainability occurs when a writer shows concern that some important aspect has been given too much attention or another has been given too little, and argues for the importance of the latter.

Possel (1999) thinks that eco-centrism has been taken too far; we need an individualistic 'extensionism'. Hempel (2000) believes similarly that we must reach

beyond the concepts that ecology supplies and proposes a historical approach. Friedmann (2000) believes that too much emphasis has been given to economic and quantitative criteria and argues for a pluralist perspective. He also thinks that the importance of religion has not been sufficiently recognised.

An implicit characterisation is often a side issue in a paper devoted to other issues. Because implicit characterisations point out a single missing aspect, and invite us to adopt it, they are of limited value to us on their own. To address the issue of sustainability as a whole we must seek explicit characterisations which take a broader view and seek to enumerate all the aspects that are important (Lombardi and Basden, 1997). They provide a framework within which to set the various implicit characterisations. However, there are many explicit characterisations and they differ not just in level of detail but in what aspects they consider important.

Merret (1995) suggests a definition of sustainability which is applied to society and concerns species, habitats, quality of life, economics and material and cultural needs. Voogd (1995) emphasises quality concepts, such as environmental quality and quality of life. Both authors seem critical with regards to an effective translation of the concept into practice. In particular, Merret argues there is a paradox behind the concept of sustainability, that is, the need to sustain the environment and, at the same time, sustain the flows of production and consumption necessary for the reproduction of human beings. Voogd suggests that quality concepts are more useful in guiding planning decisions since sustainability is not operational nor predictable and the emphasis on future generation needs may be misleading in planning.

Moffat and Campbell (1998) acknowledge that the concept of sustainability embodies three main spheres of interest: Ecological, Economic and Social, and suggest focusing on those aspects that tend to be mutually supporting. Fusco Girard and Nijkamp (1997), argue that sustainability deals with four spheres, including the

Institutional one, which is probably the most important. Yet, Camagni (1996) provides a distinction between the Natural Environment and the Physical-Cultural (built) Environment, thus, acknowledging five different separate spheres of interests in sustainability.

There is an “ecological economics” vision of the problem which is reflected, in a definition of sustainability by Pearce (1993) as follows: “ensuring that substitute resources are made available as non-renewable sources become physically scarce, and that the environmental impacts and wastes arising from resource use do not exceed the earth’s assimilative capacities”. However, there is also a pragmatic view which is offered by the UK’s National Sustainable Development Strategy (HMSO, 1994), as follows: 1) Most societies want to achieve economic development to secure higher standards of living, now and for future generations; and 2) They also seek to protect and enhance their environment, now and for their children.

An extensive collection of definitions is still available, e.g. in Pearce et al. (1989). More recently, Camagni (1996) has tried to classify all the definitions of sustainability according to different dimensions. The first paper uses the four sustainability principles identified by the PICABUE approach (Mitchell et al., 1995): futurity (a concern for future generation), social equity (a concern for today’s poor and disadvantaged), public participation (a concern that individuals should have an opportunity to participate in decisions that affect them) and environment (ensuring that human activities do not threaten the integrity of ecological systems). The second paper by Camagni classifies all the approaches to sustainability as follows:

- a) *input* or *output* oriented approaches. according to their emphasis on, respectively, limitation in the use of non-renewal resources (‘strong’ sustainability), and guarantee of well-being in the long term (‘weak’ sustainability); and

b) approaches based on 'substantive' or 'procedural' rationality (Simon, 1982), in relation to the scientific theory to which they refer, respectively, neo-classical economy and decision theories.

Sustainability is still a difficult notion to define in substantive terms, but if planners are to operate in such a way as to produce sustainable communities or urban development then the meaning of sustainability must be clear and agreed on.

An obstacle to this goal is the multi-aspectual nature of sustainability. *It may remain an academic idea, a 'fuzzy buzzword' or a 'paradox' (Merret, 1995), unless we develop a clearer understanding of which dynamics and mechanisms are required to transform the sustainability principles into practice.*

5.2 Sustainability of Population Growth

5.2.1 Definition and Analysis :-

According to Portnov and Pearlmutter (1997) the "*sustainability of population growth*" of an urban settlement is primarily determined by "*the ability of the settlement to maintain relatively high rates of annual population increase by attracting newcomers and retaining existing population*", a group of growth constituencies can be used in the following analysis to establish the integrated sustainability index:

- The annual net balance of internal (in-country) migration to a settlement, drawn from the central population register of the country (these data do not include the information on the initial settling of new immigrants, but do include sequential changes of their address.
- The annual immigration rate to a settlement, reflecting initial distribution of the new immigrants to the country, i.e. a first place of residence.
- The natural population growth of a settlement computed as the difference between number of births and deaths per annum.

5.2.2 The Factors Influencing Population Growth :-

In order to determine the factors influencing population growth, the following selected socio-economic and physical indicators were considered by Portnov (1998b):

- Indices of climatic harshness (a cold temperature discomfort index, and a heating degree days index) calculated for each urban locality respectively as the mean annual number of days with heat stress, and the average number of days during which space heating is required.
- Population of a settlement, thousands of residents.
- Number of unemployed in a particular settlement, measured separately in absolutely numbers (thousands) and in percentages.
- Annual change in unemployment rate, percent relative to the previous year.
- Annual rate of housing, industrial and commercial building completions (both private and public investments) measured in sq. m. of gross building area.
- Annual rate of road construction in a particular settlement, km.
- Private bank savings, \$ US per capita.
- Car ownership level, measured as the average number of private cars per residents.
- Distance to the closest urban metropolis of the country, km.
- The average number of pupils per class in elementary and secondary schools taken as an indicator of educational conditions.

5.2.3 Measuring Population growth:

Five criteria are often used to measure the population growth of urban settlements: the over all rate of population growth; the relative rate of population growth; percentage change of urban population in the area; the average rate of net migration and the natural growth rate.

1) The overall rate of population growth:

While this criterion is the most obvious and direct measure for gauging the process of urban growth, its reliability and usefulness are fundamentally limited. For example, two urban settlements may have the same overall rate of population growth, 4 % per annum. Whereas the first settlement has a positive natural growth (+ 5.0 % per annum) and a negative migration balance (- 1.0 %), the respective components of growth in the second locality are both equal to (+ 2 % annually).

From the standpoint of regional and urban planning, these two settlements clearly represent different cases, while the commonly used criterion of population growth treats them identically.

2) The relative rate of population growth :

This index measures population growth in a locality relative to the national or regional growth rate, taking into account the socio-demographic context of the settlement. For example, a local population growth rate of 1.0 % per annum may be considered high in Sweden, whose national population growth does not exceed 0.6 %, and low in Egypt, where annual growth is close to 2.0 %. This indicator, like the overall rate of growth, does not take into account the structure of population growth (i.e. the ratio between migration balance and natural growth).

3) Percentage change of urban population in the area:

This measure is often used to trace the progress of urban growth in a particular

geographic area, and is an important component of national statistics worldwide.

However, it should be kept in mind that a region's urban population growth does not necessarily indicate whether this growth occurs evenly across all urban localities, or is concentrated only in large metropolitan centers, for instance.

While this indicator seems to be a basic tool for evaluating the process of urban development in entire countries or regions, it may have only limited application in planning.

4) The average rate of net migration :

Unlike the previous index, this indicator is applicable to single urban settlements as well as to entire geographic regions. However, this indicator reflects only one component of population growth – migration – neglecting the effect of natural growth.

5) The natural growth rate:

It is essential for the proper understanding of the processes of urban growth in particular geographic areas since this indicator reflects both socio-demographic makeup and, to some extent, environmental and location preferences of the local population. As De Jong and Fawcett (1981) justly argue, young couples with children are often attracted to suburbs in which single-family housing is more available and affordable, while middle and older age migrants tend to settle in quiet peripheral communities. The rate of natural growth thus reflects, directly and indirectly, various parameters of socio-economic development of urban settlements. Nevertheless, the indicator in question cannot substitute for migration indices of population growth.

5.2.4 Measuring the Sustainability of Population Growth In Urban Settlements:

Criteria of urban development are used to gauge the performance of desert localities in comparison with urban settlements located elsewhere. In this brief, this thesis will try to present the Portnov's derivation of the migration balance/natural growth index (the MB/NG index) and the manner in which it may serve as a general indicator of sustainable population growth.

- **The MB / NG Ratio as an Integrated Indicator for Measuring the Sustainability of Population Growth :-**

The model considers two major components of overall population growth (OG): migration balance (MB) – the net balance of internal migration and foreign immigration, and natural growth (NG) – the net balance of births and deaths (both components are measured as the annual percentage change in the local population size).

This model reflects two general trends:

- The net balance of migration (MB) tends to be relatively low in small urban communities (10,000 – 15,000 residents). In larger urban settlements (above 20,000 – 30,000 residents), the net balance of migration becomes the main source of population growth. Finally, after peaking, the migration balance starts to decrease until outward migration exceeds the inward flow of newcomers. Such a negative MB can, for instance, be found in long established urban centers that experience suburban sprawl and other forms of outward migration of current residents.
- The rate of natural growth (NG) is relatively high in small towns, and gradually decreases as population size of settlement grows. Eventually, when the

settlement reaches a certain population threshold, the rate of NG may become negative. This trend is primarily attributed to the overall aging of the settlement's existing population, while potential new residents of child-bearing age are attracted to other urban areas where appropriate housing is considered more available and affordable.

The model shows major thresholds delimiting various stages of a settlement's population growth. Given these thresholds, different values of the MB / NG ratio can be interpreted according to a settlement's ability to sustain its population growth.

- NG > MB , while both NG and MB are positive :

If these conditions are met, the population of a settlement grows mainly due to natural causes (fertility – mortality rates), rather than due to the settlement's attractiveness to newcomers. This phase of growth is bounded by point (1) in figure 5.1 and may be defined as transitional growth.

- MB > NG , and both NG and MB are positive :

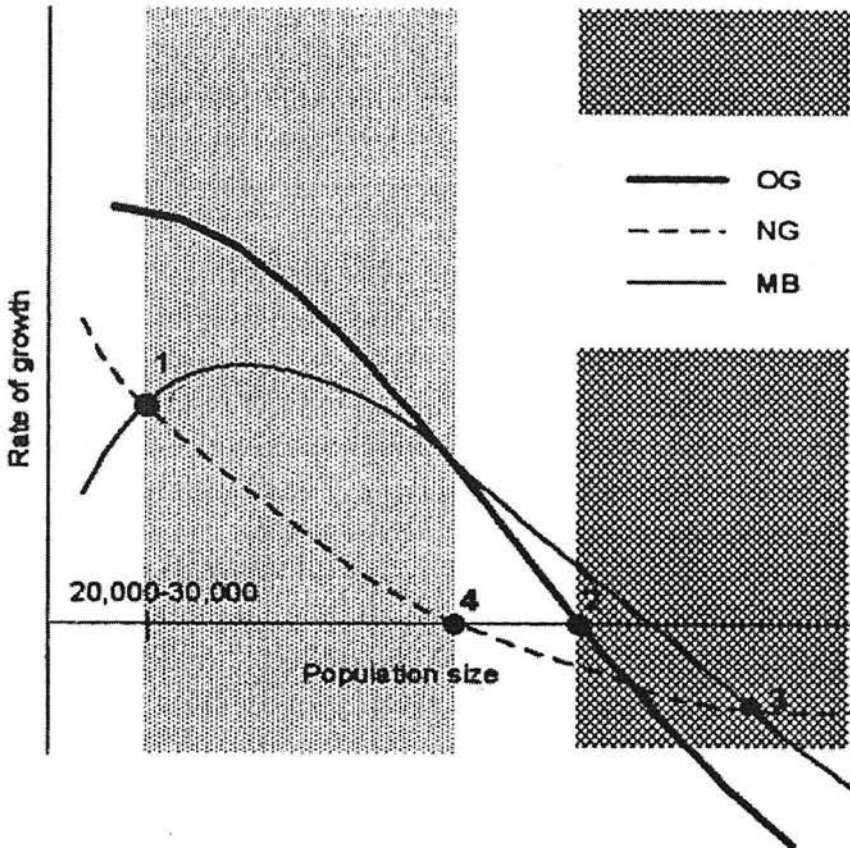
Under these conditions, the population of a settlement primarily grows because the locality is attractive to newcomers (internal migrants and foreign migrants). It is suggested that this phase of growth may be defined as sustainable. The right margin of this phase is bounded by point (4) in fig. 5.1.

- MB > NG , while MB is positive and NG is negative :

The population of the settlement is almost constant, owing to positive MB, which is offset by negative NG. This phase of growth is limited by points (4) & (2), and may be defined as transforming growth, since the overall growth of the locality can easily become negative if the settlement lacks a “migration feedback”.

- MB < NG when NG is negative :

These conditions, when met, clearly indicate the absence of any growth or, in other words, the phase of absolute population decline. The onset of this phase is marked by point (2) in figure 5.1.



OG- Overall growth; NG- Natural growth; MB- Migration balance

Fig. 5.1 Changes of the components of population growth

Portnov and Pearlmutter (1997)

The importance of the MB/NG index clearly surpasses its direct use as a simple measure of population growth. Indeed, the ongoing migration attractiveness of a particular settlement is interconnected with economic development, a favorable physical environment, and other preconditions, which are essential for “Sustainable urban

Growth“ in general. It is also important that the indicator in question allows normalization for natural growth rates that may vary substantially from one settlement to another. The index (MB/NG ratio), then, may serve as a valuable tool for urban and regional planning, in particular due to its potential use in gauging the impact of public policies, which are aimed at sustaining population growth and economic development in lagging urban areas.

The Effect of Remoteness and Isolation on Development of peripheral Settlements

1. Introduction

The differential in development power, as have indicated in previous parts of the book, is increasing in many of the peripheral areas of the world. This is because of the increasing remoteness and isolation of these areas. The remoteness and isolation of these areas is due to the fact that they are often located in areas which are difficult to reach. This is often due to the fact that they are often located in areas which are difficult to reach. This is often due to the fact that they are often located in areas which are difficult to reach.

Chapter 6:

The Effect of Remoteness and Isolation on

Development of peripheral Settlements

The previous chapter looked at the definitions relevant to sustainable population growth. Its analysis concluded that basic overall numbers of people do not in themselves indicate the long-term prospects of any settlement, and that it is necessary to recognise the respective contributions made by migration and natural growth.

This chapter comprises a similar investigation into the data used to determine the extent of remoteness of settlements. While this factor plays a role in any environmental situation it is dominant in rendering the desert as a problematic place to settle. The chapter therefore seeks to establish qualitative and quantitative terms in which remoteness and its effects can be measured and linked to issues of the sustainability of settlements. It concentrates on two approaches. The first recommends the *location paradigm*, an assessment from the point of view of private, as opposed to governmental, developers of the value and potential value of the land. This therefore crystallises a number of interacting considerations, including social expectations within a locality, into a single indicator. The second approach proposes the *index of clustering* as a mean to readily identify the level of remoteness of a place. It notes that an increasing distance from an existing urban centre generates the need for small settlements to form in clusters that present the conditions for a viable society to emerge.

6.1 Introduction:

As differentials in development potential have increased in recent years (Wong, 1995), overcoming inequalities in the level of socio-economic development has become a key issue for urban and regional planners world-wide. These inequalities are often the

- *Changes in employment*, unlike measure of unemployment, do not require complex definitions, but they too, in general do not differentiate between employment gains and losses in different economic sectors (for instance, in manufacturing and service industries).

In spite of these inadequacies, unemployment rate and employment change remain the most inclusive indicators of urban and regional development.

2) Capital criteria

These criteria are used to trace the overall investment flow to a settlement or region due to expansions or movements of commercial firms. The major disadvantage of this indicator is that it does not take into account the possibility of subsequent closure of the firms, i.e. their survival rates (Henderson, 1980). The indicator in question also says nothing about actual changes in employment/unemployment associated with relocation of firms (Diamond and Spence, 1983). In addition, the data on capital transfers between settlements and geographic areas are not always available.

3) Economic output criteria

These criteria include three quantitative indicators:

- *Overall growth of output*: it can be used as an indicator of the growth of productive capacity, which depends on the extent to which a settlement or region attracts capital and labour from elsewhere.
- *Growth of output per worker*: it is often used as a direct measurement of industrial productivity.
- *Growth of output per capita*: it is frequently used as a general indicator of socio-economic welfare (Armstrong and Taylor, 1993).

result of the spatial characteristics of the settlement pattern, reflecting differences between core and peripheral areas. For example, in many peripheral areas, the local population is denied access to social amenities that are concomitant with a larger settlement size. While the inhabitants of some small peripheral settlements may prefer to preserve the rural character of their communities and therefore resist further population growth, many welcome the advantages that a larger community allows. As the population of a community increases, it crosses the threshold allowing for higher level services and offers more varied opportunities for employment, social services and leisure.

The development of peripheral areas may also be driven by push factors, rather than by pull (Portnov and Erell, 1998a). Peripheral areas may provide an alternative for the residents of core areas, if urban infrastructure in the periphery is developed and if the level of social amenities in peripheral district is acceptable. When this is not the case, overpopulation of core areas may result in severe social and environmental problems.

Whether or not the development of peripheral areas is desirable in a given context, the factors affecting the growth prospects of a particular settlement or region must be understood. To assess the degree of sustainability exhibited by peripheral settlements in their population growth and economic development, effective monitoring indicators are needed. Generally, however, the complex and multi-faceted natures of urban growth, direct assessments alone are unlikely to be sufficient (Newman *et al*, 1995).

Population growth that is based primarily on the attractiveness of a locality to new comers (i.e. the locality has a positive migration balance that surpasses the rate of its natural growth) signals the sustainability of population growth in the future. There are another two indicators of socio-economic development – the rate of private

construction and the rate of unemployment – which are also used to study the combined effect of the spatial parameters of the urban field (isolation and remoteness) on socio-economic development of peripheral (desert and non-desert) locations.

By this study, the following questions will be addressed:

1. To what extent do the spatial characteristics of the urban field in peripheral areas affect the degree of sustainability exhibited by small urban centres in their population growth and economic development?
2. Which planning policies and strategies are conducive to sustaining urban growth in underdeveloped peripheral areas?

6.2 Sustainable Population Growth of Urban Settlements:

Additional urban growth, particularly in densely inhabited core areas, is often undesirable. Peripheral regions, however, are often undeveloped and under-populated, and may require sustainable urban growth as a precondition for achieving other aspects of development as diversity of employment, services, and leisure opportunities. Urban and regional planners must therefore be able to gauge the degree of sustainability of urban growth, particularly in peripheral urban settlements (Newman *et al*, 1995)

Firstly, the following study will clarify the definition of the terms used in this analysis, then provide a brief overview of the indicators for measuring urban growth.

6.2.1 Population Growth

In ‘Chapter 5’ of this thesis, the ratio between migration balance and natural growth (the MB/NG index) was introduced as an indicator of sustainable population growth. As Portnov and Pearlmutter (1998) point out, the importance of the MB/NG indicator clearly surpasses its direct use as a simple measure of population increase. The ongoing migration attractiveness of a particular settlement implies its sound economic

development, favourable physical environment and other preconditions that are essential for sustainable, i.e. continuing urban growth in general. It is also important that the indicator in question allows normalisation for natural growth rates, which may vary substantially from one settlement or region to another.

6.2.2 Measuring Economic Development

The economic performance of a region or a particular urban settlement may be estimated by several types of indicators including labour, capital, economic output and construction.

1) Labour criteria

In general, employment may be measured by two aggregated groups of data: unemployment rates and employment change.

- The *unemployment rate* is easily available and is widely recognised, but it suffers from a number of drawbacks. First, there are several definitions of the term, primarily because of the difficulty in establishing the appropriate definition of the working population. Second, the overall rate of unemployment gives no information about its composition. For instance, a high rate of unemployment in a particular settlement may result from a mismatch between the demand for particular skills and the actual qualification of the local labour force. This phenomenon is known as structural unemployment. If a town suffers from structural unemployment, the population of the settlement may still grow steadily due to an influx of skilled migrants from elsewhere, but if unemployment is high in all the sectors of the local economy, there is no incentive for job seekers to migrate to the locality. A high overall rate of unemployment in a locality may thus be often misleading (Moore and Rosenberg, 1995).

The usefulness of the above indicators for economic output in the study of urban and regional processes is nevertheless limited, since they often provide contradictory readings. As Armstrong and Taylor (1993) suggest, a region may exhibit low output growth and rapid growth of output per capita simultaneously if there is significant out-migration.

4) Construction criteria

The overall rate of construction is widely accepted as a key indicator of socio-economic development. This is due to two main reasons:

- First, the effect of construction on socio-economic development in urban localities is typically time-lagged, and this datum may thus be used as an indicator of a locality's future micro-economic performance and growth potential.
- Second, the rate of housing construction in a settlement tends to have a direct effect on migration. For example, a large number of housing units started in the locality may result in the influx of migrants from other settlements and regions (Portnov, 1998b).

The differences between public and private construction is also important:

- The *rate of private construction* is often given separately from the rate of public construction. As Portnov and Pearlmutter (1997) argue, the particular importance of this indicator as a general development datum is primarily due to the fact that, from the micro-economic point of view, the annual rate of private construction in a given urban area is a good indicator of its overall "investment climate".
- The *rate of public construction* may reflect social or political considerations rather than attractiveness for investment. In many cases, private construction is naturally

concentrated in the most populated areas of the country. At the same time, public construction is greatly directed toward other localities. This trend is often due to the government policy of population dispersal from the country's overpopulated core to the under-populated periphery and other "strategically sensitive" areas (Portnov and Pearlmutter, 1997).

In conclusion: The rate of private construction may be used in the analysis of peripheral urban settlements as a general indicator of socio-economic development. This indicator will be supplemented with the unemployment rate commonly considered one of the most inclusive and easily available development data. Taken together, these indicators – private construction and unemployment – can provide a useful base for the analysis of the overall socio-economic development of peripheral urban settlements.

6.3 Spatial Characteristics of Urban Development in Peripheral Areas

Quantitative spatial analysis of urban and regional development deals with three main characteristics, each requiring suitable indicators: the distribution of population within a given geographical framework, the remoteness of a specific settlement in relation to an established centre, and the degree of isolation of a particular town in relation to other settlements in the region.

6.3.1 Distribution of population and settlement location

The distribution of population within a given geographic area is commonly measured using two indicators: population density and percentage of the population living in locations of certain size.

- *Population density* is an important regional development datum whose significance is traditionally advocated by location economics (Levy, 1985). However, *mean* density figures for a given region often hide significant variations in local population density. The usefulness of such data for planning are thus limited, unless the scale of the statistical areas is sufficiently detailed to allow a spatial analysis of the region in question.
- *Percentage of the population living in localities of certain size* is a robust indicator of regional development used in a number of urban and regional studies (Bourne, 1975). It should be noted that the applicability of this indicator to entire geographic regions appears to be restricted.

6.3.2 The remoteness of a specific settlement

Since most major urban centres across the globe are located outside desert areas, the distance from these national centres to any desert settlement is likely to be considerable, at least in terms of daily commuting. As Saini (1980) points out, the remoteness of dessert settlements increases the cost of infrastructure and of the transportation of goods, especially building materials. Owing to the remoteness of desert localities, businesses in these areas are also likely to experience substantial problems in recruiting skilled labour (Golany, 1978).

Given these external factors, the economic base of desert settlements tends to lack diversity, since under otherwise equal conditions, any new enterprise would preferably be established in less remote areas (Kneese, 1978). It can be expected that compared to central (non-desert) localities, peripheral desert settlements should be more vulnerable to any negative changes in the national economy as a whole, such as recession, hyperinflation, etc.

The effects of remoteness may be related to several measures of distance from the established urban centres: aerial distance, distance by road, time required to travel to the centre, etc. Aerial distance, since it is objective and simple to measure, is probably the most useful of these measures. If the extent of the infrastructure and quality of service are more or less uniform throughout the area under study, it does not introduce an undesirable bias in the results.

The choice of the established urban centre is somewhat arbitrary, and depends on the type of interaction in question. The services provided by cities of a particular population size may vary from country to country, depending on local economic and social patterns as well as on transportation infrastructure.

However, there are two factors which affect the importance of this spatial indicator:

- First, even these distances exceed those normally considered practicable for daily commuting.
- Second, the perception of remoteness may affect investment decisions or movements of population no less than the real distances involved.

Thus, it is the “relative remoteness” of the country’s peripheral areas that may be the influencing factors, rather than absolute distance (Portnov and Erell, 1998a).

6.3.3 Spatial Isolation

The considerable distances often found between the established urban localities in a peripheral desert area are likely to cause a shortage of joint intra-regional educational and recreational structures, and limit the choice of job opportunities (Green, 1982). This is expected to lead to uneven patterns of population growth in peripheral desert settlements, due to considerable outward migration of residents in bad economic years.

As Portnov and Erell (1998b) argue, the effect of isolation may be related to the distance to other communities of similar size in the region, as well as to the number of

such communities. Both measures are an indication of the potential for intra-regional economic and social interaction.

6.4 Private Construction as a general Indicator of Urban Development:

To assess socio-economic disparities in regional development and gauge the progress of regional development programs, effective monitoring indicators are needed. A number of such criteria are currently in use, examples include employment growth, unemployment, overall population growth, and net migration balance (Markusen, 1996). One additional measure, whose potential for urban and regional planning seems to be somewhat underestimated, is the rate of private construction in a settlement. While the overall rate of construction is widely accepted as a key indicator of socio-economic development (Levy, 1985; Leeuw, 1992), the “private” component of this indicator has received relatively little attention as being a distinct measure on its own.

6.4.1 Private Construction as a Development Indicator:

Development indicators in urban and regional planning are commonly used in three distinctive ways. These include:

- Measuring the needs or opportunities of each region as a basis for resource allocation.
- Setting up the contextual “base-line” of an area’s condition in order to measure the improvement brought about by public policy intervention.
- Identifying the opportunities or problems that are most important for each area as a basis for defining and prioritising policy targets (Wong, 1995).

In the framework of the Global Urban Observatory Program (GUOP), the United Nation Centre for Human Settlements (HABITAT) developed a set of major

urban indicators. Each of these groups of indicators covers a specific aspect of development:

- 1) *Socio-economic development* (number of households below the poverty line, employment rate, number of hospital beds, child mortality rate, life expectancy at birth, adult literacy rates, school enrolment rates, etc.).
- 2) *Environmental management* (wastewater treated, solid waste generated, disposal methods for solid waste, and regular solid waste collection).
- 3) *Infrastructure* (household connection levels, access to potable water, consumption of water, and median water price).
- 4) *Local government* (major sources of income, per-capita capital expenditure, debt services charge, local government employees, wages in the budget, contracted recurrent expenditure ratio, etc.).
- 5) *Transport* (modal split, average travel time, expenditure on road infrastructure, and car ownership).
- 6) *Housing* (house price to income ratio, house rent to income ratio, floor area per person, permanent structures, land development multiplier, infrastructure expenditure, mortgage to credit ratio, housing production and housing investment) (HABITAT, 1997).

While this extensive list includes some construction indicators (housing production and housing investment data), it does not include private building as a measure on its own. However, the potential importance of this indicator (private construction) is due to a number of considerations (Portnov and Pearlmutter, 1997):

- *First*, the effect of private construction on socio-economic development in urban localities is typically time-lagged. For instance, the number of housing units started in a locality, in a particular year, may directly or indirectly affect the prospective population growth of the settlement through the influx of migrants. The findings of

numerous migration studies (Lipshitz, 1997; Portnov, 1998a) indicate the particular importance of housing availability on the pattern of in-country migration. On the other hand, private construction rates in the non-residential sector can be even more important, as commercial development for instance, often reflects the potential for future micro-economic performance and growth. The indicator of private construction can thus be considered as a leading indicator of a settlement's future socio-economic development, as opposed to other more "immediate" measures such as existing income distribution or the current level of unemployment.

- *Second*, from the micro-economic point of view, the annual rate of private construction in a given urban area can be considered as a good indicator of its overall "investment climate". It may be assumed that such an indicator is less forthcoming for public construction, whose rate may be based more upon social or political considerations than on attractiveness for investment (Lipshitz, 1997; Portnov and Erell, 1998b).

6.4.2 Location Paradigm

To explain the geographic distribution of private construction across various urban areas, Portnov and Pearlmutter (1997), as shown in Fig. 6.1 suggest a theoretical model. This model considers the phenomenon in terms of *profit maximisation* and includes both:

- a) *Cost factors* (land availability, infrastructure, government incentives and construction costs).
- b) *Benefit factors* (natural amenities, population / migration, accessibility, and buying power of the local population).

Each of these groups of location factors presumably affects the decision-making of private developers and will be explained in some detail:

- *Land availability*: A shortage of land for new development normally increases land prices and may thus limit the rate of private construction in a given urban area. A decrease in land prices with distance from the city core is evidenced by numerous theoretical and empirical planning studies (Alonso, 1991; Andoh and Ohta, 1997). Under these conditions, undeveloped land available outside the metropolitan core should increase, at least theoretically, the attractiveness of more remote urban areas for private developers. In the absence of direct data, the distance from a metropolitan centre can thus be used as a proxy for land availability.
- *Infrastructure*: The availability of roads and engineering utilities in urban areas lowers construction costs, making areas of developed infrastructure more attractive for private investors. For example, there is a distinctive effect of high transport cost on the socio-economic development of urban areas (Clark, 1982). Since the level of infrastructure development (e.g. transport network and engineering utilities) tends in general to diminish with advancing into peripheral areas (Newman, 1993; Saini, 1980), the attractiveness of these areas to private developers should also decline.
- *Government incentives*: In a number of cases, the development of certain geographic areas (specifically under-developed peripheral regions) is purposely encouraged by local governments on strategic, political or ideological grounds. Examples of such periphery-development policies are found in Northern Europe (Sweden and Norway), Asia (Japan), and in the Middle East (Egypt and Israel).

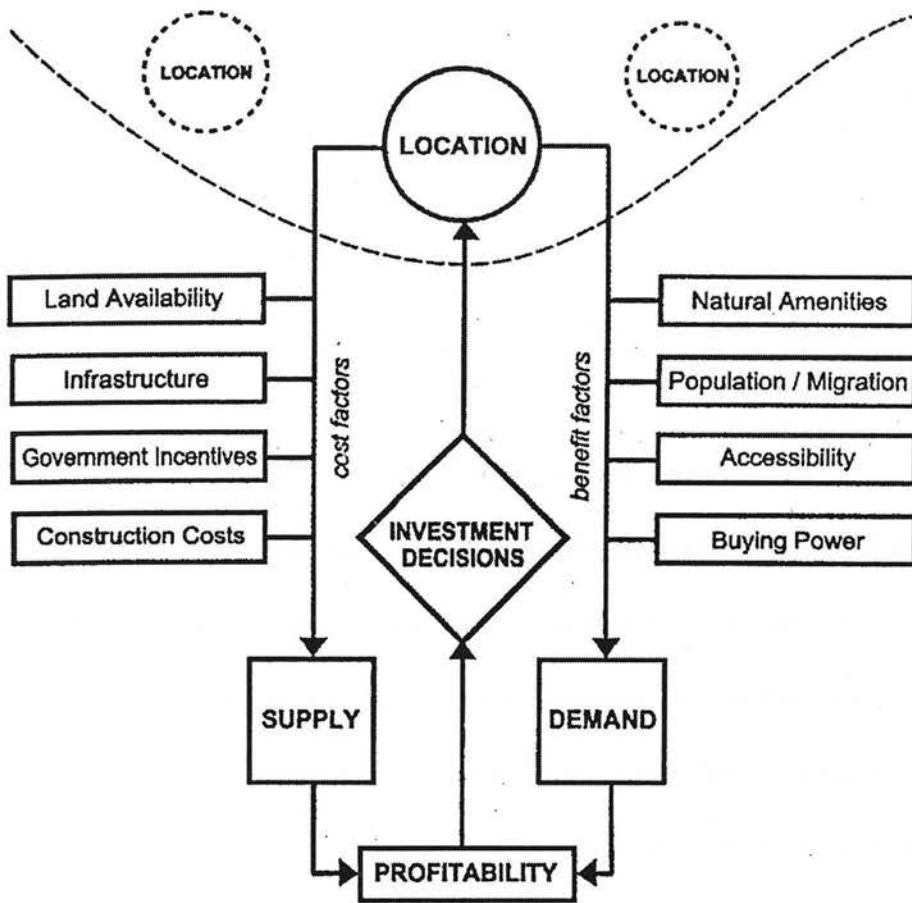


Fig. 6.1 A general model of factors determining the location of private Construction across urban settlement. (Portnov and Pearlmuter, 1997)

- *Construction costs*: The direct expenses incurred in construction, primarily for building materials and labour, may vary by location according to the availability of physical and human resources. These direct costs, when combined with other location factors, dictate the price of construction in a given urban settlement and influence the extent to which private developers are likely to invest in increasing the supply of building stock. Direct construction costs and their geographical variations are commonly documented by public or private building industry bodies for regions but are rarely available for individual urban settlements.
- *Natural amenities*: The presence of natural amenities (climate, landscape, and vegetation) may significantly affect the population attractiveness of specific urban areas. This may enhance the attractiveness of these areas to private developers. On

the other hand, the harsh climate of some geographic areas, which may be characterised by thermal stress, temperature extremes, blowing dust, or a lack of water resources and vegetation, may make areas lacking natural amenities somewhat less attractive for private developers.

- *Population / migration:* The concentration of population and a positive migration balance in a settlement should attract, at least theoretically, private developers due to the fact that private construction naturally tends to the areas where demand is greater and thus the highest profit can be expected. This trend may be offset by other interfering factors, for instance, by land availability. The interrelation of the concentration of population and land availability may lead to the concentration of private construction in urban settlement of a certain size, which are small enough to have considerable land resources available, and large enough to provide sufficient market demand for building.
- *Accessibility:* The rate of private construction should normally decline with increasing distance from major population centres, in which population and a great number of jobs and services are concentrated. In case of non-residential construction, this clear trend may be offset by a lack of undeveloped land for the construction of territory-consuming industrial or business installations (industrial parks, shopping malls, etc.). On the other hand, business in remote hinterland areas may experience difficulties in the supply of skilled labour, which is far less available in remote areas than in large metropolitan centres (Abe, 1996). These forces (land availability and availability of skilled labour) may thus lead to the absence of any straight distribution pattern.
- *The buying power* of the local population is undoubtedly a key factor affecting the spatial distribution of private construction across urban areas. Since private construction is naturally aimed at the maximisation of profit, its highest rates may

be expected in the most affluent areas of a country. From the socio-economic standpoint, these areas are distinguished by a number of welfare indicators, including wages, unemployment, bank savings, the level of car ownership, etc.

According to the model in Fig. 6.1, the aforementioned factors and forces from dynamic “supply / demand” paradigm affecting potential profitability of investment and, therefore, investment decisions of private developers may concern alternative urban locations.

6.5 Index of Clustering:

In spite of the lack of evidence in many studies for a direct relationship between the spatial isolation of communities and their population growth, the theoretical importance of this factor led to an investigation of the combined effect of this factor with that of remoteness (Portnov and Erell, 1998b). The justification for developing such an indicator may be explained as follows: In centrally located settlements, the presence of neighbouring communities of similar size does not increase significantly the potential for intra-regional contact, because social and economic life is dominated by the metropolitan core. However, in peripheral communities, the lack of a dominant urban centre should result in more links between the smaller communities. The combined effect of remoteness and isolation may thus be represented in a single index accounting for their inter-relationship.

The index in question can conditionally be named the *index of clustering* (IC). It represents (as in Fig. 6.2) a derived indicator measuring the two separate spatial parameters of urban development described above, and may be expressed as a simple ratio:

$$IC = IS / IR$$

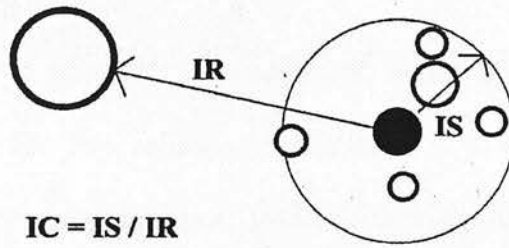


Fig. 6.2 Spatial components of the index of clustering

(Portnov and Erell, 1998b)

Where *IS* and *IR* are respectively *spatial isolation* (the number of other urban settlements located within a practical range for daily commuting, assumed to be 20 km) and *Index of remoteness* (aerial distance from a settlement to the closest major urban centre, in kilometres). The derived indicator thus tends to have a high value in central, densely populated areas, where distances from metropolitan centres are small and the urban field is dense, while its values tends to be lower in remote peripheral areas in which urban centres are more scattered (Portnov and Erell, 1998b).

The impact of this index on the patterns of settlement's growth is expected to be twofold:

- In sparsely populated peripheral areas, the presence of small, neighbouring urban communities may increase their chances to sustain their population growth and economic development due to socio-economic interaction.
- In core areas, where social and economic life is dominated by a major metropolitan centre, dense clusters of small urban localities may reduce the rate of migration to a

given settlement and its relative attractiveness to investors due to “inter-town competition”.

One reservation is required: The index of clustering does not differentiate between, for example, the two following situations: A town with five other urban settlements within commuting distance, located 25 kilometres from a metropolitan centre, and another town, located 50 kilometres from a major urban centre, but which has ten other towns within commuting distance. In both cases, the proposed index of clustering would have a value of 0.2, despite the fact that these two cases are not identical with respect to their development patterns. However, the identical values of this index do suggest that with respect to sustainability of population growth and economic development these settlements may exhibit some similarities.

6.6 **Conclusion:**

There are a broad variety of regional policies aimed at redirecting population growth from overpopulated core regions to underdeveloped peripheral areas. Such development policies are advocated in Northern Europe (Sweden and Norway), Asia (Japan), and Middle East (Egypt and Israel), as well as in other countries.

Following such a policy, this goal was pursued mainly by means of the development of a broad network of new towns in the peripheral areas of the country.

The recent studies suggest an alternative strategy for the development of sparsely populated peripheral regions, wherever this objective is desirable. According to this view, policy should be directed at achieving a certain density of the urban field, as determined by the value of the *index of clustering*.

Possible approaches to implementing this policy include:

- *Development clusters with a clearly expressed urban core* , which seems to be relevant to peripheral areas which already have existing regional centres represented by relatively big urban localities.
- *Development clusters of small urban settlements having no dominant urban core* (this pattern of urbanisation seems to be relevant to hinterland areas whose current settlement pattern is less intensive, and where existing small settlements are widely scattered across the area).

The recent studies leads to the conclusion that the population size of these development units may vary (with allowance for the distance from the closest metropolitan centre) from 120,000 to 250,000 residents (Fig. 6.3).

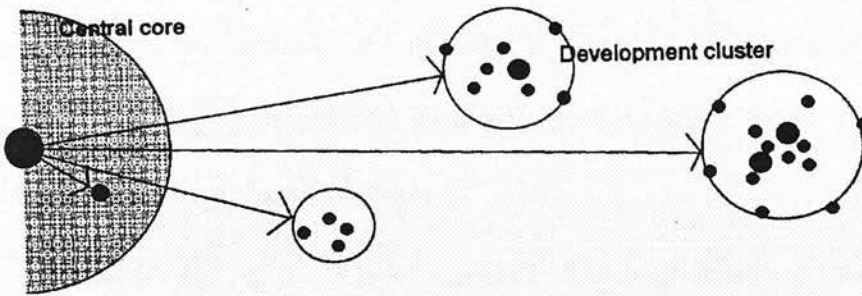


Fig. 6.3 The diagram illustrating the increase in size of settlement cluster as a function of the area's distance from the major population centres of the country.

(Portnov and Erell, 1998b).

In particular, the strong interrelation found between the *clustering of the urban field* and the *sustainability of population growth and economic development* in peripheral areas is probably characteristic of development processes in many countries.

On the other hand, with respect to private construction as a general indicator of urban development, three potential areas of use of this rate can be singled out:

- *Improving the system of state statistics.* The recent studies indicate that some measures (for instance, car ownership and school enrolment) are merely indicative of the particular development aspects which they directly measure, while the factor of private construction appears to be a more general indicator of urban development, and could thus contribute to the set of indicators in the major development series.
- *Gauging the progress of development in various settlements and regions.* The inclusion of private construction in the list of major development series may help to address a number of issues of regional development. Since the rate of private construction in a particular urban locality tends to correlate with a wide range of development factors (unemployment, settlement attractiveness for immigrants and in-country migrants, rates of annual growth, population income), systematic comparison of these rates across different settlements and regions can serve as a useful tool for singling out troubled settlements and geographic areas, and thus better targeting governmental assistance such as public loans, loan guarantees or tax exemptions to private developers.
- *Evaluating the efficiency of various planning policies aimed at developing particular settlements and regions.* Regional development policies are often aimed at encouraging socio-economic development in economically lagging peripheral areas. In lights of the findings of this study, the rate of private construction in a particular urban area may thus be considered as an effective supplement of the conventional list of policy evaluating data.

The application of all the previous insights may be of value to planners and decision- makers in any country that experiences acute problems of inter-regional inequalities in socio-economic and population growth.

Towards Sustainable Desert Settlements

Chapter 7 :

Towards Sustainable Desert Settlements

7.1 Introduction

The previous two chapters, Ch. 5 & Ch. 6, laid out much of theoretical foundation upon which the viability and sustainability of desert settlements can be assessed in terms of statistical indicators that incorporate a range of social and economic factors. These indicators, although not available in Egypt, are widely used elsewhere.

This chapter seeks to establish another theoretical framework by making a comparative analysis of three different experiences representing the three main themes of desert settlements in the world today, each exhibiting very different social, economic and political background.

The research divides the experiences of settling the desert into three main approaches: traditional; liberal economic; and military / ideological. These are exemplified respectively by the three cases of Egypt, the USA and Israel, as follows:

- *Traditional.* Egypt has a long tradition of desert dwelling. Recently, however, the will to establish new settlements in the desert has led to the government turning away from traditional patterns to experiment with other models. These, largely transferred from the more humid regions or different environments and dedicated to meeting single economic objectives or as a vessel that absorb the population and housing crisis, bear little relationship with their surrounding desert environment.
- *Liberal economic.* By contrast, the deserts of Southwest USA were seen as desirable places to settle on account of their reliable weather. The liberal economic forces

generated by USA's free-market politics fuelled a demand to live there that was disproportionate to the very limited environmental resources, especially of water.

- *Military / ideological.* The founding of the state of Israel required many settlements to be created across a huge arid area in order to establish widespread territorial claims. The process was characterised by a responsive pattern of settling into the desert environment, following a model of small and relatively self-sufficient outposts which in themselves gave strength to claims of possession of land.

These three cases, each, as mentioned before, representing a different approach to settling the desert environment are analysed in closer detail.

7.2 The Egyptian Experience

7.2.1 The Ecosystem

The extreme polarity of the Egyptian settlement landscape is repeated in its desert zones. The desert's meagre population of 1.7 percent of the total population (Fajal, 2002) is extremely concentrated at the desert margins, the littorals and the zones of interface with the Valley. The northern littoral, though classified as an arid zone rather than semi-arid, holds most of the desert population. Except for a few small cities, the meagre precipitation supports a vulnerable subsistence economy of dry farming, pasturing and a semi-nomadic pattern of life. The rest of the desert population inhabits the scattered oases of which the five of the Western Desert are the largest and best known.

With the exception of desert margins¹ (coastal zones, the Valley periphery) and the scattered oases, the desert core, with more than 95 percent of the total area of the

¹ The Western and the Southern boundary zones of Egypt are excluded from this category as they are not inhabited. They lie within the extremely hot and arid Eastern fringe of the Sahara.

desert, is entirely uninhabited. It is a 'no man's land'. In fact, due to its extreme aridity, it is not even a 'nomad's land'.

The desert regions of Egypt have a total population of about 500,000 and a population density of 1/6 person per square kilometre (Hegazy, 2000b), a situation which has changed little with the centuries. However, rather than assimilating population overflow from the congested Valley, as took place in some earlier periods (Ibrahim, 1992), the desert has continued to lose population to the Valley throughout the 19th and 20th centuries.

7.2.2 Desert Settlement Movement: Background of Different Contexts

Settling the Egyptian desert has been both a recent and a slow process. Not until after the demographic transition at the end of the last century had there been any interest in the desert as a place for new settlements. The disturbance of the ecological balance caused by an increasing population and diminishing resources has been the basic stimulant. Had it been possible to maintain the ecological balance of the inhabited Valley as the population increased, there would have been little incentive to settle the desert. Other motivations, such as socio-cultural or even purely demographic pressures, were not involved except perhaps in the very late phases and then only on a very modest scale. Economic motivations, of course, were the leading force of the whole process.

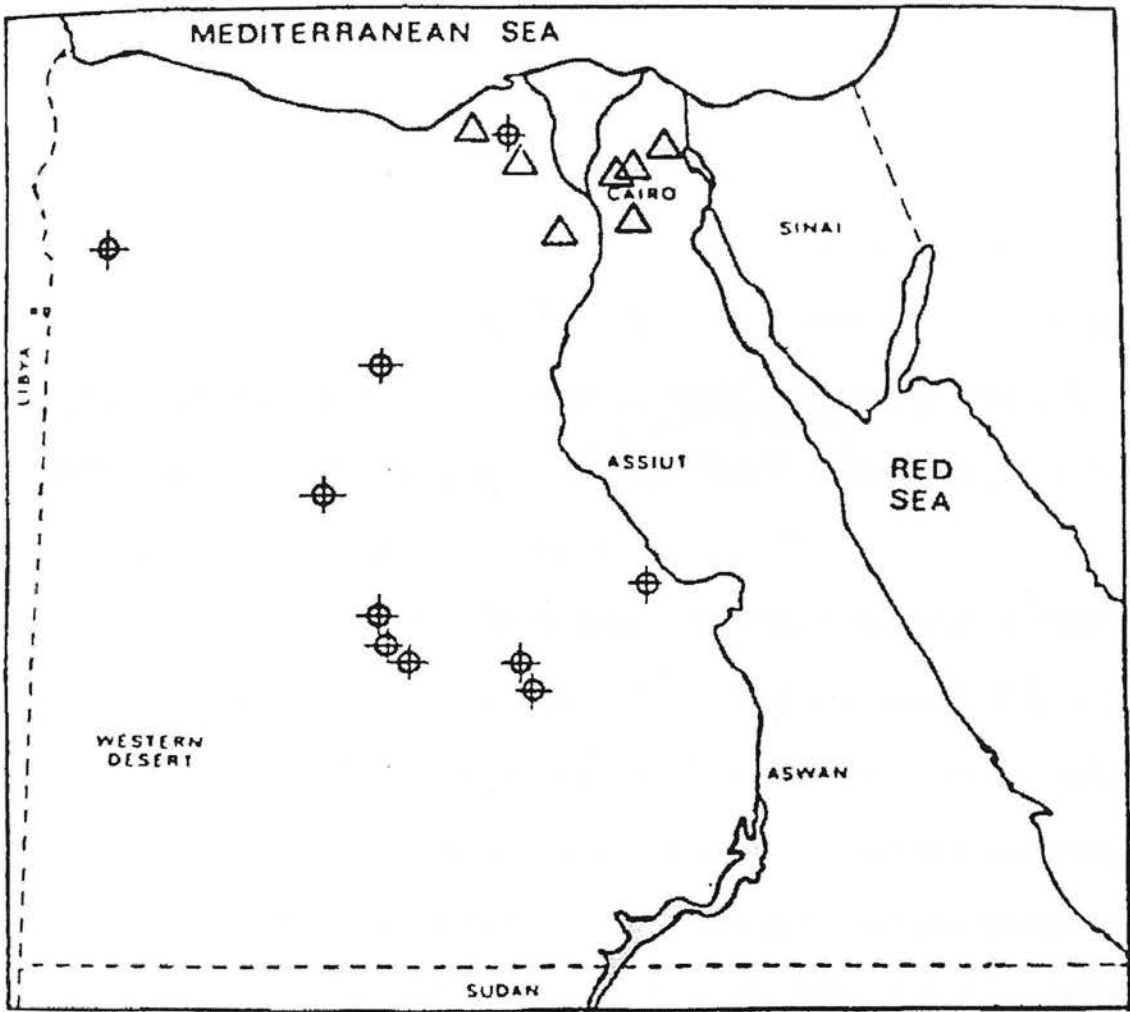
While the very early beginnings of such settlement can be dated to the 1930s (Fahmi, 1995), it did not begin to achieve a significant scale until the second half of the 1950's when it became an integrated component in the ambitious economic development plans of the new regime (Farrag, 1963). This phase, referred to here as the first phase, is well represented by Al-Wadi Al-Gadid (The New Valley) project in the oases of the Western Desert, and the Al-Tahrir province in the western vicinity of the Delta; the object of both was to reclaim extensive areas for cultivation (Ezzat, 1982).

The two projects faced substantial problems that stymied the achievement of their original ambitious objectives (MecKelein, 1980) and suppressed potential plans for extensive replications (Fahmi, 1995). The start of what is referred to here as the second phase² dates from the mid-70's. It was an attempt to establish new urban/industrial centres and satellite cities in the interface zones between the Delta and the adjacent desert margins (Fig. 7.1).

Throughout history Egyptians have had a persistent negative socio-cultural attitude toward desert living. Their society, by nature and history, is predominately agrarian (Hamdan, 1984). For centuries most of the population has lived in rural settlements. The capital and the small cities were inhabited by only a very small segment of the population, the ruling classes, made up mostly of foreigners (Hopwood, 1982). Massive urbanisation is a recent phenomenon; Egypt's demographic characteristics and its socio-cultural values are still deeply rooted in its rural past. This negative attitude has worked as a retardant factor to any desert settlement movement. The agrarian-based socio-cultural fabric combined with the absence of a sizeable industrial sector helped in moulding the desert settlement process into one that retained a rural/agrarian orientation.

The political environment in which the process was initiated has been unique. It was one in which there was a major transformation from capitalist to socialist concepts. Concentration of the decision-making process in the hands of the central government was accompanied by a build-up of an oversized and sophisticated bureaucratic system which has enhanced centralised power and control (Borthwick, 1980). Private enterprise and public participation were non-existent factors in an entirely state controlled process of desert development.

² At the official level, there is no clear demarcating line between the two phases. It is used here for better understanding of the evolution of the movement.



⊕ The First Phase △ The Second Phase

Fig. 7.1 Development Zones of the Two Phases of Desert Settlements (Egypt)

(El-Wakil and Serag 1985)

7.2.3 General Analysis

- *Planning, Policy and Implementation*

It is interesting to note that the preface of most documents or references relating to desert settlement projects of the first phase gives explicit attention to the goal of reclaiming “many thousands of acres”. The objective of establishing viable new human settlements was always given marginal attention if it was mentioned at all. This attitude

has been strongly reflected in the planning and implementation processes. The gap between “reclaiming the desert” and “building new societies”³ is large. The slogan used at the first phase time was “conquering the desert”. The word conquering should have suggested a different meaning - mobilisation, adequate planning and commitment. Unfortunately, it had an adverse impact; it reduced a complex and multidimensional process to a simplistic task of transforming the yellow barren desert to a green land. Beyond reclamation as an economic enterprise, many critical factors such as the social fabric, institutional structure, cultural pattern and even the varied ecologies of the new frontier were and still are gravely overlooked (Fahmi, 1995).

There is a clear difference between the two terms “conquering the desert” and “adaptation to desert”. The first, a politicised movement, has brought about concepts and applications for developing a desert environment that originated and were developed in a much different environmental context. In the first phase, and even in the current second phase, the planning process has been captive to conventional concepts and traditional modes of settlement typical of the Nile Valley and of western trends (Ibrahim, 1992).

A prime example was the reclamation process itself. Transforming the desert by transplanting agricultural and irrigation techniques of the Valley, at a scale far beyond experimentation, has caused, besides crop failure, irreversible environmental damage (Meckelein, 1980). These techniques which were appropriate in their original environmental context were not adaptable to desert environment. Long-term plans for desert development require the establishment of new urban-industrial centres in order to attain socially and economically balanced growth (Langford-Smith, 1978).

³ The term “new societies” has appeared only in very recent stages of the second phase in the 80s.

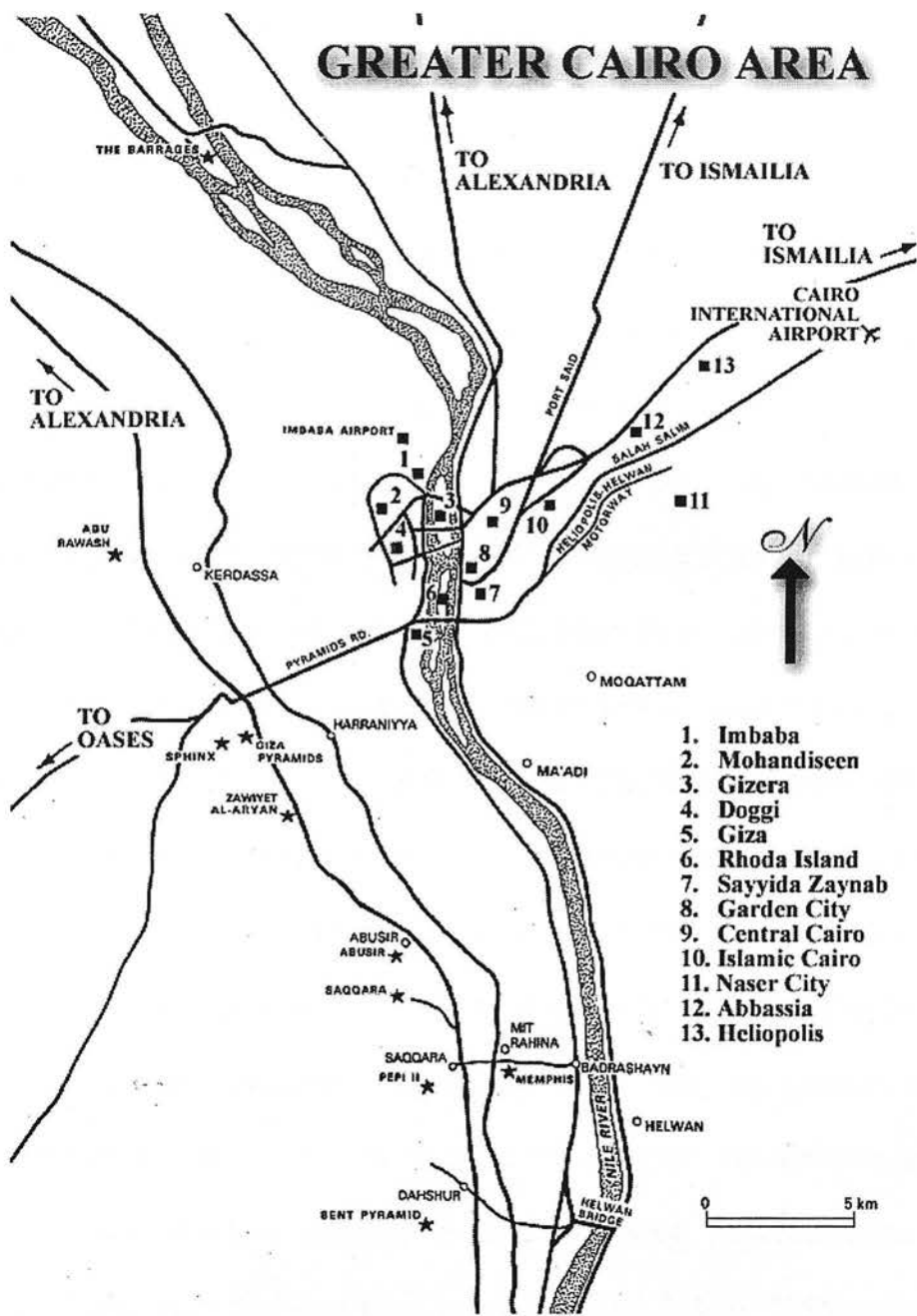


Fig 7.2 Greater Cairo Area, Location and Extension (El-Wakil and Serag, 1985)

The dominant conceptualisation of new settlement schemes as agricultural production units has rendered them, physically, economically and socially, as modestly modernised replication of the backward rural settlements of the Valley. The planning process did not aim for a structural balance between rural and urban settlements. For many reasons, the balance has been lost to the former. Industrialisation of desert raw materials has been pushed to the Valley (Hamdan, 1980). The distorted perception of

desert development as a mere spatial and sectoral extension of the economic structure of the Valley rather than the establishment of new integrated and self-contained societies has marked the whole enterprise.

Some aspects of the Egyptian experience indicate heavy reliance upon improvisation. The major lack of adequate data and analysis, and the absence of a comprehensive assessment of all the potential resources of desert regions have led to a very fragmented approach. Furthermore, there was no clear institutional body responsible for planning the whole process. With the absence of a specialised agency for comprehensive planning, planning has, at best, been fragmented and incomplete – pseudo-planning. Responsibility has been distributed among uncoordinated authorities. A number of redistribution of roles and responsibilities has aggravated the problem (Fahmi, 1995). Besides the extreme lack of co-ordination among the departments and authorities, their planning entities have been unqualified. The land reclamation authority responsible for the development of a large desert area was not prepared or staffed with professionals who were concerned with, or capable of, doing the physical and social planning required to foster viable and attractive communities. The situation has always been complicated by extreme centrality in decision-making. Implementation of desert development has actually been run from a remote capital. Fahmi (1995) maintains that most of the problems of the Egyptian experience are the result of insufficient pre-investment studies or co-ordination, exacerbated by a the lack of efficient administration and follow-up.

Any process of regional planning has two integrated components. First, its ultimate goals should be fundamentally linked to national goals. Second, the actual environment, potentials and constraints of a particular locale or region should be considered as a whole (Leitmann, 1994). The domination of the national goal of increasing the area of arable land to overcome the increasing food deficit biased the

whole process by emphasising only one dimension of the problem. Desert regions were assigned to achieve that national goal without consideration of local conditions and capabilities such as the capability of the ecosystem to withstand safely the type and scale of resource use proposed and the prospects of future economic and social development of the transplanted agrarian communities.

Pioneering movements to settle new regions require the stimulation and direction of large effort if the potentialities of the area are to be realised and the capability to achieve such goals is developed. They need a high degree of mobilisation and commitment at all levels, governmental and public. However, governmental policies and actions, and official information systems, supposedly responsible for generating such support, have not exhibited a serious commitment to these objectives. They failed to induce detectable changes in the negative socio-cultural attitude toward desert. Ibrahim (1982, p. 174), in reference to this fact, notes the two newspaper articles from an Egyptian daily newspaper (Al-Ahram, November 30, 1975):

‘Dr. Ibrahim H. Abdul Rahman, Minister of Planning, calls for the creation of desert settlements to absorb 20 million Egyptians in the next 25 years’; and

‘An official in greater Cairo water authority announces the transfer of 13 employees from Cairo to desert and remote governorates as a punishment for their neglect and lack of orderliness’.

Government policies also failed to formulate an attractive, built-in incentive structure either for civil servants or private enterprise. This has substantially diminished the prospect of obtaining the critically needed cadre of adequate and qualified administrative and technical personnel (El Kassas, 1979). With less qualified individuals and an undiversified socio-economic structure, social viability and development was vulnerable.

- *Settlement Economy*

The Egyptian experience has been characteristically marked by the absence of an active role for the private sector. The whole process has been almost entirely a governmental enterprise. This has made for a less energetic economy than might have been realised with less governmental constraint. The defects of an oversized government bureaucracy are well known. In comparison to private enterprise, governmental actions are frequently characterised by larger margins of waste, and complex, time-consuming decision-making and implementation processes. Due to a pyramidal hierarchy and extreme centrality, desert settlement efforts were commonly flawed by deficient management and control, lack of responsive correction mechanisms, and they were vulnerable to intermittent budget cuts. The absence of highly diversified, small, decision-making interactions at the base level of the economic structure not only did not allow for innovative, self-generated development, but produced stagnation (Abo-Zeid, 1996).

Any process of economic development and growth is substantially constrained by its presupposed model. Egypt's planning within the socialist model has eventually led to a situation close to a subsistence economy. The current pattern of land ownership in the New Valley region reflects this fact. Ahmed (1984) stated that 40 percent of the land owners have only three feddans or less, and 23 percent of agricultural labourers are landless, a situation that has dimmed the prospects of any self-generated development.

In planning an economic base for a settlement or a region, two different models might be used. The first is to target, from the early stages, a state of self-sufficiency. The second is to develop an economic base that is strictly tied to the national or interregional demand. These two approaches, however, can only be separated theoretically, reflecting the different implications of stage theory and base theory. However, the pattern of economic activities is determined by the approach that is selected. The second model,

which usually depends on the development of a single economic activity where the region is believed, rightly or wrongly, to enjoy a comparative advantage has not proved to be adaptable to remote desert settlements. The emphasis on one economic activity, agricultural production, for example, has impeded the seeding of secondary and tertiary industries that are critical prerequisites for long term stability. This fact was clearly demonstrated in the demographic structure of the New Valley region where, in 1992, more than 43 percent of the work force was made up of agricultural labourers (Abo-Zeid, 1996), making the settlement's economy, present and future, extremely vulnerable to any adverse changes.

- ***Social Environment.***

Unlike humid ecosystems, the desert ecosystem requires a large scale of organised efforts to initiate and stabilise resource use. Man, himself, more than any natural endowment, is the key factor for determining the success or failure of desert settlements. A stable and healthy social environment is a critical requisite to establish adaptive communities, a satisfactory quality of life and successful enterprises. Such objectives have been overlooked in the Egyptian experience. Ibrahim (1992) comments that the human values and resources of the population should also be integrated with the physical planning. He warns that careless implementation often results in serious difficulties which may later require costly adjustment.

Neither in the physical planning nor in the design of social institutions in Egypt have the social problems of desert environment been addressed. These include isolation and the interaction between populations from two different socio-cultural backgrounds: the original desert inhabitants and the newcomers from the Valley. Transferred social institutions from the Valley have not been adaptable to the desert environment. They have not been able to provide the required atmosphere of dignity, distinction and self-

development badly needed for long-term social stability. Furthermore, the design of these social and cultural institutions has not differentiated between regions and sub regions with different socio-cultural backgrounds.

The unidimensional economic structure of these settlements, with their extremely homogeneous population, dominated by peasants who migrated from the Valley, and the lack of modern urban institutions and facilities has produced an impoverished social structure. Reinforced concrete houses and utility networks in this setting are not enough to create a modern and progressive society.

- ***The Regional Setting***

Development schemes for settlement did not emerge from a clear scheme of regional planning (Hamdan, 1980; Silberstein, 2002). The absence of preset goals for population dispersion and a spatially balanced regional structure has led to a piecemeal approach to the implementation of every project. The division of the national territory into eight planning regions started only at the beginning of the 80's.

The improvised spatial structure of the new settlement schemes was reflected in a peculiar regional/administrative hierarchy. In establishing territorial administrative divisions and subdivisions, which represent the skeleton of management and development, no consideration was given to natural landscape homogeneity or economic functioning. While the linear valley was divided into 15 provinces, a straight line into only two provinces arbitrarily divided the huge area of the Western Desert.

The first phase of the desert development movement was characterised by a daring step to initiate desert development in the remote desert core. Regardless of the problems of the first phase, it succeeded in establishing spatially distinctive 'regional nuclei' that are separated from the millennia-old settlement web along the Nile. Due to the discouraging outcome of the first phase, the governmental planning of the second

phase has been heavily oriented to different spatial arrangements. While development of remote desert zones has been kept at a very low profile, investment allocation has been focused on establishing new settlements in the interface zones between the desert and the Delta and Valley margins. Many settlements and satellite cities, such as Al-Salhia, the 10th of Ramadan, the 6th of October, Al-Sadat, Al-Obour, Al-Amal and the 15th of May, have been established and are developing currently (Fajal, 2002). They are concentrated at the periphery of the Delta, attracted to the magnet of the new megalopolis of the greater Cairo region (Fig. 5.3). The social implication of this spatial pattern and its impact on the pattern of desert development as a whole was one of the points of interest in this research.

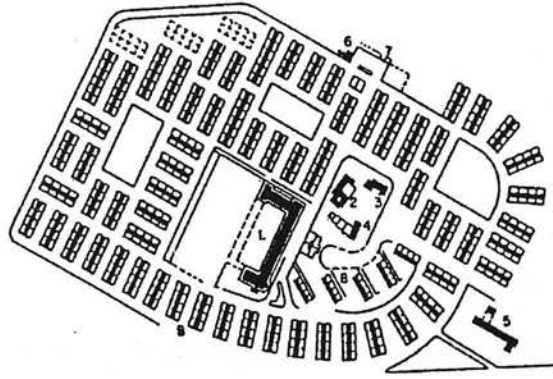
- ***Physical Structure.***

In both rural and urban settlements, physical planning, design and architectural concepts have not been appropriate for the desert environment (El-Wakil and Serag, 1985). Trends and concepts imported from remote humid and temperate regions, as shown in Fig.7.3, have been indiscriminately transplanted to an extremely hot arid environment.

Tempted by vast spaces available in the desert, the planners adopted the western grid pattern with free standing housing units on separate lots and excessively wide streets. This pattern, perhaps appropriate for an English garden city, has left settlements extremely vulnerable to desert heat and sand-laden winds. The level of physiological comfort, indoor and outdoor, has proved to be very low.

Obsession with alien and imported concepts of physical development has caused the traditional concepts and time-tested designs which were used in the ancient desert settlements of Egypt and the Middle East, some of which are still inhabited, to be cast aside (Fajal, 2002). Simple observation and comparisons between old and new

settlements has demonstrated that the ancient settlements enjoy a comfortable microenvironment, both physiologically and psychologically.



- 1- School
- 2- Worship area
- 3- Administration
- 4- Commercial centre
- 5- Hospital
- 6- Mill
- 7- Police station
- 8- Residences

ABEES VILLAGE



AL-MARGE VILLAGE

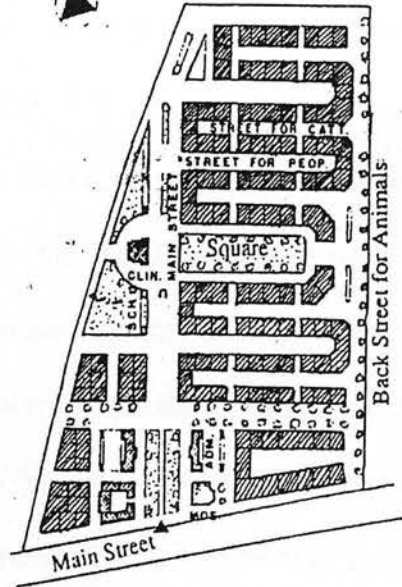


Fig.7.3 Examples of Master plan of desert communities in 1st phase of Egyptian Experience. (West desert)

Governmentally dominated planning and implementation have an intrinsic tendency for standardisation and replication. Visual images of standard housing units with a monotonous row pattern have impeded the creation of an attractive, diverse and versatile physical environment capable of reflecting the local cultural and aesthetic values. Such an environment could help much in building a distinctive and viable social environment based on self-identity and dignity. This situation has been aggravated by the absence of any transactional dialogue between planners, designers, and settlers. Tadros (1982) observes that the only relationship between settlers and designers in new developments occur after the building process has passed beyond the point where compromise between the settlers' perceptions and the designers' constraints and ideals can be found.

At the regional level, rigid and semi-standard planning and design did not differentiate among regions which have different climatic, environmental and socio-cultural characteristics. Plans and housing types used for temperate coastal areas were used indiscriminately in the very hot zone of the south.

At the sub regional level, planning the spatial structure of groups of settlements did not respond to implications and requirements of the desert ecosystem. The clustering pattern of rural settlements of the Valley, where concentration and continuity are the major factors, has been indiscriminately replicated. With the problem soils of the desert, which exhibit inferior physical, chemical and biological qualities, concentration of irrigated agricultural land uses have exerted irreversible environmental changes. Fahmi (1995) indicated that the problems of lateral contamination of soil adjacent to low-lying areas, water logging and surface crusting were common in all development areas. The transplanted spatial pattern has restricted the potential for more diversified land use. In Al-Kharga city, the largest urban centre in the New Valley, agricultural land

use represents 16.9 percent of the total area, while light industry is only 3.4 percent and services are 13.7 percent (Abo-Zeid, 1996).

7.2.4 Conclusion from the Egyptian Experience

The experience of Egypt shows that desert development should be a comprehensive process of building new integrated and internally balanced communities. The strong impact of the unidimensional impetus in combination with the impact of a broad range of economic, socio-cultural and socio-political contexts has shifted the whole process away from this rationale to become merely a large-scale governmental economic enterprise heavily dependent on a single, unproved economic base. This unidimensional approach to what is a multifaceted and complex process of development indicates the lack of consideration of the many factors involved, such as human psychology, the social fabric, culture, socio-political and institutional structures, among others. The obstacles to the development of land use and under-utilised resources of the Middle East are mostly social and institutional. Furthermore, the nature of interdependencies and interactions between these factors, especially within the characteristic environmental context of desert, were wholly overlooked. Some disciplines are overlooked when studying and planning for major desert irrigation projects and these disciplines are mostly associated with health, administration and social aspects. The impact of social elements is of particular importance, especially where new technologies are introduced.

Egypt's current attempts of desert settlement could gain many useful lessons from the experience of its first phase. However, there are many indications that many of the defective approaches are still being applied. Of great importance is the lack of understanding of the ecological interactions within the desert habitat.

7.3 The USA Experience

7.3.1 General Analysis

The USA experience of settling the arid south-west involves a kind of paradox. This region of water scarcity is, in comparison to the humid regions in the north-east, experiencing an unprecedented rate of population and economic growth (Ortolano, 2000). The cities of Tucson and Phoenix, in arid Arizona, have the fastest growing population in the United States. This pattern of growth, as shown in Fig.7.5, is a peculiar one when compared with the global pattern of desert settlement and it is exactly contrary to that of Egypt. This riddle, or the great exception in the world history of arid zone development, can only be understood by examining the many different contexts and dimensions of the whole phenomenon.



Fig. 7.4 Infrastructure and a complete net of roads across Arizona desert

were the first steps in planning for new settlements.

While in the Egyptian experience the basic motivation for desert settlement has been the pressure of population on resources, it has been individual initiative and the hope of profit which provided the impetus in settling the American arid Southwest.

However, the absence of a confining structure of regulations and controls over development and the initiatives of free enterprise, due to different socio-political, socio-cultural, constitutional and institutional factors, has substantially enhanced this development mechanism. Both positive and negative interactions have been generated by the individual, small scale, and unrelated decisions of separate developers operating on a trial and error basis under relatively free market conditions. In total, a sophisticated web of development and settlement has been created. While social and political ideals, such as building a free and egalitarian society in the new frontier (Worster, 1986), have supplemented the energies of the movement, their impact has been only marginally significant.

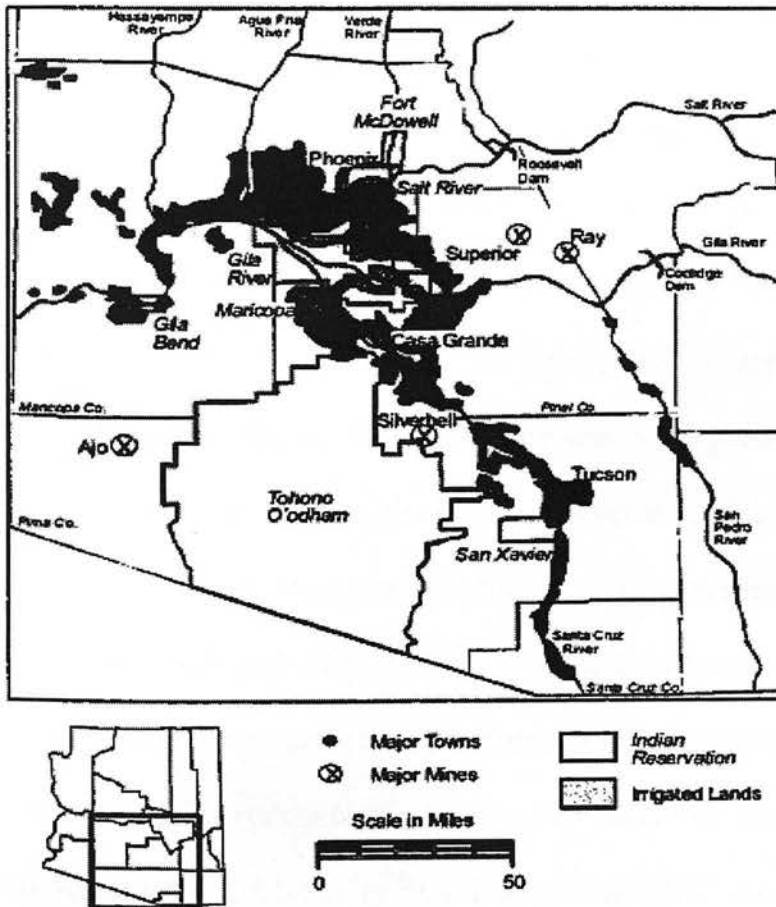


Fig. 7.5 Irrigated Areas and Major Settlements in South-Central Arizona

Jodha (2001)

The economic dimension of the American experience is a pivotal one. An understanding of the peculiar pattern of the rapid economic growth of the arid West can be found in the clear distinction between physical scarcity (that which arises from natural phenomenon largely beyond man's control and independent of his wants, desires and values) and economic scarcity (that which is determined by demand, cost or other decisions made by men) (Ortolano, 2000).

Overcoming the physical scarcity by technologically advanced techniques of environmental manipulation or relying heavily upon amenity resources and service economies raises the question of the role of external factors in a local economy. The economic growth of the arid western United States cannot be understood separately from its national context. Large water transfer schemes and infrastructure have been financed by Federal grants and subsidies. Locating military bases and defence industries in these regions has sparked a chain reaction of economic activities. Optimum utilisation of a year-round warm and arid environment in establishing a viable resort industry substantially reflects the increasing demand for such services by the whole nation in response to increases in the average per capita real income of Americans (Portnov, 2000b). Generally, the economic development and growth of the arid Southwest has drawn upon the assets of the humid regions of the nation through an overwhelming influx of population, capital, technology and advanced socio-cultural structures. These flows, combined with selective and adaptive investment allocation, have created a very successful regional economy. Furthermore, the flexibility and quick response of the free enterprise system to the often rapid changes of demand, costs and profit margins have allowed the build-up of a highly diversified economic base by continuously integrating more secondary, tertiary and high technology industries. This is clearly reflected in the gradual shift of the use of water resources from agriculture to industrial and urban uses (Langford-Smith, 1978; Parfect and Power, 1997). It seems

that only the Southwest, among all similar arid regions all over the world, has fully escaped the constraints of aridity and entered the phase of 'internally generated' economic development (Ortolano, 2000).

A comprehensive analysis of experience in the USA also reveals some negative aspects. The magnitude of economic and population growth has been tremendous, both in scale and the short-time span. Rapid growth, in combination with unadaptable concepts and traditions transferred from the humid and resource-rich Northeast and indiscriminately applied to an arid environment, have resulted in a pattern of development that is water and energy intensive and wasteful. This pattern has exerted substantial pressure on the scarce resources and the fragile desert ecosystem (Kneese, 1978). Certain types of water and land use have led to irreversible environmental damage. While a free market system and loose institutional and legislative structures have unleashed the positive forces of individual initiative that have eventually led to rapid development and growth, they, at the same time, have tolerated short term interests combined with lack of appreciation for the ecology of the region to formulate depletive and destructive patterns of resource use. As far back as 1963 Clawson was writing about signs of soil erosion, groundwater depletion, deforestation and urban pollution in the arid West.

Problems of resource exhaustion and environmental deterioration are currently stimulating many controversies related to the future of human settlements in arid lands of the U.S. The optimists argue that while the scarcity of water has been an important factor, it will never be a serious obstacle to future stability and growth. Astute economic and political management and new technologies could allow transfer of water supplies from ever greater distances at a reasonable cost and with new methods to overcome the adverse environmental impact. The southern California region, with nearly 10 percent of the nation's population, seems to have already transcended the limits of a resource-

based economy quite enough to overcome any future limits of water scarcity. The approach of economists can be typified as the hope that, once the ogre of water scarcity is solved by technology or by reallocating it to more productive uses, then the arid West can enjoy a continued rapid population growth and improved employment and income.

Assuming a similar growth rate of the nation will continue the 'filling-up' process for the next fifty years will probably bring the population density of the arid West close to the national average. A far different scenario projects a bleaker picture for these regions if the current wasteful patterns of resource use are sustained or if future growth continues at the current rate. A major repercussion in population dynamics in the arid west, in comparison to the rest of the nation, might be expected. Supporters of this view call for a better understanding of the characteristic limitations of arid lands and see the necessity of more research to provide guidance for their optimal use (Graham, 2000).

7.3.2 The Social Dimension

All over the world, old desert societies developed elaborate social, cultural and political patterns that were characteristically adaptive to desert environment. The westward movement has transferred to the arid Southwest socio-cultural and socio-political traditions and structures that originated and developed in the humid north-east. Such structures have been far from adaptive to the arid environment. Hodge (1963) referred to the calls of John Wesley Powell in 1878, when the region west of the 100th meridian was just beginning to be settled, to modify social and political institutions and farming policies prevalent in humid regions to be more adaptive to the arid ecosystem. Ortolano (2000) pointed out the high social costs that resulted from failure to adopt John Wesley Powell's plans for social organisation on the frontier.

Evolution of social and political institutions to more adaptive forms has been very slow. It has only responded when pressures due to accumulating conflicts were

finally recognised. However, an excellent example of the impact of aridity on social institutions is found in the 'water law' of the West. Under conditions of water scarcity, an 'appropriation system' rather than a 'riparian system' provides the most beneficial water use to both the individual user and the general public. However, this law, which was designed to insure the security of water rights in a predominantly agrarian society, is now perceived as an obstacle to the current shift of water use to more economically efficient use, i.e., from agriculture to urban and industrial development.

The development of desert settlements of the Southwest has taken place under affluent economic conditions that have made it possible to afford technologies which have often made inefficient use of water and energy resources. There has been little incentive for either individual or social cognisance of the realities of water scarcity. The impact of this phenomenon goes beyond the issue of natural resource abuse to the question of social equity.

Large scale, but heavily subsidised, water development and transfer schemes have created a persistent belief in technological solutions to problems of water scarcity. Modern technology has been seen as the panacea for water problems. However, to the extent that technology has eliminated local water shortages, it has also eliminated the 'should-be-emphasised value' of water and the rationality of its use in an arid ecosystem. This is readily apparent in the green landscape, the large areas of well-watered lawns, as well as in the high levels of water consumption in comparison to other regions. The general problem can be exemplified in the Santa Cruz region of Arizona, one in which current water use is exceeding the natural recharge of the aquifers that supply the area (Foster, 1982). Sustaining the current pattern of growth has been based on an extremely exaggerated demand. Whether the region continues to augment current supplies and call for additional new water supplies, or accepts demand and supply rationalisation, has become a controversial socio-political issue.

Current attitudes accept the proposition that water follows urban growth rather than the historical formula that settlement be close to water.⁴

In the near future, many communities of the arid Southwest must realistically face the inevitable balancing act between people and scarce water resources. If the current rate of growth is to be sustained, the accumulating pressure could induce radical changes in social and institutional structures. Lindsey (1986) states that the retreat of the federal government finance from dams and other water projects is leading environmentalists and others to press for a free market in water as a way to make more efficient use of this scarce resource.

It seems that only a shift to more adaptive social, institutional as well as physical structures could have a greatly effective role in solving the complex issue of adapting to aridity. Kelso, Martin and Mack (1973), Eckbo (1983) and Ortolano (2000) concluded that the problem and its solution are far more man-made problems of ownership, management and transfer of water than they are nature-made problems of scant and declining supplies.

7.3.3 Physical Characteristics

The settlement of the arid West introduced into the area life styles and traditions that originated and developed in the entirely different environment of the humid areas of America and northern and western Europe. Instead of adapting to the characteristic environmental constraints by formulating new physical forms, designs and building techniques, the settlers for the most part attempted to adapt the area to their imported traditions and practices (Parfect and Power, 1997).

USA's ample land resources, the agrarian origins of urban development and a strong preference of Americans for large residential lots have contributed much to a

⁴The spatial distribution of settlements in the state of Colorado, where most settlements lie in the resource-poor eastern side of the Rocky Mountain chain, reflects this fact.

sprawling pattern of urban development, with an emphasis on unattached, single-family housing. Separation of different land uses according to zones of use and the 'car culture' created the demand for direct access to the street for every house or building. Wide streets of a grid-iron pattern typically cut across the whole urban area. With a heavy dependency upon private transportation, a relatively high percentage of development devoted to streets and building lots tend to be large. This pattern of low-density development increases the total heat gain and maximises the thermal stress on the microenvironment.

Human settlements of the arid Southwest have grown to tremendous sizes. Los Angeles and recently Phoenix are good examples. Urban sprawl and low density development characterise the whole region. The characteristically high rates of crime, delinquency and other social problems, in comparison to other regions of the U.S., raises the question of the roles of the physical structure and environmental stress on social pathology (Heathcote, 1983).

The physical structure of cities of the arid Southwest is far from adaptive to desert environment. These cities are, in fact, 'environmental bubbles' or 'air-conditioned oases.' However, while their artificial manipulation of a stressful environment actually provides an attractive life pattern, it is extremely costly in terms of resources, especially water and energy⁵ (Eckbo, 1983).

7.3.4 Conclusion from the USA experience

The USA experience in desert settlement is a notable exception, in both scale and time, to the usual experience elsewhere in the world. However, like the Egyptian experience, it has been characterised by the lack of a comprehensive and deep understanding of desert environment as a human habitat. The two experiences have

⁵ Per capita water consumption in the Tuscon area averages 200 gallons per day, well over the 1970 average of 166 gallons per day (Finkler, 1983).

been captive to concepts and traditions that originated and were transferred from entirely different environments.

Anyone viewing the USA experience for Egyptian use should be extremely cautious, given the differences in the environmental, socio-cultural and socio-political contexts of the two situations. The development of the American Southwest benefited greatly from the resources that a rich economy was able to transfer to the region. Such transfers are not possible in Egypt.

The USA experience illustrates the critical role of individual initiative and incentive in providing versatile energies and innovative approaches, in direct contrast to governmentally controlled enterprises with restricted access to the private sector. It also suggests that the institutional decentralisation and the diffusion of political power, which is more oriented to local entities,⁶ have been positive factors in the development process. However, at the same time it illustrates how loose institutional structure, and the lack of strong regulatory controls, can lead to the long-term deterioration of the desert ecosystem. Explicitly, it shows that this type of ecosystem has certain constraints or limits to growth that must be adequately addressed in the planning process.

Social structures as well as the physical structures of settlements have not provided any significant lessons for desert environment management. Unadaptive patterns have been artificially sustained by tremendous flows of subsidies and other externalities. The social cost has been ultimately absorbed by the national economy as a whole.

Following the USA model in physical planning in Egypt could produce drastic negative results. The USA experience tends to confirm the fact that desert settlement is a multifaceted phenomenon. It can only be researched and subsequently planned within

⁶ Socio-political structure of the Southwest has exhibited, deviating from the American political tradition of "locally oriented" political systems, a slight tendency to stronger connections with, and dependency upon the Federal government. However, in comparison to the Egyptian experience, it still represents an exaggerated model of political power diffusion and decentralisation.

a multidimensional framework which incorporates the various physical, social, economical and political aspects.

7.4 The Israeli Experience

7.4.1 The Geopolitical Dimension

The Israeli experience in desert settlement is also a very unique one. Its uniqueness stems from the fact that it has been synchronised with the establishment of the state (Golany, 1979; Fialkoff, 1992). While the American experience has been dominated by socio-economic considerations and the Egyptian by national economic motivations, the Israeli one has been motivated by pure politics.

Given the political and military conflict in the Middle East, establishing desert settlements in the southern region of the Negev desert was motivated by a predominantly political decision to disperse the largest possible population in the largest possible area in the shortest possible time in order to establish de facto territorial rights. The pattern, size, form and regional setting of these militarised settlements have been eminently influenced by these geopolitical and military considerations, especially in the early years of settlement.

The Israeli experience is a clear example of the positive interactions between national policies and arid zone development schemes. Geopolitical motivations induced a comprehensive national commitment. The movement became a national mission. Commitment at all levels was enhanced by ideological, spiritual and moral motivations that gave the movement its impetus. Establishment of desert settlements was tied to the national stability, security and even survival. The settlement process was given first priority. A rational and systematic decision-making process was established which made use of all available knowledge and innovative technological trends.

The policies of population dispersal (PPD) aimed at redirecting population growth from overpopulated core regions to underdeveloped peripheral areas. The main objective of this policy in Israel (settling the under-populated areas of Israel through population dispersal) was announced in 1949 in response to the predominant concentration of the country's population in a few metropolitan areas.

To achieve this goal, directing new immigrants were directed to primarily sustained population growth of the country's periphery in the 1950s- 1960s so called 'priority development zones'. Geographically, the spatial frontiers of these zones loosely coincide with two peripheral districts of the country – the northern and southern district.

Political pressure combined with short-term schemes led in many cases to improvisation. Over-enthusiasm sometimes led to over-estimation of resources and of the production capability of the land. Vulnerability to different, sometimes contradicting, political points of view and practices and the absence of a centralised body empowered to manage the whole process induced many difficulties. However, many useful lessons emerged from the trial-and-error approach. Objective and scientific handling of the information and data derived from the experience in every case has caused the process to evolve in more successful and matured patterns.

7.4.2 The Economic Dimension

The dominance of the political dimension over the whole Israeli experience is seen in the fact that economic development was never an objective per se in the early phases. The driving motivation was to occupy the land, literally, to plant communities across the whole territory.

As in all contemporary desert development schemes, the flow of external subsidies played a substantial role. Walton (1969) estimated that for each new family

settled, \$15,000 was available from World Jewry and from grants-in-aid from the U.S. and the German government. However, it should be noted that a significant portion of this capital has been designated for research related to the desert environment, its potentials and problems.

Since the early 1970s, the aforementioned approach of immigrant location was gradually replaced by various economic incentives. These incentives are of four basic types:

- Planning and development,
- Financial incentives to private investors,
- Allocation of public land, and
- Housing and location aid.

The settlements of the early phase were characterised by a strong agricultural orientation (Golany, 1979). Both the anti-urban Zionist ideology and the attitudes and expectations of the immigrants worked to promote a rural pattern even in the face of difficult environmental constraints. Exactly as in the Egyptian experience, the expectations for agricultural output were unrealistically high. However, this trend has been adjusted toward more balanced regional structures of both rural and urban industrial settlements.

Due to spatial dispersion and other socio-political considerations, the concept of self-sufficiency has been adopted for the small and scattered agrarian settlements. The kibbutzim and moshavim are the result of the direct applications of such concepts. The use of short-term plans, improvisation, innovative techniques that were monitored, flexibility, and regional management, have provided correction mechanisms. An accumulated knowledge of the desert ecosystem has also enabled them to respond positively and has allowed for proper management of small scale economies (Pearlmutter and Meir, 1997).

The government, quite similar to the Egyptian case, has played the major role in developing policies and strategies. However, flexible institutional arrangements and political mechanisms at the self-contained local level have helped in mitigating the negative aspects of controlled economies. Sadan and Pohoryles (1979) say, in reference to the institutional framework of agricultural settlements that overall centrally set quotas and price-supporting arrangements were applied at the local level through a mixture of formal and informal institutions. This helped to maintain a degree of democratic and local involvement in political decision-making.

While the desert settlement movement suffered sometimes from the contest with other regions for a priority position in the state, there has always been a strong governmental commitment. A governmental policy in 1963 gave the Negev desert the highest precedence for investment in industry, housing, public institutions, education and municipal services. However, full institutionalisation of the movement diminished, to some extent, the positive implications of unrestricted free enterprise. Golany (1979) observed that while policy and strategy made developmental processes thus enjoy the advantages of legislative control, they also endure the disadvantages of having no competition from other institutionalised programs.

The economies of the small desert settlements in Israel have been singular in the manner in which they integrated the function of research and development within the economic process. Improvising and developing new agricultural techniques and technologies adaptive to the desert ecosystem, such as drip-irrigation and controlled environment agriculture, has provided strong feedback (McClusky *et al*, 1998). They also provided useful lessons for desert economy in general concerning the type and pattern of production such as off-season products and high-valued products that capitalise on the specific climatic conditions of the desert.

7.4.3 The Social Dimension

The social, socio-political and socio-cultural dimensions have been distinctive factors in the Israeli experience. The movement has greatly benefited from the visionary and ideological motivations of settlers. Successful social mobilisation efforts capitalised on their spiritual enthusiasm and pioneering mode. The celebrated value of land has been put to use effectively in overcoming the primary difficulties of initiating and stabilising new communities in the barren and harsh environment. Strengthening the historical and cultural ties with the land has not only facilitated immediate settlement policies, it has also helped immensely in overcoming the problems of socio-cultural heterogeneity in the new settlements.

The Israeli experience has introduced new forms of social institutions to desert settlement experience. Social structures of the kibbutz and moshav represent a useful case study. While their forms primarily reflected pure ideological affiliations to socialist and communist models, their continuity raises the question of the compatibility of specific social forms and patterns to the environmental context of desert. Small size, spatial dispersion, self-containment, intensive social organisation and communal socio-economic and socio-political structures have been the general characteristics of these types of settlements.

Size has been an important consideration in the Israeli experience with an emphasis on small rural settlements and 'neighbourhood unit' towns that prevailed in early phases. While this could be attributed to policies oriented to maximum population dispersion and scarcity of local water resources, limited size promoted the objectives of maintaining social stability, control and the highest degree of organisation and co-operation.

In spite of the fact that settlement planning has been comprehensive with its focus on some diverse social services in the early and intermediate phases, there has been a

lack of sophisticated knowledge concerning social implications and needs of an isolated desert habitat. However, many trials within the most recent phase have been deliberately oriented to address these problems. Portnov (1999) saw evidence of the current trend in the adaptive physical structures of the recently established settlements.

7.4.4 Physical Characteristics

The physical structure of settlements has always been a direct reflection of the prevailing socio-political and socio-cultural attitudes. Three distinctive, but overlapping, phases can be identified in the Israeli experience: the first reflected the romantic ideas of immigrants coming from a humid environment (Rahamimoff, 1981). Their 'garden cities' and rural townships were entirely inappropriate to the hot dry climate, to the economic constraints under which they were operated, and even to the pressing social needs. Saini (1973) characterises the first phase as following the classic pattern of a series of neighbourhood units, each with its own ring-road, development roads, access roads and green open spaces. Here, the residential buildings were made up of one-storey dwellings with green areas stretching from the residential zones to civic and commercial centres. As the density was extremely low, development costs were equally high.

A classic instance of unadaptive physical patterns, and one which is often cited in the literature of desert planning, is the new town development in the northern sector of Beer Sheva, where the planners failed to foresee the adverse consequences of applying principles that were appropriate for places with abundant rainfall and moderate climatic conditions, but not for a desert environment.

In the second phase of development, there has been a more mature understanding of desert environment and its relevant requisites for the physical structure. Designs have become more compact and of higher densities. Much more of the urban space is

usefully employed and protected. However, the concept of small neighbourhood unit town with limited social services has continued.

The third phase is displaying very promising approaches of highly adaptable physical forms. It expresses the results of extensive research in the physical and social requirements of a human habitat in desert environment. Addressing the need for ample urban and social services and viable central cores has been a major characteristic (Portnov, 1998b).

7.4.5 The Regional Setting

While numerous studies (Drabkin-Darin, 1957; Gradus and Krakover, 1977, Shefer, 1990; Lipshitz, 1996) were carried out to trace the changes in the population balance between Israel's core and peripheral districts, the spatial dispersion of settlements is another unique aspect of the Israeli experience. Geopolitical and military considerations together have created a peculiar regional character of sparseness. Golany (1979) observes that the pattern of Israeli settlements did not follow existing transportation networks but penetrated into 'virgin' wilderness areas. Such movements set out to establish political 'facts', "defence lines which would guarantee territorial rights to the region in the future". To him, the strategy proved most effective when, after the state was established, military conflicts, followed by lengthy political conflict took place.

However, this strategy has indirectly served long-term social goals of an even and balanced distribution of population in the country as well. It contributed to the creation of a network of very small centres that serve as the long-term social bases and nuclei in a balanced regional structure. Isolation has indirectly contributed to positive improvisation, pioneering experimentation and has accelerated the development of local resources.

Dispersion exerted a negative impact in the early phases. Self-sufficient rural settlements could not develop viable organic relations with urban settlements. A pattern of regional divergence between them was created. The need for non-agricultural settlements and sub-regions has become evident. Recently, the problem of the balance between rural and urban settlements and their weak regional links has been recognised and considered. Efforts also have been made to establish strong regional connections between the Negev region and the rest of the country.

The rates of population growth in various geographic areas of Israel are represented in (Fig. 7.6), while the changes of population size of the core and periphery over the past five decades (1948-95) are illustrated in (Fig. 7. 7).

As (Fig. 7.6) shows, since the founding of Israel in 1948, the highest rates of population growth have predominantly occurred in the country's periphery. In particular, the southern sub-districts of the country (Be'er Sheva and Ashqelon) continuously exhibited some of the highest rates of annual population increase. Thus, in the wake of the 1990-91 mass immigration from the former Soviet Union, the population of Ashqelon sub-district grew each year by 8-10 per cent, three times as fast as that of the country as a whole. High rates of population increase were also observed in other peripheral sub-districts. At the same time, annual growth in most of the areas of the country's core was somewhat less substantial. In the Tel Aviv district, for instance, the population grew by less than two per cent in 1970-75, and less than one per cent in 1990-97. But this doesn't indicate that the spatial distribution of the country's population gradually became more even.

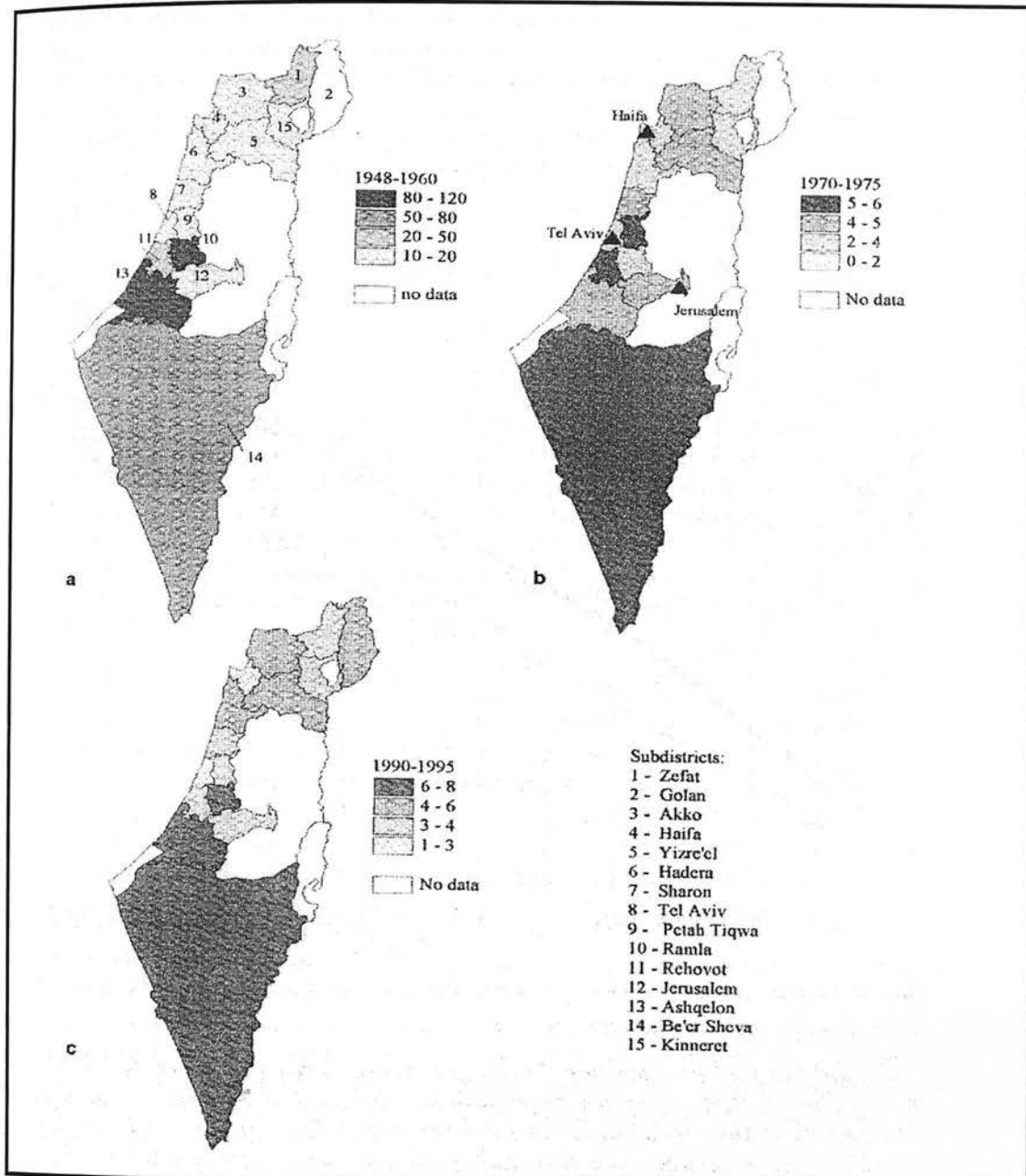


Fig 7.6 Average annual rates of population growth by sub-district of Israel in 1948-1995 (Portnov and Erll , 1998a)

As (Fig. 7.7) shows, until 1990-95, the gap in population size between core and peripheral areas of the country tended to increase. This gap was equal to 170,000 residents in 1948, and then increased to 400,000 in 1960, to 500,000 in 1980 and to 700,000 in 1990. Between 1990 and 1995, this gap, however, decreased to 600,000

residents. This decrease was primarily attributed to the recent patterns where housing is more available and affordable (Lipshitz, 1996; Portnov and Pearlmuter, 1997).

In general, between 1948 and 1995, the population of the core grew by some 2.5 million residents, while that of the periphery increased by only 2.0 million people as shown in (Fig. 7.7).

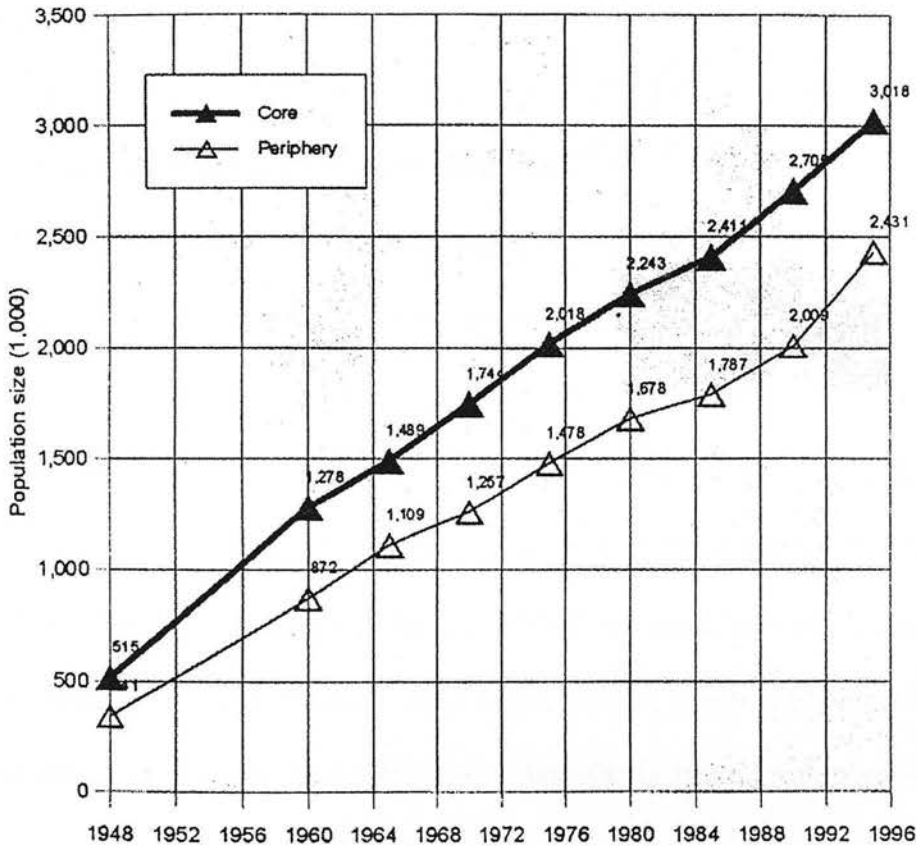


Fig. 7.7 Changes in the population size of core and peripheral

Areas in Israel in 1948-1995 (Portnov and Erll, 1998b)

This trend thus clearly contradicts the main objectives of PPD which was intended from its outset to restrict overpopulation of the core, by redirecting future growth of the periphery.

Although the gap in the population size between the centre and periphery of the country tends to increase, the policy of population dispersal (PPD), and specifically, the

involvement of the government in construction in development areas, appears to prevent a further increase of the gap.

According to an alternative scenario analysed, this gap would reach 1.0 million people in Israel by 1996, while in reality it was 600,000 residents. This shows that spatial public policy can in fact aid in redistributing population, thus easing the severity of the core-periphery imbalance, and thus result in more sustainable regional development.

7.4.6 Conclusion from the Israeli experience

Although the scale of the Israeli experience is relatively small in comparison to that of other nations, it provides a broad range of useful lessons. It provides an example of the role of national commitment in desert development. The critical role of ideological and spiritual motivations indicates the importance of providing a functional integration of the socio-cultural factors in any desert planning process. The success of untraditional social institutions, though related to local circumstances, raises the question of which pattern of social organization is more adaptive to desert environment. The success of small-scale, self-sufficient settlements in Israel introduces an innovative, social and economic model for desert planning elsewhere.

The Israeli experience has demonstrated that understanding the ecology of the new frontier through research and experimentation is an essential factor. New directions have thus been set for desert economies that are different from other ecological zones. The pattern of spatial dispersion, though due to geopolitical forces rather than rational social and economic planning, provided an important case study.

The Israeli experience, in general, did not escape the flaws that have characterised other contemporary experiences, those of using alien planning concepts of different environmental context, and lack of comprehensive knowledge of ecological interactions

within a human habitat in desert. However, it was most unique in the capability to adjust, modify and make corrections in response to both lessons learned from experience and from formal research done in a relatively short time.

The Israeli experience, as well as the Egyptian and American experiences, tends to confirm the fact that interactions between different environmental, social, cultural, economical and political factors induce great impact, both positive and negative, on the process of desert development and its rationale.

PART THREE

Case Study

CHAPTER EIGHT

Research Techniques

Chapter 8: Research Techniques

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Research Techniques

8.1 Introduction

Validity and reliability of a data-gathering instrument are essential criteria to any research. Identifying an instrument that can best measure the research variables is one of the most difficult tasks facing a researcher in social sciences (Coolican, 1994).

Various techniques can be employed to identify any population change. On the one hand is the use of official statistics; on the other, local case studies. In this thesis, in which North Sinai, Egypt is used as a case study, official sources include the Census of Population used in Egypt by CAPMAS (the Central Agency for Public Mobilisation and Statistics) (1986, 1996). However, because all processes affecting population operate in all areas, at all times (Grafton, 1982; Lewis, 1990; Livi-Bacci, 2001), official sources highlight only the most prominent process evident in the spatial unit at that time.

“The closing stages of the decade are not the most satisfactory time for a description and analysis of the latest trends in the spatial distribution of population!” (Champion, 1989, p.114).

Case studies normally involve questionnaire surveys. Such techniques are clearly restricted in their spatial coverage, but have proved particularly successful in determining the finer details of the migration component of population change, being able to investigate the reasons and motivations for moving, characteristics of persons involved and similar matters.

Official statistics, by the very nature of their compilation, are useful in identifying general trends and provide a limited amount of information at the macro-scale. Case studies, in contrast, examine changes at the micro-scale and place greater emphasis on

the acquisition of detailed information. Both groups of data have a place within research of this type, and several studies have benefited from combining the two. This is recognised by Champion (1981), although he has since relied on official sources (1988):

“...in the end there is no real substitute for detailed case study and special household survey. Without such research, theory and speculation may abound, but in practical terms it is just a matter of waiting to see what happens next” (p.23).

Without micro-scale information pertaining to more relevant points than official sources could ever provide it is only possible to hypothesise as to the underlying causes, characteristics and consequences of these general trends. To validate mere speculation a detailed survey involving a questionnaire can fulfil the role of eliciting just such a level of information from individuals or groups, so that the (in this case) repopulation process may be more accurately understood and assessed.

8.2 The Nature of the Survey:

8.2.1 Survey questions

As in other Egyptian desert regions, the Province of North Sinai has generally recorded low population growth, with a few areas experiencing only marginal change (CAPMAS, 1996). Nonetheless, a redistribution of persons has occurred, initially from the north-eastern core (El-Arish), more recently accompanied by sub-regional urban expansion and population growth in many essentially desert environments.

Although financial and time constraints affect many surveys, these can be offset by focusing the survey questions most effectively into the concerns of the study. Any survey is governed by the general aims of the research project, and, following the central theme of this thesis (see Chapter 1) the survey addresses several key questions:

- What processes sustain population growth within desert settlements in North Sinai and how do they vary between different desert environments?

- Are the socio-economic characteristics similar for each process or do they possess selective features associated with migration processes generally?
- What is the social impact of these processes on local Bedouin communities, and should any in particular be encouraged?
- What is local opinion towards such changes?
- What are the main differences in attitudes between the local inhabitants (Bedouins) and the new comers from the Nile Valley & other provinces?
- How can we motivate people from Nile Valley to inhabit desert settlements?

8.2.2 Nature and Distribution of Survey Samples

Ample evidence, as presented in this thesis, suggests that different growth processes operate in different locations with different rates. This anticipates several varying causes and consequences across North Sinai, and requires some form of comparative analysis. The danger in researching a number of areas is similar to that relating to official data sources: detail is lost in the study of a wider area. It is therefore intended to incorporate a minimum number of study locations to fulfil the spatial aims of the research without detracting from the detail sought. This thesis looks at five study areas incorporating 50 households in each, thus providing a degree of geographical variety.

Previous chapters came to view migration as the primary component of population change and redistribution. While no direct association between migration and desert population growth has yet been obtained at the micro-level, other studies suggest that it is the major agent of change (Lewis, 1990; Portnov, 1998a). Also, although population change is usually examined in terms of individuals, household changes are perhaps more pertinent to the study (Lewis, 1990), as rural repopulation is largely associated with family moves (Jones, 1990), for such a major change of

residence is unlikely to be an individual decision. Fielding (1982) further queries whether migration, as a consequence of larger social pressures, should be seen as an individual's decision, pointing out that migrants exercise their decision to move within a number of socio-economical limits. This is supported by those who link rural population growth to changing perceptions of urban and rural areas (Champion, 1989).

Consolidating these insights, this thesis accepts that there will always be several possible locations from which the 'migrant' can choose, with the final decision more often than not resting with the individual and the household. Thus a household survey is used to explore the general migration patterns, offering the additional advantage of collecting more information on more individuals without incurring extra expense.

8.2.3 Definition of Migration

As a number of factors play a role in evolving population trends, it is important not to overlook any possibility. Each factor involves an aspect of mobility, usually associated with migration defined as the change of residence from one community or geographical unit to another (Devis and Southworth, 1984; Jones, 1990). By this definition, however, an assessment of population change risks overemphasising migration and immigration and thus overlooking the potentially important determinant of movement within the immediate locality, which effectively reduces emigration. Kant's (1962) detailed classification of different types of migration equally excluded more local moves. In contrast, Poot (1996) draws an important distinction between migration and 'residential mobility', defining the latter as a change in residence within the same community. It is appropriate within the context of the present research to be able to measure a broader concept of movement classifiable as movement 'within' (mobility) or 'between' (migration) administrative electoral wards.

Furthermore, while previous studies focus on the immediately preceding move of

any individual, they largely ignore the larger pattern of mobility that can culminate in desert residence. As yet, no research indicates whether moving to a desert involves a series of progressive moves or is associated with a highly mobile population which, given its past record, is likely to move again. As stimuli which may provoke second or third moves include employment opportunities, network expansion and residential development, stepped movement can thus be primarily associated with the urban-rural (as opposed to internal) component of desert repopulation. Although some research refers to such a stepped element only in passing, it forms the basis of Ravenstein's (1885) second 'law' of migration,

"The inhabitants of the country immediately surrounding a town of rapid growth, flock into it; the gaps thus left in the rural population are filled up by migrants from more remoter districts, until the attractive force of one of our rapidly growing cities makes its influence felt, step by step, to the most remote corner of the State" (p.198).

Aware that relocation can involve several stages, this study incorporates different types of residential movement and the residential history, over ten years, of those who are surveyed. Particular emphasis is also placed on family decisions to move from their previous address, why they have chosen to live in their present area, and what characteristics were important in their decision to move to it. Thus, it is recognised that a move to a new home is not necessarily the straightforward process which it has perhaps been considered to be. To fulfil the wider aim of the research, an identification of the biographical and community impacts behind repopulation patterns, the survey was not restricted to those who moved to their present address in a pre-defined time period. Instead, the questionnaire considered households irrespective of their duration of residence.

8.2.4 Summary

The survey therefore aims to make a field-based contribution to understanding recent population changes affecting desert areas in order to check the explanations and characteristics of phenomena shown in official sources. The intention is also to provide hard evidence of the processes of change affecting a variety of desert locations, rather than the more common study of one particular area.

8.3 Selection of the Study Areas

Official data sources indicate that desert repopulation is spatially selective; with different processes characterising different geographical locations. It is therefore imperative to apply the research to different locations. Rather than duplicating work that pertains to one area, the investigation of a variety of locations would represent a genuine step forward of studies within North Sinai, where limited case studies are the norm. Nonetheless, as in all case studies, the results are seen only to pertain to the particular areas included. Through the identification of processes, their causes and consequences in one particular type of environment in one location, it is not intended to imply that identical processes operate in similar environments elsewhere in the region, as desert population change is complex in nature, with different factors operating to varying degrees in response to local conditions.

In order to facilitate sampling procedures (section 8.6) the study areas selected were restricted to settlements which had recorded a notable (but not the greatest) population growth during the period 1986-96. Attention was then turned towards incorporating a variety of desert environments from a variety of geographical locations. In North Sinai, there is a lack of understanding of how processes interact in different geographical locations. This research, therefore, intends to examine the processes operating in a variety of loosely defined desert environments; from the more urban-

influenced suburban settlements to the remoter peripheral localities and covering those small towns and villages between these two extremes.

Optimisation between resources of time available and the need for the research to look at a variety of settlements which would enrich it with feedback from locations that experience several different environment constraints meant that five settlements was the maximum number that the author could investigate.

A preliminary examination was undertaken of settlements, looking for settlements that demonstrated the following characteristics:

- Those recording different growth rates during the specified period to determine at first-hand the variability within desert areas;
- Those old and deeply-rooted Bedouin desert settlements which represent demographic, socio-economic and cultural characteristics of North Sinai desert communities.
- Small settlements and communities not in urban areas, because this is the suggested pattern for new agricultural settlements in order to achieve greater distribution and exploitation of the desert area resources.

Following this the five study areas were finally selected. While the criteria for selection were based on a variety of locations and desert environments, this at first appeared to lend itself towards stratified sampling techniques. The choice of a stratification factor could have been based on:

- Lack of even distribution between categories; and
- Settlement size as a possible stratification factor.

Both of these proved problematic, as only one settlement represented the most urban category and no significant difference was recorded between settlement size and population growth. Furthermore, in relation to both possibilities, inadequate sources of

data rendered them unsuitable for specific selection procedures. Instead, as one evident feature of repopulation is its recurrence in all corners of the region, selection was finally based on location. Again, stratified sampling techniques could have been employed, but it did not prove possible to produce a wholly convincing locational division. The one significant requirement of this selection was to fulfil the aims of this research, *viz.* to identify a range of dispersed study areas (Figure 8.1) incorporating a variety of desert environments (Table 8.1).

Settlement	D.C.A.	% Growth 1986-96	(No. H'holds 1996)	Location
Rabaa	Romana	2.9	486	Near the North Coast & on the main road
El-Hasana	El-Hasana	0.5	375	Central location For the province
El-Salam	El-Arish	4.9	232	Adjacent to El-Arish City (the Capital)
El-Shoahit	Bir El-Abd	1.9	78	South-western Side of Bir El-Abd
El-Matala	Rafah	4.7	784	On the eastern boundaries of Egypt

Table 8.1 General characteristics of each study area

The settlements demonstrate variety along the following factors, with a particular emphasis on *size, location* and *background*:

- *El-Salam village*; is close to the main urban centre (the capital of the province),
- *El-Shoahit village*; is remote and small settlement,
- *Rabaa village*; is located close to coastal urban environment and at the same time on the main north axis road,
- *El-Hasana*; is remote but on the central axis of the province,

- *El-Matala village*; close to Egyptian eastern border and in contact with an urban centre (Rafah).

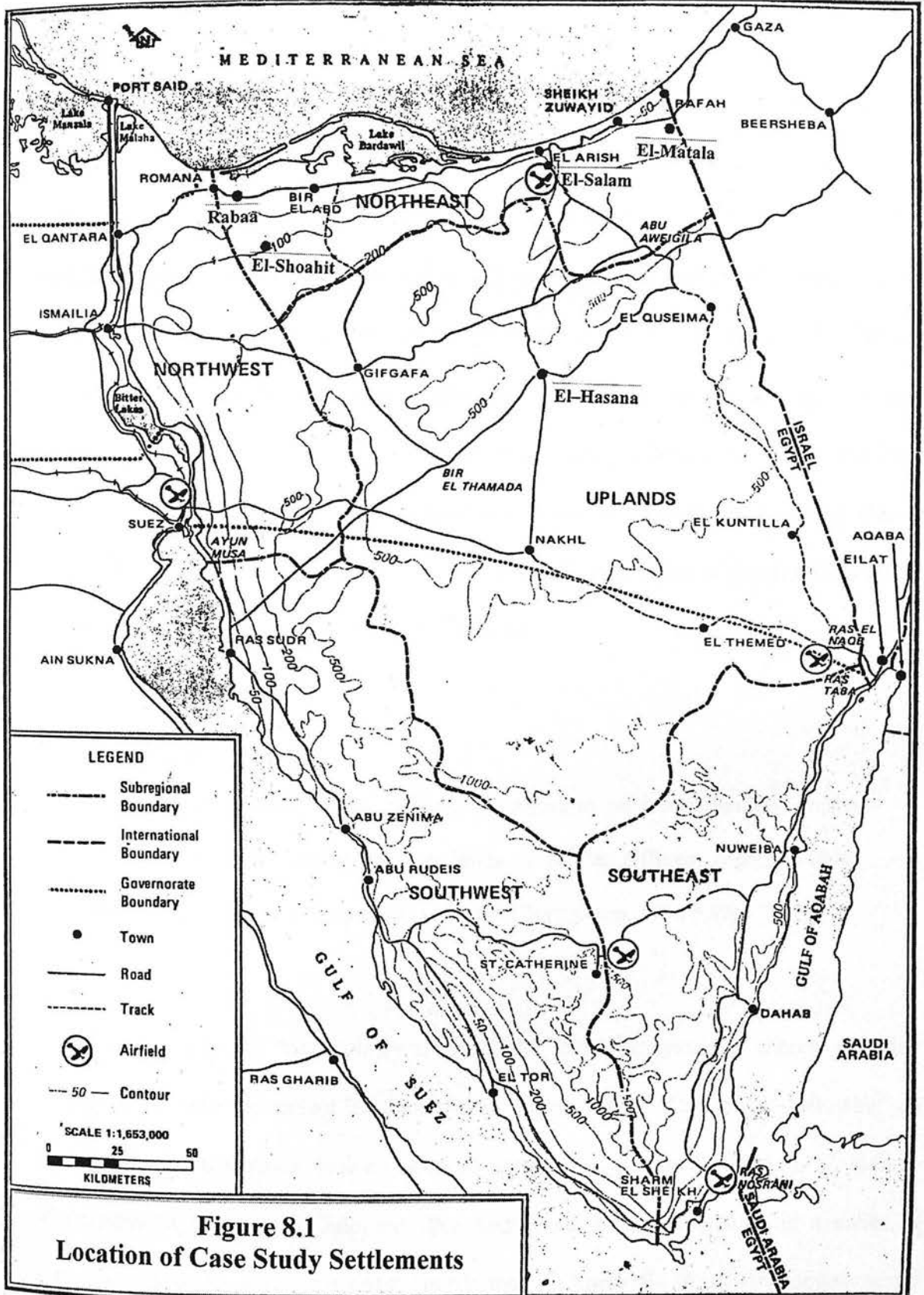


Figure 8.1
Location of Case Study Settlements

Source: Construction Agency of Sinai (2001)

The inclusion of several of the above settlements for analysis needs to be defended. Many studies, for example, omit coastal locations, arguing that they are disproportionately affected by retirement migration and attracting unusually large numbers of unemployed persons, while others omit areas within commuting distance of large employment centres which, they argue, are influenced by 'regionally specific factors' (Hegazy, 2000a). While the present researcher appreciates that the first certainly applies to the premier holiday locations including the resorts of El-Arish, such criticism cannot be directed towards the settlement of Romana and its traditional villages, which, despite possessing ample natural amenities (section 8.3.2), has remained relatively undeveloped as regards its economic potential. More importantly, omitting a coastal location, or indeed a settlement close to urban centres (El-Salam village), would have excluded important locations of supposed repopulation. Bearing in mind the aim of determining how growth processes vary between different types of desert environment, the inclusion of these areas is central to the thesis.

8.4 The Questionnaire

"In reality questioning people is more like trying to catch a particularly elusive fish, by hopefully casting different kinds of bait at different depths, without knowing what goes on beneath the surface!" (Oppenheim, 1966 p.49).

In this study the "particularly elusive fish" is the processes of change affecting population growth of desert settlements in North Sinai. Generally, following an assessment of the various options open to survey design (section 8.4.1), an author-administered approach was adopted. The household survey, focusing on a series of questions listed on a pre-designed questionnaire (Appendix A), incorporated seven principal sections:

- Section A:** Basic household profile;
- Section B:** Residential Information;
- Section C:** Residential mobility;
- Section D:** Social interaction and attitudes towards population growth;
- Section E:** Settlement Characteristics;
- Section F:** Future mobility intentions;
- Section G:** Planning regulations;

Given the general objectives of this thesis, it was important to place particular emphasis on the respondents' residential histories. For this reason, and deploying several techniques, the questionnaire was structured in such a way as to take the respondent through his/her residential history, their motivations for moving and considerations involved at each stage of the relocation process. Attention was also directed towards their residential preferences, their future plans to move, and to relate individual involvement in the community with their attitudes towards 'newcomers'. Finally, their knowledge and attitudes towards local planning policies were asked for in order to determine to what extent such policies met the needs of the general public. Particular questions were therefore not appropriate for all respondents.

Several sections of the questionnaire were to be answered only by 'newcomers', defined as those having lived at their *present* address no more than ten years. Others were directed to the 'local population', defined as those residing at their *present* address in excess of ten years and assumed not to be party to any recent repopulation process.

Despite, the popularity of questionnaires as a means of data acquisition, their use is problematic and, as the only data source suitable for this study, required careful organisation. Decisions needed to be made regarding both its design and also its

background sampling procedure. The remarks of Oppenheim (1966), Feldman (1981), and Coolican (1994) on this form of data acquisition were highly relevant to the researcher. Rather than repeating their comments here, the author aims to apply them to the major decisions taken during the planning phase of this particular research.

8.4.1 Questionnaire Design

Under this general heading fall three specific considerations: administration, questioning techniques and key terminology, as discussed in greater detail below:

- ***Administration***

How to administer the questionnaire is probably the first decision any researcher has to contend with. A postal approach places the onus on the respondent to complete the relevant sections; alternatively an interviewer or team of interviewers can be used to administer the questionnaire. This decision depends fully on the merits and demerits of each approach in relation to the objectives of the particular study. Within the present context each had attractive characteristics.

The postal approach allows the researcher to obtain a sample which greatly exceeds any that one could hope to reach through direct interviews. It is also relatively less expensive, both financially and in terms of the time involved. Although attractive in these terms, postal questionnaires do present limitations. The most damaging one relates to their associated low response rate, and this is more likely in a case study which deals with the different norms and traditions of Bedouins environment although such a problem could be relatively minimised by including a stamped-addressed envelope and a covering letter explaining the purpose of the survey, how the respondent came to be chosen and assuring anonymity. Follow-up letters may be despatched but, even then, one can never expect to receive replies that even approach the number originally

contacted. Of those that are returned, especially after a follow-up letter, it is unlikely that the questionnaire received notable care and consideration from prospective respondents. At this point a second group of problems emerges, as the researcher now has no way of knowing:

- Who completed it. Questions directed to the “head of the household” may have been answered by his wife or son; and
- In which order the questions were completed. It can reasonably be assumed that some respondents initially read through the full questionnaire and answered early questions in response to what he/she thought about later ones.

Similarly, the researcher loses the spontaneity of answers and, in the absence of observational data, has no means of clarifying the information received. Moreover, without the researcher’s ability to probe, valuable details may be lost.

A third group of problems related to this approach concerns the design of the questionnaire itself. Simplicity is essential in terms of layout and wording while if it appears to be long, the response rate will almost certainly suffer.

In the light of these problems, many researchers almost automatically favour an interview situation. This ensures greater control over who answers the questions, in what order they are asked and also presents opportunities to probe where appropriate. Equally important, it is more difficult (yet not impossible) for a would-be respondent to refuse someone at their door than to throw out what seems to be ‘junk-mail’. In addition, the purpose of the survey to be explained at the outset of an interview, and at length if need be, and queries about the selection procedure can be answered. It is also easier to assure confidentiality personally than through a letter, a factor described by Oppenheim (1966: 37) as “crucial in obtaining frank and revealing responses”.

Interview techniques, however, introduce a range of associated problems, response errors and interviewer bias being the most notable. While the effect of the

former is believed to be small (Moser and Kalton, 1979), interviewer bias presents a greater difficulty. The interviewer may unconsciously communicate opinions to the interviewees and thereby influence the reply. To minimise this in personally administered questionnaires it is important to ask each question exactly as it is worded.

With regard to the present study in desert environment it was decided to adopt an administered approach for the following reasons:

- The relatively low response of the postal approach. despite losing potential advantages in terms of sample size, time, the elimination of interviewer bias etc.;
- The need to have greater control over questioning, acquire spontaneous answers, the ability to probe and supplement information obtained through observational data, were considered appropriate to this research; and
- An interview situation also allowed more detailed questions and of a greater number to be asked than would have been possible under indirect circumstances.

To minimise interviewer bias it was also decided that the researcher should administer all questionnaires so that any positive bias, although not removed, would at least be consistent.

• *Questioning Techniques*

Two key decisions needed to be made regarding structure of the questionnaire to be employed: whether to use a fixed questionnaire in each interview or structure each interview according to its specific circumstances; and to what extent indirect questioning techniques, which probe deeper into the individual mind, should be used.

The choice of whether or not to use a standard questionnaire format is dependent on the nature of the study. In relation to the present research, certain questions, such as those referring to basic household and personal information, were standardised and asked of all respondents. For questions about community involvement and attitudes,

respondents were sub-divided into 'new households' and 'local households', depending on their duration of residence, and asked similar, but differently worded questions.

Direct questioning techniques represent the most common tool used to elicit information, but indirect methods (Coolican, 1994) are potentially important and are most relevant in studies that seek to penetrate deeper or to uncover information that the respondent, for various reasons, may not wish to divulge. The present research, however, could not be described as touching on such issues. Using indirect or projective methods, despite their inherent structural and interpretative difficulties, would also have confused many respondents. An essential requirement for a successful interview is that the respondent can relate each question to the general objectives of the survey as a whole. Indirect methods covering a diverse sample would eliminate this for, as Oppenheim (1966) admits, such methods rely the respondent not knowing their purpose.

A variety of question structures were included without distracting from the logical sequence of the questionnaire. The majority incorporated:

- (1) The funnel approach, with a broad question introducing the subject and subsequent questions progressively narrowing the topic to particular details;
- (2) Open and closed questions. These were normally employed together (for example see question C8). The first part was of a closed nature with the respondent asked to answer YES/NO. Subsequent parts were open-ended to allow the respondent to answer in his/her own words. Notwithstanding the coding difficulties associated with open-ended responses, it was appropriate at this stage to obtain as much detail as possible initially rather than impose a list of pre-determined categories into which the responses could be fitted subsequently.
- (3) The third main type of questions involved some different inhabitants' background (Nile delta, upper Egypt, Suez Canal region, desert Bedouins etc.). As the distinctions are not always logical, nor indeed consistent, it was decided to use the

term 'newcomer', with respondents being asked to comment at various levels about the movement of people into their area. Thus, in question F4, the respondent was presented with a number of 'newcomer types' and asked to comment on how welcome they believed each would be in their locality.

- ***Defining key terms***

An important aspect of any survey is to define exactly who is being interviewed and any part of the schedule open to misinterpretation. In this study only two such definitions were required:

The Respondent. Where possible, the intention was to obtain information concerning each individual within the household, with the majority of questions answered solely by the main respondent, originally seen as the 'head of the household'. As severe difficulties in defining such a person or finding them at home arose, in practice the main respondent was generally any adult (over the age of 18) who was willing to participate. On a handful of occasions a younger member of the household was interviewed, but never anyone under the age of 16. If, after three visits at arranged times, no such person was available, the household was classified as 'not available'.

Household Location. In desert environments, a basic definitional problem involves the exact limits of a settlement. Various possibilities were considered, for example where the inhabitants' land ends or where the built-up area ends (Fajal, 2002). However, none were appropriate within the present context, given the diversity of the settlements. As each settlement in question made use of differing ways to demarcate its 'cut-off' point, a more practical approach was 'common-sense'. Furthermore, as the author was conducting all the interviews, his understanding of this delimitation would be consistent.

8.5 The Pilot Study

The structure and wording of the questionnaire received much attention in the early stages of its design. It was initially discussed in detail with fellow research students and staff in Edinburgh College of Art, then pre-tested amongst a number of experts and people with interests similar to the researcher's in Egypt before being finally piloted in the field. This pilot study tested the quality of the survey on a sample of 20 families sharing a relatively similar desert background but including traditional desert people and 'newcomers'. The respondents to the pilot study were all to be found in the area of Qantara City in North Sinai.

The pilot study was concerned with several potential weaknesses:

- First, it was necessary to assess the logical structuring of the questionnaire and the arrangement of the questions within each section.. The intention was to provide a schedule ordered such that the respondent could relate the relevance of each section, indeed each question, to the overall research aims. Furthermore, piloting permitted a test or possible introductions and links between sections.
- A second objective was to test the wording of questions, which should be neither incomprehensible to some respondents nor patronising to the more articulate ones. Particular attention was paid to problem questions identified through inadequate or misinterpreted responses. Several needed to be re-worded.
- Third, the pilot served to test how much time the interviewees would be willing to devote: this proved to be approximately one hour. The length of the questionnaire therefore did not present a problem.

8.5.1 **Modifications made after the Pilot Study**

The principal modifications during this phase of design are discussed in relation to five sections included in the questionnaire:

- ***Basic Household Data***

Researchers are still undecided as to whether this section should begin or end an interview. Although Coolican (1994) believes such information should be left until rapport is well-established the author's view is that the majority of people are used to answering such questions first; in the event their position did not create a problem.

- ***Residential Mobility***

It had been recognised in advance that there could be problems associated with this section. Many researchers have identified that questions dealing with past events are seldom answered totally accurately. Indeed, as Dixon and Leach (1980) warn:

“...the memory though, is not an automatic reckoner, and can be highly inaccurate. Memory decay is rapid but uneven; exceptional events are remembered for some considerable time, but often incompletely” (p.25).

Little can be done about this problem however. In an attempt to reduce the likelihood of inaccurate data, information relating to personal moves was limited to one year prior to the interview.

With regard to question B2 (Appendix A) concerning emigration from the household during an unspecified time period, it was observed that the respondent, when referring to ‘destination’, spoke of the migrant's present address, rather than the one initially moved to. Thus, in subsequent interviews, ‘first destination’ was emphasised.

Included also in this section was a topic relating to residential preferences. In the main survey, this was altered to ask firstly whether an urban or rural environment was preferred and then to provide four options as to the preferred location within that environment. As many people do not visualise a settlement by its statistical size, the choice for those stating an urban preference suggested settlement sizes with which the respondent could relate, for example, the size of: a) El-Arish, b) their local district town, c) a local small town; and d) a local village. This method, however, risks inadvertently

influencing the respondent to name a particular settlement with which they have a personal affinity rather than settlement size.

- ***Social interaction***

This particular section caused most problems during piloting. For example, in relation to question (D3) it was recognised that the phrase “since moving here” had to be emphasised, as many answered with reference to friends they had known all their life. Question (D5) was originally piloted using a Likert Scale but it became apparent that respondents were unwilling to “strongly agree” or “strongly disagree” with statements. Also, as Lemon (1973) puts it:

“...it is a commonly observed phenomenon in this area [attitude studies] for respondents to respond to questions in terms of what they consider is the socially desirable response to the item rather than in terms of their own private beliefs on the issue” (p.79).

The question needed to be presented in a modified form. Specific categories of ‘newcomers’ were proposed and the respondent asked how welcome they thought each would be in their *area*, as opposed to how the respondent *personally* would view their arrival. In the majority of cases it was their own personal view they were expressing. Although not eliminating the original problem, the theme was pursued for no other reason than possessing an innate feeling that the question, at worst, would pick up the extreme exceptions. This type of question was therefore very much on trial.

- ***Future Mobility Patterns***

Like any topic concerned with future events, these are impossible to verify without conducting a second interviewing at a later opportunity, an avenue not afforded by the present research. Instead, this section F (Appendix A) asked for the *desired* future mobility patterns, rather than seeking information that would presume to precisely measure future events. Also, while it would have been advantageous to have

all occupants present at the time of the interview, the main respondent answered on behalf of the household. Although some error was inevitable, if any household member had definite plans to move, the respondent would most probably know of their intent.

- ***Planning Regulations***

The main problem encountered during this section was that Bedouin respondents were largely unaware of their extant and detailed knowledge. By probing as to what they knew about 'site controls', 'design controls' etc., a range of planning particulars were obtained. The phrase 'planning regulations' appeared to deter the respondents.

8.5.2 Further Problems

Regardless, of the detailed preparation involved in designing the questionnaire, several problems were not obvious until the main survey. For example, in relation to question (D2), when asked if there were any 'newcomers' within a five-kilometre radius of their home, many actually *named* new residents living nearby. The desired result was the same, but this lengthened the time spent. However, the naming of individuals demonstrated that responses to later parts of the question were based on the respondents' personal knowledge and, accordingly, were more authentic.

The questionnaire, incorporating these major alterations and minor refinements, is presented, in the form used in the main survey, in Appendix (A).

8.6 Sampling Techniques

As it was the intention to survey households irrespective of duration of residence, a random sample was made based on a list of all households within the study area.

Although the inclusion of fifty households was practical within the present financial and temporal constraints, the decision regarding the sample size requires

further clarification. Firstly a standard number of households in each area gave rise to significant disparities in the ratios of houses studied per area, from 64.1% (El-Shoahit) and 8.6% (El-Matala). As Coolican (1994) stress, the importance of the sampling fraction is over-rated and indeed uniform fractions are not necessary. In this study the emphasis is on comparing areas, thus suggesting a large sample from each area. To include a uniform sampling ratio for each area would have led to interviewing many households. This point is explained using a 1/10 sampling fraction (Table 8.2). Severe problems in relation to a comparative analysis would arise from such sample sizes, necessitating the weighting of results. Bolton (1988), in using sampling fractions, found that half of her interviews were concentrated in just one of ten study parishes, but then her data were aggregated for analysis. Secondly, in deciding on the sample size careful consideration was given to the way the results were to be analysed (Moser and Kalton, 1979) as discussed in the following section. At this stage (before the exact breakdowns of results was known) a sample of 50 was taken as satisfactory.

Study Area	Total Households	Sample Size
Rabaa	486	49
El-Hasana	375	38
El-Salam	232	23
El-Shoahit	78	8
El-Matala	784	78

Table 8.2 Sample size using a 1/10 sampling fraction

Prior to the commencement of fieldwork, a decision was made regarding possible non-responses in the sample. Generally, a minimum of three visits was attempted on alternative days and at varying times, after which the household was classified as ‘not available’. Similarly, any interview that was refused was classified as a ‘refusal’. In relation to both types of non-response, no replacement was selected. Although

replacements are commonly used in research of this nature, they may introduce an unwanted degree of bias in that the new respondent will differ from the original in several important aspects. Most notably such households are available or willing to participate and are therefore more likely to contain elderly people or young children, as younger respondents and those containing no children are more difficult to reach.

Fieldwork lasted from December 2001 to March 2002 and approximately three to four weeks were spent in each area. As not all questions were relevant to each respondent (section 8.4), the interview on average lasted between 45 and 60 minutes, the longest taking over two hours!

The survey set out to complete 50 questionnaires in each of the five study areas. In the event, the greatest difficulty involved finding residents at home, although the use of an identity card and a notice of introduction posted in local shops ensured a relatively high number of completed schedules. The final sample sizes are displayed below:

Study Area	Number Completed	Refusals	Not Available
Rabaa	46	3	1
El-Hasana	42	2	6
El-Salam	45	4	1
El-Shoahit	41	8	1
El-Matala	44	4	2
Total	218	21	11

Table 8.3 **Sample size**

8.7 Data Processing and Analysis

Upon the completion of fieldwork, the 218 questionnaires were subsequently coded in order to facilitate computer analysis. This involved the transfer of responses into numerical representations on coding sheets and keying these into the computer. Normally this is a very time-consuming procedure made more laborious the more open-

ended questions are employed in the schedule. The categorisation of each question produced a coding frame with all variables.

Once in the computer, the data were checked for both coding and typing errors, first manually and then by producing frequency tables for each variable. Only when the author was satisfied that all such errors had been eliminated did a statistical analysis of the data commence. This involved the use of a Statistical Package for the Social Sciences (SPSS) and Excel program.

Analysis was largely based on the household scale. The individual level was included only where it added depth to the study, for example in relation to socio-economic characteristics, community participation etc., where results pertaining to the main respondent might not have been representative. Notwithstanding the care taken in determining an appropriate sample size, several cells in the analysis tables required re-grouping and these occurrences are all noted on the relevant table. On other occasions the analyses involved an aggregation of all areas. While not statistically accurate, on account of variations in the sampling ratio for each study location, it did provide some useful indicators for future research.

The results from this analysis are discussed in the next three chapters:

- Chapter 9 describes the household characteristics of each area, identifying their demographic, socio-economic and housing traits;
- Chapter 10 addresses the various aspects of residential mobility with the emphasis being firmly placed on the identification of desert processes; and
- Chapter 11 concerns the behavioural impact of these processes. Throughout, reference is made to other studies within the wider spectrum of 'counter-urbanisation' and 'repopulation'.

CHAPTER NINE

Characteristics of the Sampled Households

Characteristics of the Sampled Households

9.1 Introduction

This chapter outlines the demographic, socio-economic and residential characteristics of households interviewed in each of the study locations. The presented data relate to their characteristics at the time of interview only. Analyses are directed towards a comparative examination by duration of residence, with the sample categorised into two groups: 'new households' represents the first group, those residents who had lived at their present address for no more than ten years prior to interviewing. The second group consequently contains two sub-groups:

- 1) 'long-term households' are those who moved to the present address at least ten years earlier; and
- 2) 'non-movers' represent those who continue to reside at their childhood home.

For statistical purposes long-term and non-mover samples are generally combined in the second group (section 9.4.1).

While largely descriptive in nature, the chapter begins by comparing the size of these samples in each area and proceeds to examine, firstly, the demographic structure associated with each group, secondly their socio-economic characteristics and finally, their housing characteristics. The demography of each is assessed in relation to the area of birth, the household composition and size, the age of heads of households and the demographic structure of the total population.

Socio-economic characteristics are examined in relation to four factors: educational attainment, social class and in relation to the economic aspect in particular, employment status and journey-to-work patterns. The final section, the review of the

housing characteristics of those interviewed, identifies the tenure and types of housing associated with each area, the general location of specific samples within the area, the acquisition of present homes and the possession of several household amenities. Thus, although aiming to provide a comprehensive profile of desert settlement households, the emphasis is equally directed towards an identification of disparities, namely those between "new" and "long-term/non-mover" samples.

Data are presented, where appropriate, for each individual within a household with the characteristics of the head of the household taken to be the most appropriate indicators of change affecting the social composition of desert areas. Social customs in the desert hold that it is improper for a strange visitor to converse with a female member of the household. Consequently, as over 95% of respondents in each area were male, the women were interviewed through their sons or relatives. The head of the household, although commonly used in similar studies, is rarely defined. Some research assume the "head" in desert communities is synonymous with the "husband", but a problem arises when a husband is absent. Equally valid may be individuals over 18 who are economically active within a household (Abo-Zeid, 1996), but as this may be biased towards individuals who have only a little control over the decision to move due to the nature of Bedouin life, in this thesis it was decided to combine both approaches. The general rule applied was that if a husband was present and was economically active, information pertaining to his characteristics was assessed. Where this criterion could not be fulfilled, data relating to the wife were examined and, failing this and in respect of Bedouin traditions, the eldest male member. In about 80% of the cases, it is the husband's characteristics which are presented.

9.2 Duration of Residence

Before assessing the various characteristics associated with desert households included in the survey, each is classified in relation to its duration at the present address. In this section, the emphasis is directed towards an identification of sample sizes in each area, while in the next chapter the duration of residence is more specifically examined in relation to temporal variations in repopulation trends.

A total of 96 respondents were found to reside at their childhood home (Table 9.1), ranging from 12 (27.3%) in El-Matala to 28 (68.2%) in El-Shoahit. Excluding the “non-mover” group, the mean duration of residence exceeded ten years in all areas; El-Matala being attributed with the longest duration (18.7 years) and El-Salam with the shortest (12.5 years). No significant difference was obtained between the mean duration of residence in each area; although differences were apparent in relation to the sample sizes in each locality.

Table 9.1 Duration of residence (number & %)

	New	Long-term	Non-mover	TOTAL
Rabaa	10 (21.7)	17 (37.0)	19 (41.3)	46
El-Hasana	6 (14.3)	14 (33.3)	22 (52.4)	42
El-Salam	12 (26.7)	18 (40.0)	15 (33.3)	45
El-Shoahit	4 (9.8)	9 (22.0)	28 (68.2)	41
El-Matala	13 (29.5)	19 (43.2)	12 (27.3)	44
TOTAL	45	77	96	218

At least 70% of the households interviewed in all settlements had been at their present address for more than ten years. Notably, the highest rates of new households (those less than ten years) were shown in Rabaa, El-Salam and El-Matala which reflects that these are the most accessible to an urban centre, as desert populations have grown increasingly dependent on urban facilities (Hegazy, 2000b).

New household ratios are directly associated with distance from an urban centre. Accordingly, the remoter locations of El-Hasana and El-Shoahit not only record the smallest proportions of "new households" (accounting for approximately less than 15% of those interviewed), but also the largest proportion of "non-movers". Residential mobility in these two areas is, therefore, lower.

Unlike these two locations, the areas on the northern axis contain many local service centres. Small towns and villages are important locations for desert population growth (chapter 6) and thus one can assume that these areas represent an intermediate stage between the higher number of "new households" associated with urban-influenced environments, and the much lower proportions associated with remoter, more desert types of locality.

9.3 Immediately Preceding Residence

The immediately preceding residence of households is examined fully in the following chapter; however, the topic is introduced here with a brief preview of the principal mobility trends.

The last change of residence is characterised by short-distance, inter- and intra-desert movement in all areas. For example, in excess of 60% of long-term residents moved from another rural or village environment within their respective D.C.A. (Domestic Council Area), many within their present ward boundary. More recent mobility patterns, i.e. those occurring within ten years prior to the interview, are more variable between areas. Over and above this trend, El-Matala in particular, has attracted many households from more distant areas. Furthermore, recent flows display an increased urban-to-rural element (except in El-Shoahit), with the difference found to be statistically significant in the most accessible locations; El-Matala, El-Salam and Rabaa.

Recent mobility patterns, therefore, involved movement over longer distances (El-Matala), and importantly were characterised by a growing urban-to-rural component.

9.4 Demographic Characteristics

The primary interest of this chapter so far concerns the consequences of a repopulation process. This section not only addresses the commonly studied age structure but also the wider demographic characteristics of lifetime migration, household composition and size.

9.4.1 Lifetime Migration

Any analysis of desert areas assessing primarily patterns of residential mobility amongst new households needs to be viewed within the wider context of traditional desert mobility patterns. One must first distinguish the origins of long-term inhabitants, i.e. those residents at their present address for more than ten years, before determining if recent changes depart from traditional processes. While the relevance of the immediately preceding address is assessed in Chapter 10, the lifetime migration patterns of both groups are reviewed here.

Lifetime migration is assessed in relation to data pertaining to the birthplace of first and second occupants, aggregated and deemed representative of the origins of the household. For example, 83.9% of all second occupants are identified as the respondents' spouse, with a further 14.3% as their parent or in-law.

Birthplace data, although commonly studied in relation to the area of origin, are also analysed here in order to ascertain whether residents were raised in a rural or urban desert environment. Tables 9.2 and 9.3 categorise the area of origin for both samples into five groupings with the relevant locational data for each provided in Tables 9.4 and 9.5.

In accordance with findings for North Sinai generally, these areas have not been popular destinations for non-natives. By far the largest influx of people has been from Jordan and Palestine; three areas housing in excess of 1.6% Jordanian and Palestinian born residents recorded for the Province as a whole in 1996 (Hegazy, 2000), included El-Hasana, El-Matala and El-Salam. The presence of such in-comers in El-Hasana and El-Salam (amongst long-term residents), and in El-Matala (amongst both samples) is, however, relatively more important, but absolute numbers are small, there being 5 among long-term households in these areas, and accounting for only one of the most recent movers in El-Matala. This latter area's proximity to the Egyptian border is clearly an influential factor.

Recent movers who were brought up elsewhere in Egypt, while generally uncommon in each area, are more frequently found in El-Salam (18.2% or 4 individuals). Although the varying proportions originating from outside the Province are important, rural desert areas as a whole are characterised by an indigenous population. Moreover, the most striking feature evident from Tables 9.2 and 9.3 is that in excess of 60% of residents in the remoter locations of El-Shoahit and El-Hasana were raised within the ward where they now reside, reinforcing findings from other studies.

Hegazy (2000a), in a study of North Sinai villages, observed that most of his sample had "grown up" in their present locality: many having done so within three to five kilometres of their current address. By contrast, in this thesis, the frequency between the two samples in group A (within ward) in El-Salam falls from 54.5% to 22.7% or from 36 to 5 people. Thus, while over half of the more established residents were reared within the vicinity of El-Salam, its "new" population originated from a wider geographical area, i.e. 31.8% coming from elsewhere in North Sinai.

Table 9.2 Birthplace of long-term residents (%).

Area	A	B	C	D	E	Number of residents
Rabaa	56.1	24.4	14.5	5.0	-	82
El-Hasana	60.9	22.0	9.3	4.7	3.1	64
El-Salam	54.5	19.7	13.6	10.7	1.5	66
El-Shoahit	66.2	20.2	12.2	1.4	-	74
El-Matala	45.2	29.2	16.1	6.5	3.2	62

NOTE: Columns A and B, and C through to E were combined to “within” and “beyond” each’s respective Domestic Council Area.

- A Within ward
- B Elsewhere in respective D.C.A
- C Elsewhere in North Sinai
- D Elsewhere in Egypt
- E Abroad

Table 9.3 Birthplace of recent movers (%).

Area	A	B	C	D	E	Number of residents
Rabaa	40.0	30.0	20.0	10.0	-	10
El-Hasana	60.0	20.0	15.0	5.0	-	20
El-Salam	22.7	27.3	31.8	18.2	-	22
El-Shaohit	62.5	25.0	12.5	-	-	8
El-Matala	24.0	44.0	16.0	12.0	4.0	25

NOTE: Data regrouped into “within” and “beyond” D.C.A.

- A Within ward
- B Elsewhere in respective D.C.A
- C Elsewhere in North Sinai
- D Elsewhere in Egypt
- E Abroad

Furthermore, El-Salam also attracted a relatively large proportion (18.2%) of people from elsewhere in Egypt; this result is among the most conspicuous of this data set. In another case of El-Matala, long-term residents in the area traditionally originated

within the ward (45.0%), but the much of the "new" population (44.0%) originated from elsewhere within the "Rafah" D.C.A.

In summary, each of the study locations was largely characterised by residents of local origin, i.e. within the respective D.C.A, with many presently residing only a short distance from their childhood home. Therefore, no statistical difference is obtained (when data are regrouped) in the relationship to origin of long-term residents between areas. When combined with the "non-mover" sample, they are duly referred to as the "local population" in the remainder of the text. In contrast, a greater variation is found to be statistically significant in all settlements among the new household samples. This variation can be wholly accounted for by the recent movers of El-Salam, where only 22.7% originated from within the ward compared to about 60% who came from elsewhere within North Sinai. Consequently, this area, and El-Matala as well, departs from traditional migration patterns of the other settlements.

Turning to the environments in which the sampled populations grew up, statistically significant differences were obtained between areas for both groups of residence (Tables 9.4 and 9.5). As many residents were raised within their present locality, large numbers, the majority of whom had been brought up in dispersed homesteads in the open desert came from rural backgrounds.

Statistics describing the birthplace category of the long-term residents show a high number of people of urban origin in El-Salam, and of village origin in Rabaa (Table 9.4). The figure for the latter area is allied to the local origin of residents, i.e. the ward is composed of an old village community. However, that 24,3% of the residents of El-Salam who originated elsewhere within North Sinai and within Egypt (Table 9.2), when viewed with the associated importance of urban locations, suggests that this area has traditionally not only attracted residents from a wider geographical area, but from

more varied locational backgrounds. On the whole, long-term residents were characterised by local rural roots, with only El-Salam exhibiting a greater diversity of origins.

Table 9.4 Long-term residents: Birthplace category (%).

	Dispersed Households	Urban	Village	Number of residents
Rabaa	50.0	17.2	32.8	82
El-Hasana	65.1	18.8	16.1	64
El-Salam	62.1	24.2	13.7	66
El-Shoahit	81.0	6.8	12.2	74
El-Matala	62.9	19.4	17.7	62

Table 9.5 Recent movers: Birthplace category (%).

	Dispersed Households	Urban	Village	Number of residents
Rabaa	60.0	30.0	10.0	10
El-Hasana	45.0	25.0	30.0	20
El-Salam	31.8	50.0	18.2	22
El-Shoahit	75.0	12.5	12.5	8
El-Matala	40.0	48.0	12.0	25

Those who were resident at their present address for fewer than ten years were distinguished by a greater variety of locational backgrounds (Table 9.5). Again a high proportion in remoter localities had been raised in dispersed homesteads in the open desert. However, a common facet in four of the five locations was the considerable increase in the proportion of those who had been brought up in an urban environment. Only in El-Shoahit did this remain low. El-Matala and El-Salam in particular record the greatest influx of urban-origin residents; a statistical difference noted between the location of birth of the new and local samples. This group accounts for about one-half of the most recent movers in these two areas and, importantly, the trend corresponds to the

more accessible localities, i.e. accessibility to Rafah and El-Arish respectively. While suggesting that this group originated within these towns, Table 9.6 lends considerable support to this contention in relation to El-Salam and El-Matala, but in Rabaa all those who had been brought up in an urban centre originated outside the Bir El-Abd D.C.A.

Table 9.6 Recent movers of urban origin: Place of birth (numbers).

	Within D.C.A.	Outside D.C.A.	TOTAL
Rabaa	-	3	3
El-Hasana	3	2	5
El-Salam	2	9	11
El-Shoahit	1	-	1
El-Matala	5	7	12

9.4.2 Age of the Heads of Households.

In addition to the age structure of the total population, the age of the head of household is a useful indicator of the demographic composition of an area. The following section examines the age-sex structure of all interviewed households, with the age of the heads of households examined here. Table 9.7 presents the frequency of ages for the "local sample" with Table 9.8 providing the corresponding distribution among new households. Age is categorised into three groups; under 35, 35-50 and those over the age of 50.

The distribution among the heads of households of long-term and non-mover samples was characterised by older age groups, with less than 15% in each area being under the age of 35. Furthermore, at least half of those interviewed in Rabaa and El-Salam were over the age of 50. Particularly in El-Salam, this predominance of older heads of households is reinforced, as only one was under the age of 35. Similarly, the modal age group in El-Hasana was the over 50s, accounting for 46.9% of the total

sample. This group included 20.5% in their sixties. Those aged between 35 and 50 were prominent in El-Shoahit and El-Matala, so that the local sample in all areas was characterised by a large middle-aged to elderly population. Heads of new households, by comparison, were distinguished by the younger age groups, no more than 1 in 4 being over the age of 50 (Table 9.8).

Particularly in Rabaa, there was nobody at all over 50 among the sampled heads of new households. Notwithstanding this trend, the age composition of the heads of new households varied between study locations. Whereas at least 40% were under the age of 35 in Rabaa, El-Hasana, El-Salam and El-Matala, this age group accounted for under a third in El-Shoahit. Significantly, the new household sample in Rabaa was largely composed of heads aged between 35 and 50 (60.0%), while in El-Shoahit a comparatively high share was over 50 years of age (25.0%). Similar proportions of elderly heads were also noted in El-Hasana (20.0%), but the size of this sample was notably smaller than the corresponding local proportions. Nevertheless, an age difference was apparent between the two samples in each area.

Table 9.7 Local households: Age of heads of households (number & %)

	Under 35	35-50	Over 50	TOTAL
Rabaa	6 (14.6)	14 (34.2)	21 (51.2)	41
El-Hasana	3 (9.3)	14 (43.8)	15 (46.9)	32
El-Salam	1 (3.0)	14 (42.4)	18 (54.6)	33
El-Shoahit	4 (10.9)	18 (48.6)	15 (40.5)	37
El-Matala	4 (12.9)	16 (51.6)	11 (35.5)	31

Table 9.8 New households: Age of heads of households (number & %)

	Under 35	35-50	Over 50	TOTAL
Rabaa	1 (40.0)	3 (60.0)	- (0.0)	5
El-Hasana	4 (40.0)	4 (40.0)	2 (20.0)	10
El-Salam	6 (50.0)	4 (33.3)	2 (16.7)	12
El-Shoahit	1 (25.0)	2 (50.0)	1 (25.0)	4
El-Matala	6 (46.2)	6 (46.2)	1 (7.6)	13

In general terms, heads of local households were found to be older than the most recent mover group, results which are consistent with previous studies concerned with the repopulation of North Sinai.

9.4.3 Household Composition and Household Size.

The final demographic characteristic assessed relates to the individual household composition and size associated with new and local samples in each area. Whereas the demographic analysis thus far identifies the origins of rural desert households, attention is now directed towards a describing of the types of households included in the survey.

In each study location both the local and new samples were composed of family units (Tables 9.9 and 9.10). Before discussing this aspect in detail, it is worth focusing on the large numbers who lived with an additional occupant. More than half of this group was non-movers continuing to reside at their childhood home. While households containing one occupant were not found at all in any local sample, households of two or more related persons were also uncommon. Although it is implied that this singles group of new household did not marry, in both cases in which one person was widowed and one divorced; these males were under the age of 35.

The modal composition category amongst new households (Table 9.10) consisted of a married couple with school-aged children (under the age of 16). Such a family type represents from 30.0% in El-Hasana to 53.8% in El-Matala.

Local households (Table 9.9), while predominantly comprised of families, showed a greater variation of units. In contrast with new households, local families containing children over 16 were identified as the modal category in all study areas, but were notably more frequent than those of people who live with parents/relatives in El-Hasana and El-Shoahit. With reference to the age distribution of local heads in these

areas, and also to their family size, the results indicate that such households contain a greater number of children of all ages (over and under 16) than do those of new samples.

Table 9.9 Local Households Household Composition (number & %)

	Rabaa	El-Hasana	El-Salam	El-Shoahit	El-Matala
One person	-	-	-	-	-
Two or more related persons	2 (4.9)	1 (3.1)	2 (6.1)	1 (2.7)	1 (3.2)
Married couple	2 (4.9)	1 (3.1)	1 (3.0)	-	1 (3.2)
Married couple and parent/relative	3 (7.2)	2 (6.2)	2 (6.1)	3 (8.1)	1 (3.2)
Married couple and children under 16	7 (17.1)	3 (9.4)	7 (21.2)	3 (8.1)	7 (22.6)
Married couple and children under 16 and parent/relative	5 (12.2)	6 (18.9)	4 (12.1)	8 (21.6)	3 (9.7)
Married couple and children over 16	8 (19.4)	5 (15.6)	8 (24.3)	3 (8.1)	9 (29.0)
Married couple and children over 16 and relative	6 (14.6)	7 (21.9)	4 (12.1)	9 (24.4)	2 (6.5)
Lone parent and children under 16	-	-	-	-	-
Lone parent and children over 16	2 (4.9)	1 (3.1)	2 (6.1)	-	3 (9.7)
Lone parent and children over 16 and relative	2 (4.9)	2(6.2)	1 (3.0)	2 (5.4)	1 (3.2)
Husband, his two wives and children under 16	1 (2.4)	-	1 (3.0)	2 (5.4)	1 (3.2)
Husband, his two wives and children over 16	2 (4.9)	3 (9.4)	1 (3.0)	5 (13.5)	2 (6.5)
Husband, his three/four wives and children over/under 16	1 (2.4)	1 (3.1)	-	1 (2.7)	-
TOTAL	41	32	33	37	31

Indeed, the categorisation of many was influenced by the specific composition of families. Accordingly, the presence of families containing lone parents and children

over the age of 16 was found only amongst the local samples.

Table 9.10 New Households: Household Composition (number & %)

	Rabaa	El-Hasana	El-Salam	El-Shoahit	El-Matala
One person	-	-	1 (8.3)	-	1 (7.7)
Two or more related persons	-	-	2 (16.7)	-	3 (23.3)
Married couple	-	-	1 (8.3)	-	-
Married couple and parent/relative	-	-	-	1 (25.0)	-
Married couple and children under 16	2 (40.0)	3 (30.0)	6 (50.0)	2 (50.0)	7 (53.8)
Married couple and children under 16 and parent/relative	1 (20.0)	2 (20.0)	-	-	-
Married couple and children over 16	1 (20.0)	2 (20.0)	2 (16.7)	1 (25.0)	1 (7.7)
Married couple and children over 16 and relative	-	1 (10.0)	-	-	-
Lone parent and children under 16	-	-	-	-	1 (7.7)
Lone parent and children over 16	-	-	-	-	-
Lone parent and children over 16 and relative	-	-	-	-	-
Husband, his two wives and children under 16	1 (20.0)	1 (10.0)	-	-	-
Husband, his two wives and children over 16	-	1 (10.0)	-	-	-
Husband, his three/four wives and children over/under 16	-	-	-	-	-
TOTAL	5	10	12	4	13

In El-Matala a bimodal distribution was apparent. Local households containing a married couple with children under the age of 16, and those accompanied by children over that age account for 22.6% and 29.0% of the total respectively. The same can be noted in El-Salam, but with less frequency. Similarly in El-Shoahit, while the common

local household category comprised of school-aged children accompanied by parents/relatives was represented by 21.6%, the most frequent category includes those with children above school-leaving age and also accompanied by parents/relatives (24.4%).

Households with more than one wife were apparent in local samples of all study areas. Although this is commonly the case in Bedouin communities, it was most significant in El-Shoahit (more than 20.0% of local households). In contrast, samples of new households in El-Salam, El-Shoahit and El-Matala show no households with more than one wife, unlike in Rabaa and El-Hasana where there are a few.

In all areas the mean household size for the total sample at the time of interviewing (Table 9.11) was generally greater than the regional average at 7.1 people (CAPMAS, 1996). As most are identified as family units, the larger household size was expected, especially in settlements far from urban areas of the Province. The smaller household sizes (averaging less than 7.8 occupants) were very strongly associated with the three settlements close to urban areas: El-Salam, El-Matala and Rabaa. Furthermore, whereas the sample in these three areas was identified as contributing most to the numbers under the age of 20, only in Rabaa did the mean "new household" size exceed that of its local counterparts.

Table 9.11 Average household size.

	New	Local	AVERAGE
Rabaa	8.7	8.4	8.5
El-Hasana	7.6	10.3	8.9
El-Salam	6.1	8.2	7.1
El-Shoahit	8.6	11.7	10.1
El-Matala	7.9	8.2	8.0
Average	7.8	9.4	8.6

The comparative increase of average household size in favour of the local sample is most apparent in El-Shoahit. Whereas the modal local household size was 8, except in El-Hasana where it is typified by those containing 13 occupants and in Rabaa where the most frequent category included 12 members, in El-Shoahit the local mean is 14 or more occupants. By contrast, the most frequent household size amongst new households was notably smaller. In all areas the modal size of these was 7, except in Rabaa (8 occupants) and El-Shoahit (9 occupants). Household composition and size, therefore, depict the wider demographic structure of new and local households.

9.5 Socio-economic Characteristics:

The socio-economic characteristics of movers and established residents have been the subject of close scrutiny, especially in rural desert areas recording population growth. The fact that both groups differ from one another is nothing new; migration theorists have long been aware of the selective process (Jones, 1990). Whichever migration stream is examined migrants are commonly found to display differing socio-economic characteristics from stayers: migrants being stereotyped as of higher socio-economic status.

The present study collects data on a number of social and economic variables. While in practice both characteristics are interrelated, for the sake of clarity the analysis of results will be given under several headings, information pertaining to social class serving as a link between the two themes.

9.5.1 Educational Attainment

To facilitate a statistical analysis, the educational status of heads of households was categorised into four groupings. Tables 9.13 and 9.14 disclose the educational

attainment of new and local heads in each area, with a more detailed categorisation for the total adult population presented in Tables 9.15 and 9.16. Where the respondent was unsure of the qualifications obtained by specific occupants, these individuals are excluded (7).

An early indication of the disparities amongst new and local samples is immediately apparent from Table 9.12. Of the number of heads without formal qualifications, local households in particular were over-represented. At least 1 in 2 possessed no recognised accomplishment in Rabaa, El-Hasana and El-Shoahit, while 2 in 5 in El-Salam and El-Matala was categorised likewise. 3 in 4 of the most recent incomers, in contrast, generally possessed a qualification. El-Salam recorded the lowest percentage of unqualified heads.

Table 9.12 Household heads without a recognised qualification (number and %).

	New	Local
Rabaa	3 (30.0)	20 (57.1)
El-Hasana	2 (33.3)	22 (62.9)
El-Salam	3 (25.0)	13 (40.1)
El-Shoahit	1 (25.0)	23 (65.7)
El-Matala	3 (23.1)	12 (40.0)

While the ratio of 'unqualified' heads is remarkably lower than their more established counterparts, the number amongst the new sample who have failed to obtain a recognised qualification was particularly significant. It was, however, largely associated with heads over the age of 35 (87%). Variations in the number with or without a recognised qualification are, therefore, influenced by the age of the individual included, older heads are most likely to be without. Consequently this maps changing educational aspirations over time. For example, 3,258 school leavers in 1986/87 did not obtain any qualifications, while the number during the 1990s declined to 1,434 for the

Turning now to the actual qualification obtained, a qualification up to a supplementary level or the equivalent, characterised the local sample (Table 9.13). Relatively few, in contrast, possessed a degree or professional (engineering/teaching etc.) qualification. By comparison, higher levels of achievement distinguish the new household samples (Table 9.14 & Fig. 9.1). Fewer possessed just a supplementary level or equivalent qualification and more were in receipt of a degree or professional qualification, findings which are widely acknowledged in similar studies (CAPMAS, 1996). However, a statistically significant difference was obtained between the educational status of new heads of households. El-Shoahit, where 3 out of 4 of new heads of households possessed the lowest level of educational attainment, was particularly at variance with the general trend. Elsewhere, whereas the lowest grouping was identified as the modal category in Rabaa (50%), new heads of households are typified by those possessing a secondary level or equivalent.

In recognition that the preceding results may be influenced by the household composition and levels of economic activity, data relating to the educational attainment of all adults (over the age of 18) were tabulated. These results, rather than contradicting those pertaining to the “head”, emulate the characteristics identified from the preceding tables.

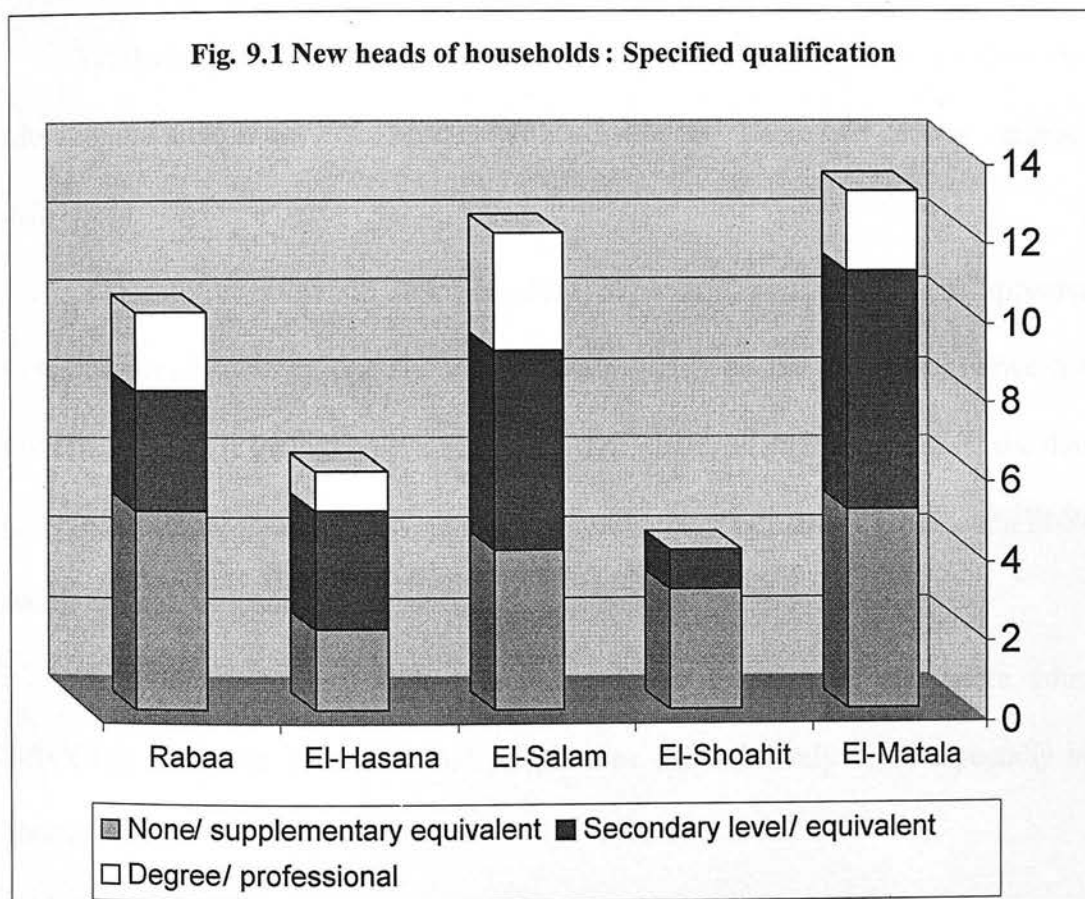
Table 9.13 Local heads of households: Specified qualification (number and %).

	None/ supplementary equivalent	Secondary level/ equivalent	Degree/ Professional	TOTAL (*)
Rabaa	24 (70.6)	9 (26.5)	1 (2.9)	34
El-Hasana	25 (71.4)	8 (22.9)	2 (5.7)	35
El-Salam	20 (62.5)	8 (25.0)	4 (12.5)	32
El-Shoahit	26 (74.3)	9 (25.7)	0 (-)	35
El-Matala	18 (60.0)	9 (30.0)	3 (10.0)	30

(*) Excludes heads where no definite response was provided

Table 9.14 New heads of households: Specified qualification (number and %)

	None/ supplementary equivalent	Secondary level/ equivalent	Degree/ professional	TOTAL
Rabaa	5 (50.0)	3 (30.0)	2 (20.0)	10
El-Hasana	2 (33.3)	3 (50.0)	1 (16.7)	6
El-Salam	4 (33.3)	5 (41.7)	3 (25.0)	12
El-Shoahit	3 (75.0)	1 (25.0)	0 (-)	4
El-Matala	5 (38.5)	6 (46.2)	2 (15.3)	13



Again, amongst the local sample the modal category represented those with no recognised qualification (Table 9.15): this ratio, except El-Salam, representing approximately 1 in 2 adults. Although few possessed university degree, such highly educated individuals were most frequently found in El-Salam and El-Matala.

Table 9.15 Local households: Specified qualifications for each adult (number and %).

	1	2	3	4	5
None	82 (59.9)	77 (60.2)	38 (40.4)	88 (56.4)	47 (50.5)
Supplementary level./equiv.	35 (25.5)	27 (21.1)	30 (31.9)	45 (28.9)	25 (26.9)
Secondary level/equiy.	14 (10.2)	21 (16.4)	19 (20.3)	20 (12.8)	14 (15.1)
University Degree	6 (4.4)	3 (2.3)	7 (7.4)	3 (1.9)	7 (7.5)
TOTAL	137	128	94	156	93

1 Rabaa 2 El-Hasana 3 El-Salam
4 El-Shoahit 5 El-Matala

Similarly, results within new households (Table 9.16) display the acknowledged educational attainment of heads. Still, El-Salam possessed fewer unqualified individuals.

On the other hand, supplementary level and secondary level appeared as representative. However, one should not focus unduly on the difference between these two categories as it included several 18 year olds due to sit examinations. While those of higher educational attainment were more common, their numerical presence in El-Salam and El-Matala, was particularly striking.

In new households, while containing fewer unqualified and more educated individuals, the ratio of unqualified people was still relatively high, especially in El-Shoahit.

Table 9.16 New households: Specified qualifications for each adult (num. and %).

	1	2	3	4	5
None	10 (31.3)	7 (36.8)	12 (27.3)	7 (46.7)	15 (35.7)
Supplementary level./equiv.	12 (37.5)	6 (31.6)	15 (34.1)	4 (26.7)	13 (31.0)
Secondary level/equiy.	7 (21.9)	4 (21.1)	10 (22.7)	3 (20.0)	9 (21.4)
University Degree	3 (9.3)	2 (10.5)	7 (15.9)	1 (6.6)	5 (11.9)
TOTAL	32	19	44	15	42

1 Rabaa 2 El-Hasana 3 El-Salam 4 El-Shoahit 5 El-Matala

9.5.2 Economic Characteristics.

Repopulating the desert areas not only results in a social transformation, as demonstrated in previous studies, but also introduces potentially more discernible variations in relation to the employment characteristics of recent population (Abo-Zeid, 1996). Furthermore, as only some new households were found to participate in the agricultural sector, the question arises as to whether a repopulation of the desert areas is accompanied by employment in other rural-based activities, or entails a merely residential repopulation.

Data relating to the employment position and journey-to-work patterns of interviewed households are presented in this section not only to provide a comprehensive review of the economic characteristics typical of each area, but also to ascertain if employment attributes differ between samples. As before in this chapter, the analysis incorporates data pertaining to the heads of households and individual adults above school-leaving age. Data relating to employment trends within North Sinai are included for comparative purposes.

The economic activity rate for each sub-sample within each of the five locations is shown on Table 9.17.

Two major trends are evident:

- activity rates among new heads of households exceed those of their local counterparts, except in El-Shoahit; and
- the corresponding activity rates for the adult population are generally lower.

This latter trend is likely to be influenced by the predominance of spouses (wives) who are not normally and traditionally employed, and those over the age of 18 continuing in full-time education.

Table 9.17 Economic activity rates of the sampled population (number and %)

	New Households		Local Households	
	Heads	Adults	Heads	Adults
Rabaa	6 (60.0)	14 (43.8)	21 (58.3)	65 (47.4)
El-Hasana	4 (66.7)	8 (42.1)	19 (52.8)	55 (42.9)
El-Salam	10 (83.3)	29 (65.9)	25 (75.8)	56 (59.6)
El-Shoahit	2 (50.0)	6 (40.0)	21 (56.8)	69 (44.2)
El-Matala	11 (84.6)	26 (61.9)	25 (68.6)	54 (58.0)

Firstly, addressing the economic activity rates for the heads of households, the above trend is derived from the older age structure of local samples. Accordingly, unemployment rates are comparatively high (Table 9.18), accounting for at least 30% in three areas. Where lower proportions were observed, as in El-Matala (12.9%) and El-Salam (18.1%), they reflect the impact of younger age structure of these areas.

Of local heads who were economically active (Table 9.18), the modal employment status was found to differ between areas. In El-Salam and El-Matala the most frequent employment status included full-time employees, whereas in Rabaa, El-Hasana and El-Shoahit, 33.3%, 30.6% and 45.9% respectively of the total sample were self-employed. In these areas, self-employment included a number of occupations. For example, in El-Hasana and Rabaa it related to the preponderance of tradesmen who generally worked for themselves while in El-Soahit, it referred to a small number of farmers, pastors and local proprietors. Notwithstanding these variations, no statistically significant difference was obtained when the data were regrouped, the majority in each locality being economically active.

Table 9.18 Local heads of households: Employment status (number & %)

	1	2	3	4	5
Self-employed	12 (33.3)	11 (30.6)	7 (21.2)	17 (45.9)	9 (29.0)
Full-time (*)	8 (22.2)	6 (16.6)	16 (48.5)	4 (10.8)	15 (48.4)
Part-time(*)	1 (2.8)	2 (5.6)	2 (6.1)	-	1 (3.2)
Unemployed	11 (30.5)	12 (33.3)	6 (18.1)	13 (35.2)	4 (12.9)
Retired/Invalid/ sick(**)	2 (5.6)	4 (11.1)	2 (6.1)	1 (2.7)	2 (6.5)
Housewives(**)	2 (5.6)	1 (2.8)	-	2 (5.4)	-

NOTE: (*), (**) regrouped.

1 Rabaa 2 El-Hasana 3 El-Salam
4 El-Shoahit 5 El-Matala

Turning towards the employment status of the new heads of households, the most conspicuous feature was not the variations between the numbers of self-employed people or those engaged in full-time employment, but rather the varying ratios registered as unemployed (Table 9.19 & Fig. 9.2). Ranging from 30.0% in Rabaa to 0.0% in El-Salam, at least 1 in 4 households participating in the repopulation phenomenon in Rabaa and El-Shoahit did not contain an economically active occupant, with proportions increased if the numbers of retired/invalid/sick or containing only housewives are added.

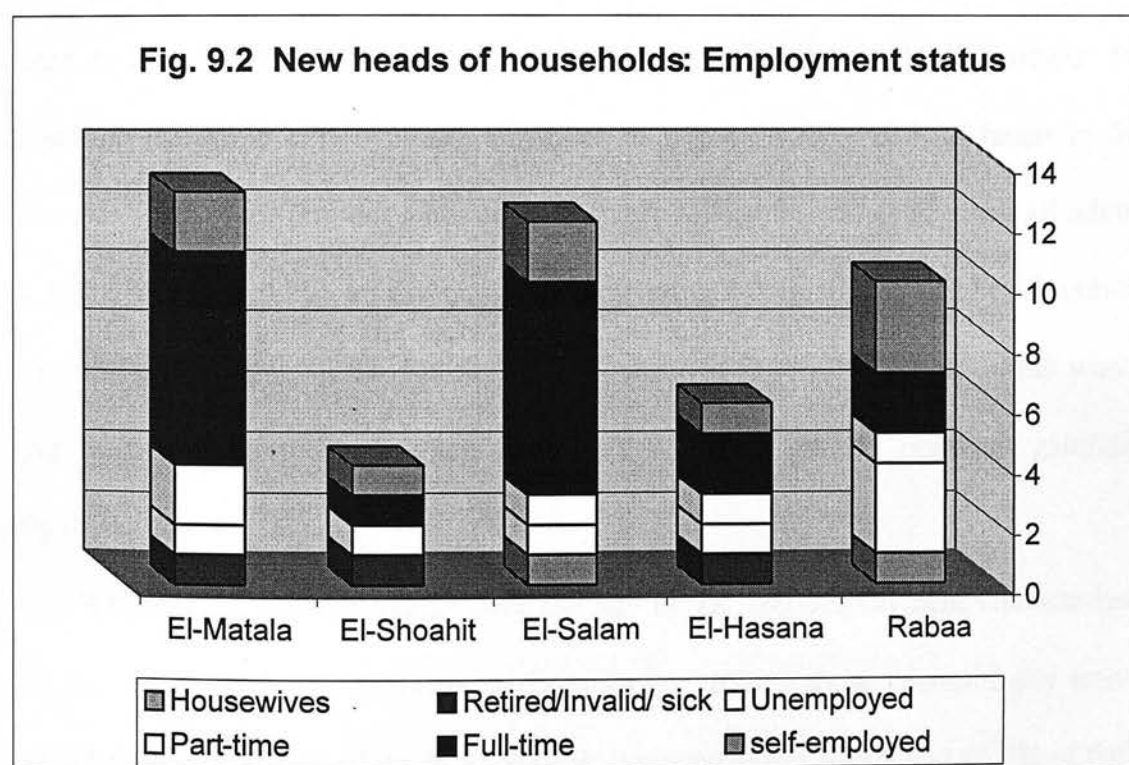
In relation to El-Shoahit, the results pertaining to unemployment correspond to areas containing high ratio of traditional Bedouin populations. Thus, it seems appropriate to interpret the results as reflecting the higher levels of unemployment associated with traditional Bedouins communities generally within North Sinai (Fahmy, 1989). However, the results in these areas do represent a marked deviation from previous studies, advocating an employment-led growth hypothesis.

Table 9.19 New heads of households: Employment status (number and %)

	1	2	3	4	5
Self-employed	3 (30.0)	1 (16,7)	2 (16.7)	1 (25.0)	2 (15.4)
Full-time (*)	2 (20.0)	2 (33.2)	7 (58.4)	1 (25.0)	7 (53.8)
Part-time(*)	1 (10.0)	1 (16.7)	1 (8.3)	-	2 (15.4)
Unemployed	3 (30.0)	1 (16.7)	1 (8.3)	1 (25.0)	1 (7.7)
Retired/Invalid/ sick(**)	-	1 (16.7)	-	1 (25.0)	1 (7.7)
Housewives(**)	1 (10.0)	-	1 (8.3)	-	-

NOTE: (*), (**) regrouped.

1 Rabaa 2 El-Hasana 3 El-Salam
4 El-Shoahit 5 El-Matala



For example, Ibrahim (1992), in examining the characteristics of migrants to and from rural desert areas in Egypt, presented evidence of a net gain of economically active persons. At the same time, not only were comparatively high numbers seeking work in Rabaa, El-Hasana and El-Shoahit but the level of unemployment exceeded the official

figure for North Sinai, put at 16.7% of the working population in 1996. To suggest, however, that in some areas, namely the more remote and most rural desert ones, repopulation is associated with a high number of unemployed residents would be a great over generalisation.

When figures relating to all adults are analysed to compare the level of unemployment amongst local households (Table 9.21), in each area this was significantly higher amongst the most recent household group (Table 9.20).

An important factor to emerge from recent literature for encouraging a rural revival relates to agriculture. If migration by farming individuals was an important component of recent trends, one would have anticipated a greater importance in El-Salam and El-Matala, each of which possesses a relatively good environment for agriculture (full-time employment). However, as approximately 20% of heads in the latter two areas were farmers, with comparatively high ratios retained when all adults are included (Table 9.20), an association with farming did exist. The numbers involved were smaller than the corresponding local proportions (Table 9.21) and on the whole were relatively unimportant when compared with the greater numbers gainfully employed.

With respect to respondents over the age of 18, self-employment characterised new heads of households in Rabaa, accounting for 50% of those economically active and to both heads and all adults in El-Shoahit, accounting for 50.0% and 66.7% of their respective totals. Thus, self-employment predominates in areas containing a large number of skilled manual residents, a trend already observed in relation to the local samples. By comparison, full-time employees, representing over 60% of working heads and adults in each, distinguished the most accessible locations, i.e. El-Salam and El-Shoahit.

Table 9.20 All adults within new households: Employment status (number and %).

	1	2	3	4	5
Self-employed	5 (15.7)	3 (15.8)	4 (9.1)	4 (26.6)	3 (7.1)
Full-time (*)	8 (25.0)	4 (21.0)	23 (52.3)	1 (6.7)	20 (47.7)
Part-time(*)	1 (3.1)	1 (5.3)	2 (4.5)	1 (6.7)	3 (7.1)
Unemployed(**)	8 (25.0)	5 (26.3)	4 (9.1)	3 (20.0)	1 (2.4)
Retired/Invalid/ sick(**)	1 (3.1)	-	1 (2.3)	-	1 (2.4)
Housewife(+)	9 (28.1)	6 (31.6)	10 (22.7)	6 (40.0)	14 (33.3)

Note: (*), (**) combined and (+) excluded to facilitate statistical analysis.

1 Rabaa 2 El-Hasana 3 El-Salam
4 El-Shoahit 5 El-Matala

Table 9.21 All adults within local households: Employment status (number and %).

	1	2	3	4	5
Self-employed	16 (11.7)	18 (14.1)	13 (13.8)	32 (20.6)	17 (18.2)
Full-time (*)	45 (32.8)	34 (26.6)	41 (43.6)	29 (18.6)	34 (36.5)
Part-time(*)	4 (2.9)	3 (2.3)	2 (2.1)	8 (5.1)	3 (3.5)
Unemployed(**)	18 (13.2)	20 (15.6)	3 (3.2)	22 (14.1)	5 (5.4)
Retired/Invalid/ sick(**)	12 (8.6)	16 (12.5)	1 (1.1)	28 (17.9)	2 (2.1)
Housewife(+)	42 (30.8)	37 (28.9)	34 (36.2)	37 (23.7)	32 (34.3)

Note: (*), (**) combined and (+) excluded to facilitate statistical analysis.

1 Rabaa 2 El-Hasana 3 El-Salam
4 El-Shoahit 5 El-Matala

In seeking to describe the employment characteristics of interviewed households another key factor is their journey-to-work patterns. Tables 9.22 and 9.23 relate to this factor among local and new heads.

Perhaps the most striking single feature to emerge when the workplaces of new

and local heads are compared is the apparent transformation from a locally employed population to a largely commuting one. Over 60% of local heads, except in El-Salam (40.0%) and El-Matala (48.0%), were economically active within their present ward of residence (including those based at home), whereas the corresponding proportion for new heads of households was lower, representing only 1 in 2 in Rabaa, El-Hasana and El-Shoahit.

Table 9.22 Local economically active heads of households:

Journey-to-work patterns (number and %).

	1	2	3	4	5
Home-based	6 (28.6)	5 (26.3)	8 (12.0)	8 (38.1)	4 (16.0)
Locally within ward	7 (33.3)	9 (47.4)	7 (28.0)	7 (33.3)	8 (32.0)
Domestic Town	2 (9.5)	1 (5.3)	2 (8.0)	3 (14.3)	4 (16.0)
Elsewhere in D.C.A.	2 (9.5)	-	6 (24.0)	2 (9.5)	3 (12.0)
Outside D.C.A (locally)	3 (14.3)	4 (21.0)	5 (20.0)	1 (4.8)	3 (12.0)
Outside D.C.A (elsewhere)	1 (4.8)	-	2 (8.0)	-	3 (12.0)

1 Rabaa 2 El-Hasana 3 El-Salam
 4 El-Shoahit 5 El-Matala

Local employment was, therefore, only prominent in the remotest study locations where the results are derived from the large number of family-run businesses. For example, in El-Shoahit several new and local heads worked in pasturage within the village, while in Rabaa and El-Hasana the high proportions working from home included a small number of self-employed farmers, mechanics, tradesmen and, in Rabaa especially, those owning small businesses within the ward. In these three areas, the majority of heads were employed within approximately 3 km of their present home, i.e. 61.9% (13) in Rabaa, 73.7% (14) in El-Hasana and 71.4% (15) in El-Shoahit.

By comparison, the local heads of households in the most accessible localities generally commuted to work outside their home environment. For example, 52.0% (13) in El-Salam, 36.0% (9) in El-Matala travelled in excess of 8 km daily into the nearby urban centre (Table 9.22). In El-Salam and El-Matala, the major employment centres were the El-Arish and Rafah cities respectively, whereas in Rabaa the majority commuted to Bir El-Abd city.

Such urban-orientated employment was most apparent in relation to the new household samples, except El-Shoahit (Table 9.23 & Fig. 9.3). The most conspicuous figure on this table is that approximately 6 out of 10 of new heads of households in El-Salam journeyed outside the D.C.A. to work.

Table 9.23 New economically active heads of households:

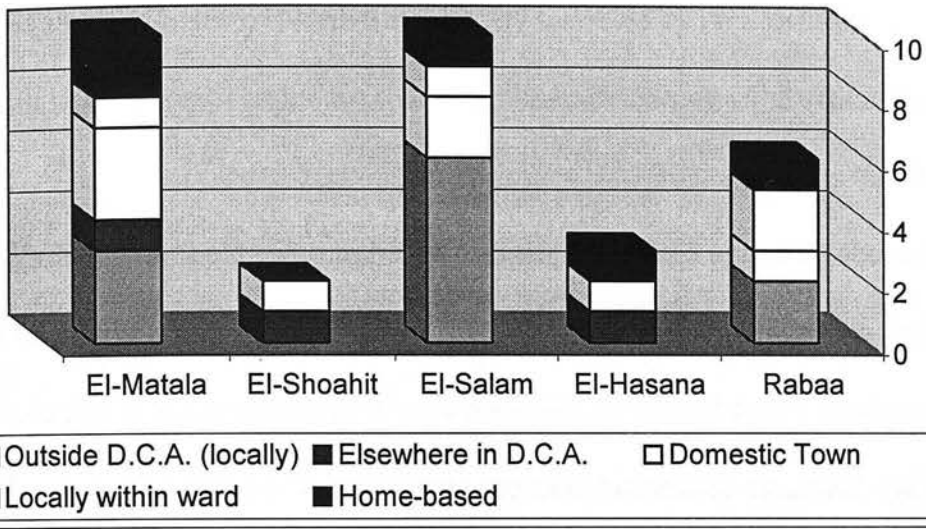
Journey-to-work patterns (number and %).

	1	2	3	4	5
Home-based	1 (16.7)	1 (25.0)	1 (10.0)	-	2 (18.1)
Locally within ward	2 (33.3)	1 (25.0)	1 (10.0)	1 (50.0)	1 (9.1)
Domestic Town	1 (16.7)	-	2 (20.0)	-	3 (27.3)
Elsewhere in D.C.A.	-	1 (25.0)	-	1 (50.0)	1 (9.1)
Outside D.C.A (locally)	2 (33.3)	-	6 (60.0)	-	3 (27.3)
Outside D.C.A (elsewhere)	-	1 (25.0)	-	-	1 (9.1)

1 Rabaa 2 El-Hasana 3 El-Salam
 4 El-Shoahit 5 El-Matala

Thus, with the exception of El-Shoahit, recent movers were more likely to work in an urban centre. Reflecting the limited employment opportunities in rural desert areas generally, new households including an increased number of heads involved in non-manual social classes commute to nearby urban centres.

**Fig. 9.3 New economically active heads of households:
Journey-to-work pattern**



In Chapter 6 it is demonstrated that areas within commuting distance of the principal urban centres had recorded a population growth. The survey data shows this to largely represent a purely residential expansion. As a theme that has been the focus of some repopulation literature, accessible rural desert areas in North Sinai were found to lend support to previous studies. For example, in the United States, Mitchelson and Fisher (1987) found a statistical correlation between population growth and levels of commuting, concluding that areas within commuting fields are most likely to be places of rapid growth. Similarly, Fuguitt (1990) believes that an increasing 'small town' function was to provide a satisfactory place to live for people who work elsewhere. Indeed, given the expansion of the service sector within the Province, which reflects the implications of the growth centre and district town strategies and whereby employment was largely urban-based, the rural reliance on large and medium sized settlements for employment is the result of regional policy. Importantly, in remoter locations greater numbers worked within their area of residence. Rather than representing greater employment opportunities in these areas, this shows that most were self-employed.

Notwithstanding the importance and continuation of increased level of commuting, the mode of conveyance is particularly important, as public transport in each area was viewed by many respondents as inadequate. In excess of 60% of commuters in the villages of North Sinai largely travelled by private modes of transport, irrespective of duration of residence, with the remainder taking a lift with a neighbour or a relative. As expected, car ownership in each area was higher than its counterparts in the Nile Valley, with the mean number of cars per household generally about 0.4 (Table 9.24). Although Portnov (1998a) uses levels of car ownership as an indicator of affluence, in this study it represents a basic necessity for a rural desert residence.

However, the mean number of cars per new household exceeded the figure for their local counterparts, suggesting greater affluence amongst the new sample and/or different life-styles and expectations. For example, the rural desert residence strategy by these people is, therefore, a mistaken one, or involves a perceived inconvenience they can overcome. Rabaa and El-Shoahit depart from this trend with the average number of cars per household less than 0.4.

Table 9.24 Mean number of cars per household.

	New Households	Local Households	Average
Rabaa	0.4	0.3	0.3
El-Hasana	0.5	0.4	0.4
El-Salam	0.7	0.6	0.6
El-Shoahit	0.25	0.4	0.3
El-Matala	0.6	0.5	0.5

Thus, although the high ratio, relatively, of new and local samples possessed private transport, several containing two or more vehicles, sizeable proportions in these areas did not. These were largely associated with older residents and, indeed, those

dependents on their relatives. Furthermore, given the high incidence of commuting, many non-economically active residents did not have access to private transport during working hours. This group was dependent on a poor public transport service.

It is worth stressing at this stage that the majority of new respondents in Rabaa viewed public transport in their area as adequate. Whether this represents a genuinely adequate service or contentment with a limited service, is discussed when examining service provision in a later chapter.

9.6 Housing Characteristics

The residential characteristics of the interviewed households are discussed under three principal headings; tenure, house type and location; property acquisition; and household amenities. Notwithstanding its rather obvious connection with repopulation, detailed research concerning housing characteristics is notably absent from the now voluminous literature concerned with a rural desert revival. Hegazy (2000b), although addressing virtually every other aspect of rural population growth, omits completely the importance of house availability. Similarly, Abo-Zeid (1996) seems to dismiss this aspect on the grounds that about 30% of whole migrants to North Sinai moved for housing reasons. However, irrespective of the motive for moving, it can only be fulfilled if property is available. Other studies, while discussing the social implications of the tenure of new arrivals, have left the type of property obtained, its location and acquisition almost exclusively to those with an interest in desert planning, e.g. Golany (1980, 1982) and Portnov (1997, 1998a). Nevertheless, both aspects are not separate identities. Instead, if we are to develop our understanding of rural desert population change, particular emphasis must be placed on the distribution and availability of housing.



Fig. 9.4 New Semi-detached housing in El-Hasana, North Sinai.

9.6.1 Tenure, House Type and Location

In accordance with tenure figures for North Sinai as a whole when compared with the rest of Egypt (Fahmi, 1995), the sampled households are distinguished by high levels of owner-occupancy (Table 9.25 & Fig. 9.5). Although rates were in excess of the 70% provided for the Province (CAPMAS, 1996), rural desert areas as a whole could be expected to exhibit higher rates. However, the proportion of home owners was notably greatest amongst the local sample in all study areas. This overall departure from previous studies was significantly different, despite at least 2 in 3 households, irrespective of duration of residence, being resident in owner-occupied accommodation.

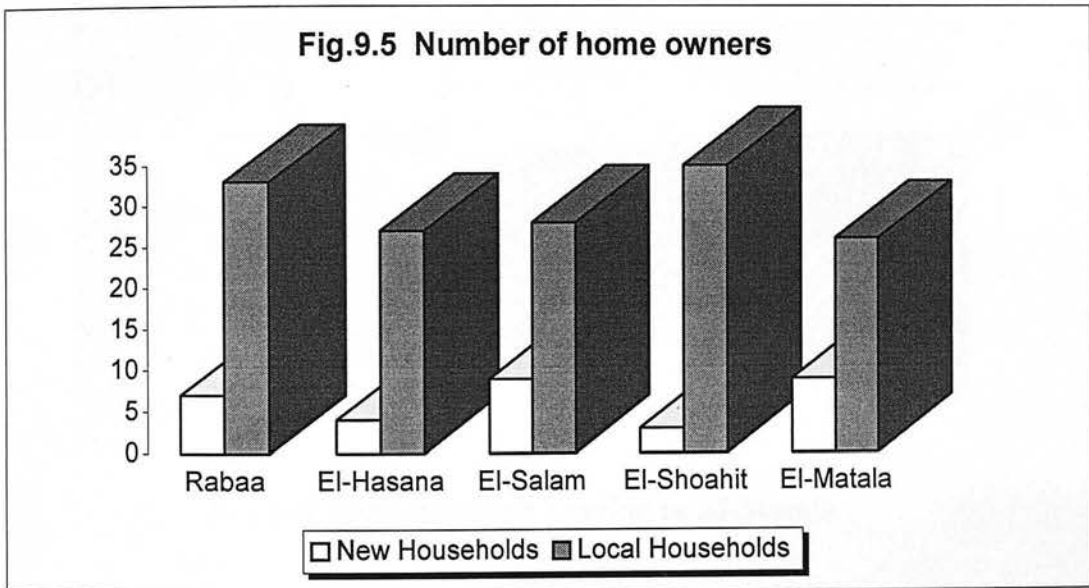
However, amongst new households a comparatively higher ratio lived in rented properties, most notably within the public housing sector.

The values obtained can be assumed to relate to public sector residential development in El-Hasana, El-Salam and El-Shoahit as well as in several areas in North Sinai. In contrast, Rabaa and El-Shoahit recorded the highest proportion of owner-

occupied households and no public housing sector at all in their locations.

Table 9.25 Number of home owners (number and %).

	New Households	Local Households	TOTAL
Rabaa	7 (70.0)	33 (91.7)	40 (87.0)
El-Hasana	4 (66.6)	27 (75.0)	31 (73.8)
El-Salam	9 (75.0)	28 (84.8)	37 (82.2)
El-Shoahit	3 (75.0)	35 (94.6)	38 (92.7)
El-Matala	9 (69.2)	26 (83.9)	35 (79.5)



These developments, although small and occurring during a recent period, the presence of new public housing projects especially in El-Arish, Rafah and El-Hasana were a major source of house availability in these locations (Hegazy, 2000b). The importance of public sector development was also noted in a previous study of Abo-Zeid (1991) who observes that a sudden rise in many desert communities population corresponded with substantial public sector developments. Indeed in the present study, although most were homeowners, public sector development accounted for a small, yet important, proportion of the sample and housed largely working-class families. Such

rented accommodation (models shown in Fig. 9.15 & 9.16) was most evident in El-Hasana, where 25% of the local sample also resided in public sector estates so that this area contained the largest non-owner-occupied population.

Turning now to the type of dwelling occupied: detached, semi-detached, temporary or traditional separate Bedouin, one would have expected that given the high incidence of owner-occupancy in these localities, the separate Bedouin style house so typical of rural desert areas would characterise the sample.



Fig. 9.6 Semi-detached housing in El-Matala

Semi-detached properties were only dominant in El-Matala (52.0%) and El-Salam (51.0%). In the remaining localities the separate Bedouin style proportions were comparatively high, varying from 87.8% of the total households interviewed in El-Shoahit to 54.8% in El-Hasana. However, as Table 9.26 & Fig. 9.8 show, slightly smaller proportions of new households were associated with this type of properties. Whereas, no statistically significant difference was observed in relation to the house type of new and local households, the tendency for the most recent movers in El-Salam and El-Matala to locate in detached and semi detached property is the most conspicuous of this data set. It was, however, largely associated with residence on a housing estate

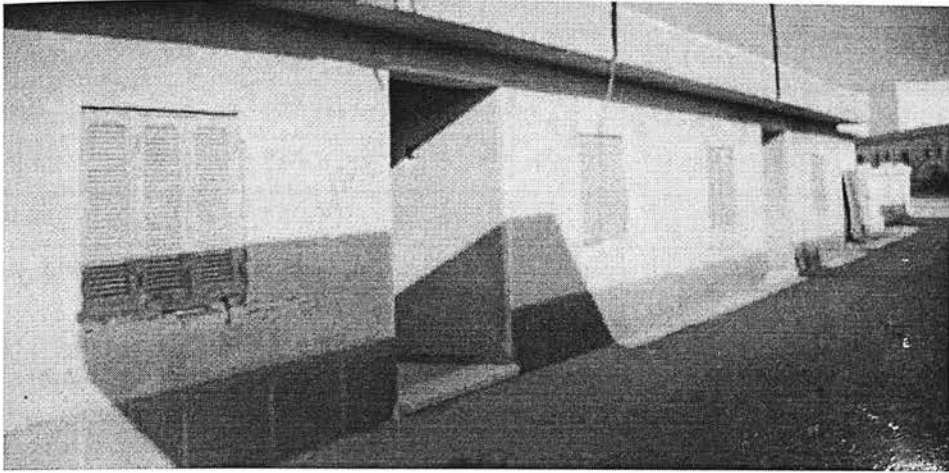


Fig. 9.7 Semi-detached housing in one block, El-Salam Village

Table 9.26 Residence on detached properties (number and %).

	New Households	Local Households	TOTAL
Rabaa	8 (80.0)	31 (86.1)	39 (84.8)
El-Hasana	2 (33.3)	21 (58.3)	23 (54.8)
El-Salam	5 (41.7)	15 (45.5)	22 (48.9)
El-Shoahit	3 (75.0)	33 (89.2)	36 (87.8)
El-Matala	5 (38.5)	16 (51.2)	21 (47.7)

Fig. 9.8 Residence on detached properties

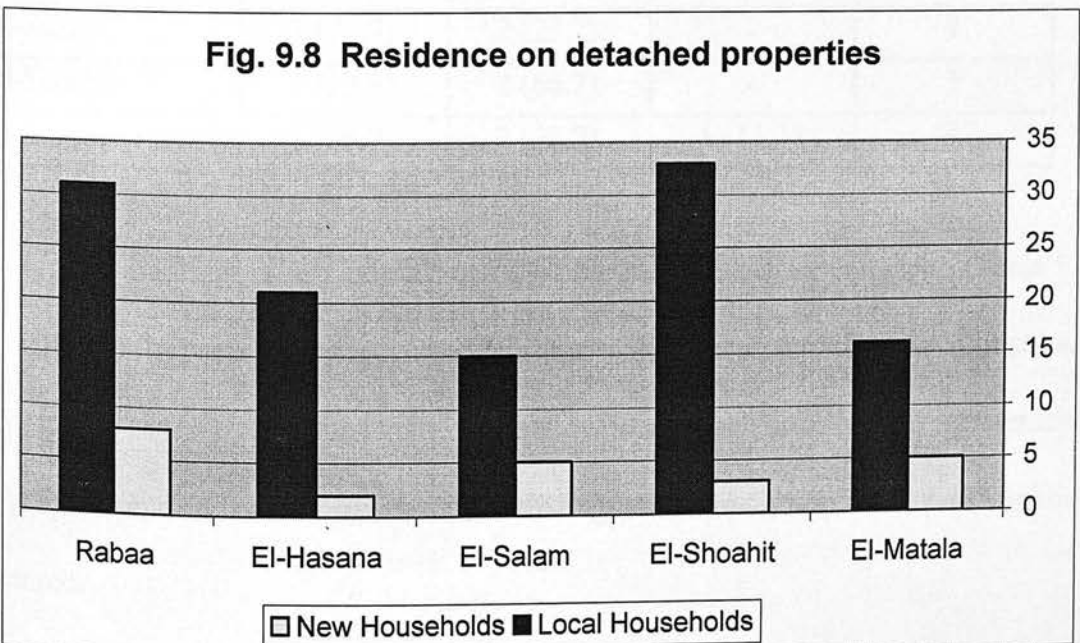


Table 9.28 Local households: Acquisition of homes (number and %).

	Purchase	Built	Inherited	TOTAL
Rabaa	6 (18.2)	11 (33.3)	16 (48.5)	33
El-Hasana	9 (33.3)	6 (22.2)	12 (44.5)	27
El-Salam	7 (25.0)	13 (46.4)	8 (28.6)	28
El-Shoahit	5 (14.3)	11 (31.4)	19 (54.3)	35
El-Matala	7 (26.9)	10 (38.5)	9 (34.6)	26

By comparison, although inheritance was common in the remaining localities - accounting for at least 1 in 4 homes - house building was more frequently cited: by 46.4% in El-Salam and 38.5% in El-Matala. In all, few of the local samples were associated with the purchase of property, although a third in El-Hasana had done so. Acquisition through house building or inheritance therefore, was representative of the long term samples.

Table 9.29 New households: Acquisition of homes (number and %).

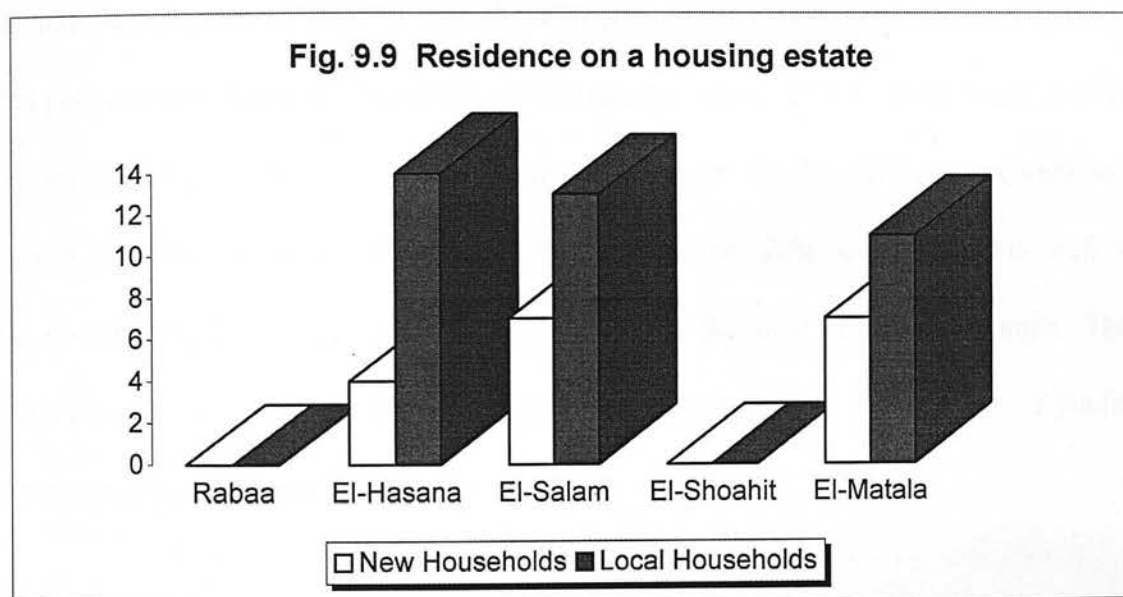
	Purchase	Built	Inherited	TOTAL
Rabaa	2 (28.6)	4 (57.1)	1 (14.3)	7
El-Hasana	2 (50.0)	1 (25.0)	1 (25.0)	4
El-Salam	7 (77.8)	2 (22.2)	-	9
El-Shoahit	1 (33.3)	2 (66.7)	-	3
El-Matala	6 (66.7)	2 (22.2)	1 (11.1)	9

This tradition is less notable amongst the most recent mover group (Table 9.29 & Fig. 9.12). In particular, acquisition by inheritance was under-represented, that mode having been stated by less than 25% of home owners in each area. Instead, greater levels of purchase and individual constructions distinguished this group, but again variations occurred.

Of areas within close proximity to a large urban centre; El-Salam and El-Matala,

Table 9.27 Residence on a housing estate (number and %).

	New Households	Local Households	TOTAL
Rabaa	-	-	-
El-Hasana	4 (66.7)	14 (38.9)	18 (42.9)
El-Salam	7 (58.3)	13 (39.4)	20 (44.4)
El-Shoahit	-	-	-
El-Matala	7 (53.8)	11 (35.5)	18 (40.9)



In each locality, except El-Shoahit and Rabaa, at least 1 in 2 of new households were resident on a housing estate. The corresponding proportion amongst the local sample, ranging from 40.9% in El-Matala to 44.4% in El-Salam. New households in El-Hasana, El-Salam and El-Matala were, therefore, distinguished by housing estate residence and semi-detached or detached properties. While suggesting that the new household sample was associated with the public sector developments, it was found that, of those residing in semi-detached/detached dwellings, only in El-Matala did 63% of this group accord with this assumption. In El-Hasana and El-Salam, 69% and 72% respectively owned their present homes. Although a possible product of recent

legislation allowing the purchase of North Sinai Housing Executive properties by sitting tenants (Hegazy, 2000), the findings in El-Hasana, El-Salam and to a lesser extent in El-Matala, represent recent private speculative development within their limits. In each location, new households were predominantly located within the village, whereas the local samples traditionally resided in dispersed housing in the surrounding desert.

Only in El-Salam did one in two local households reside within the village, results that accord with the description of this locality in Chapter 8. However, 69.8% of the new sample was situated within the village, occupying newly constructed private and public sector housing. Similarly, in El-Hasana, where 55.3% of the local sample resided in dispersed housing in the surrounding desert, 66.7% of recent movers had located in the village, and in El-Matala 79.2% of local residents were located as well in the surrounding desert, compared to about half of the new household sample. The association in these areas with village locations can be linked to the presence of public and private housing sector (Fig.9.13 & Fig.9.14).

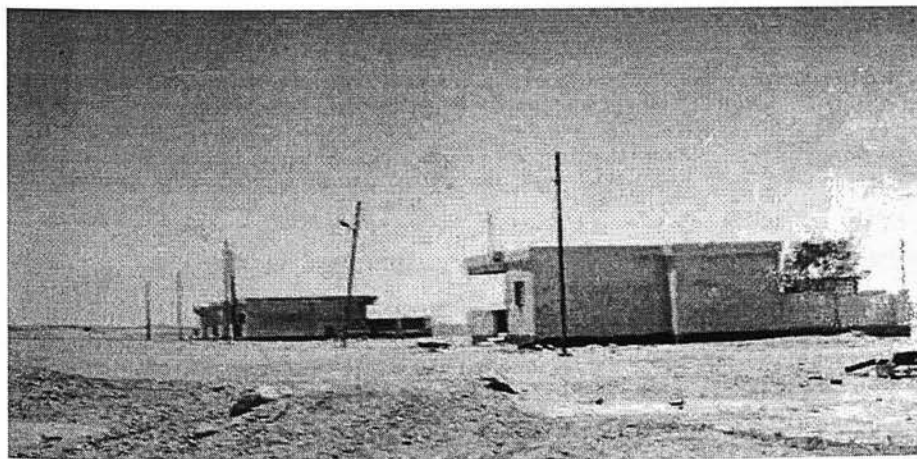


Fig. 9.10 Separate Housing, short distant in between, El-Shoahit.

As mentioned before, new and local households rarely lived side by side, with the difference verified by statistics.

In relation to the most traditional rural desert locations of Rabaa and El-Shoahit,

the majority of new and local households resident in the surrounding desert. However, in accordance with results elsewhere, a greater proportion of new households in these two areas reside within the village.

On the whole, both samples of new and local households in these two locations are distinguished by a high number of owner-occupied non-estate separate Bedouin residences.

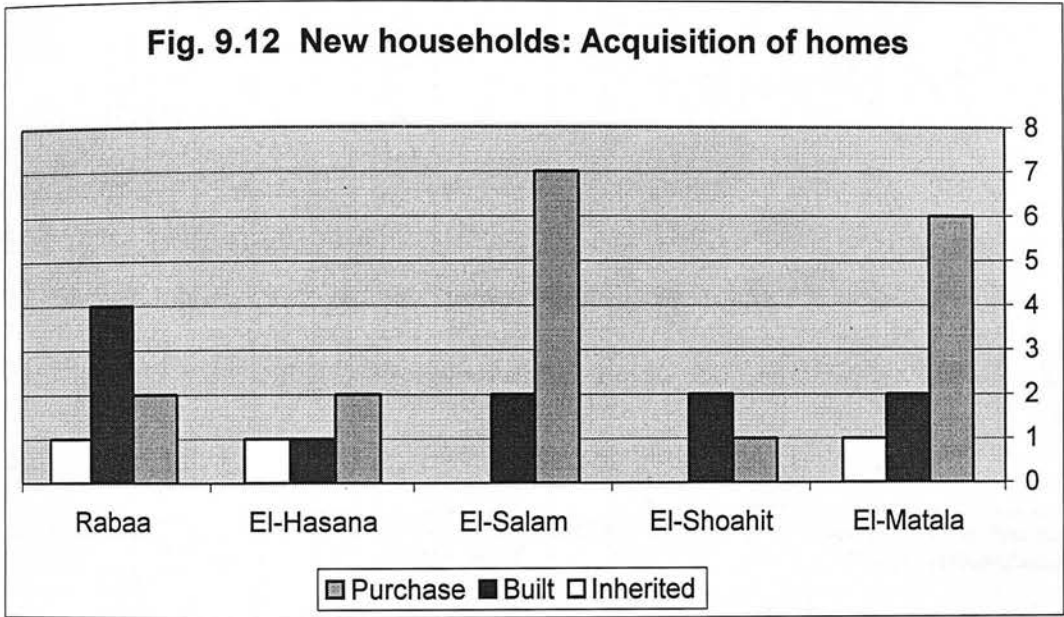


Fig. 9.11 Completely separate Bedouin residence with light fence to define the borders, El-Shoahit.

9.6.2 Acquisition of Property

Examining specifically the acquisition of the owner-occupied tenure group, Tables 9.28 and 9.29 provide the relevant data for local and new households in each area. Whereas the form of acquisition was not statistically different between areas in relation to the local sample, specific categories were comparatively more important in each area (Table 9.28). Generally, all three forms of acquisition were represented, but in the less urban-influenced localities, acquisition through inheritance was identified as the modal group (Rabaa, El-Hasana and El-Shoahit).

60% or more had purchased their homes, a trend also relatively repeated in the locality of El-Hasana. These values undoubtedly represent the purchase of dwellings within new private development “estates”. Consequently, the purchase of property is associated with areas containing a large number of detached, semi-detached and estate residences.



Thus, while local detached households dispersed throughout the surrounding desert are associated with inheritance and building of dwelling units, the evidence suggests that areas containing a new sample located within or close to a settlement involve the purchase of dwelling units in new private development estates. A statistically significant difference was obtained between the acquisition of new and local homes in each area.

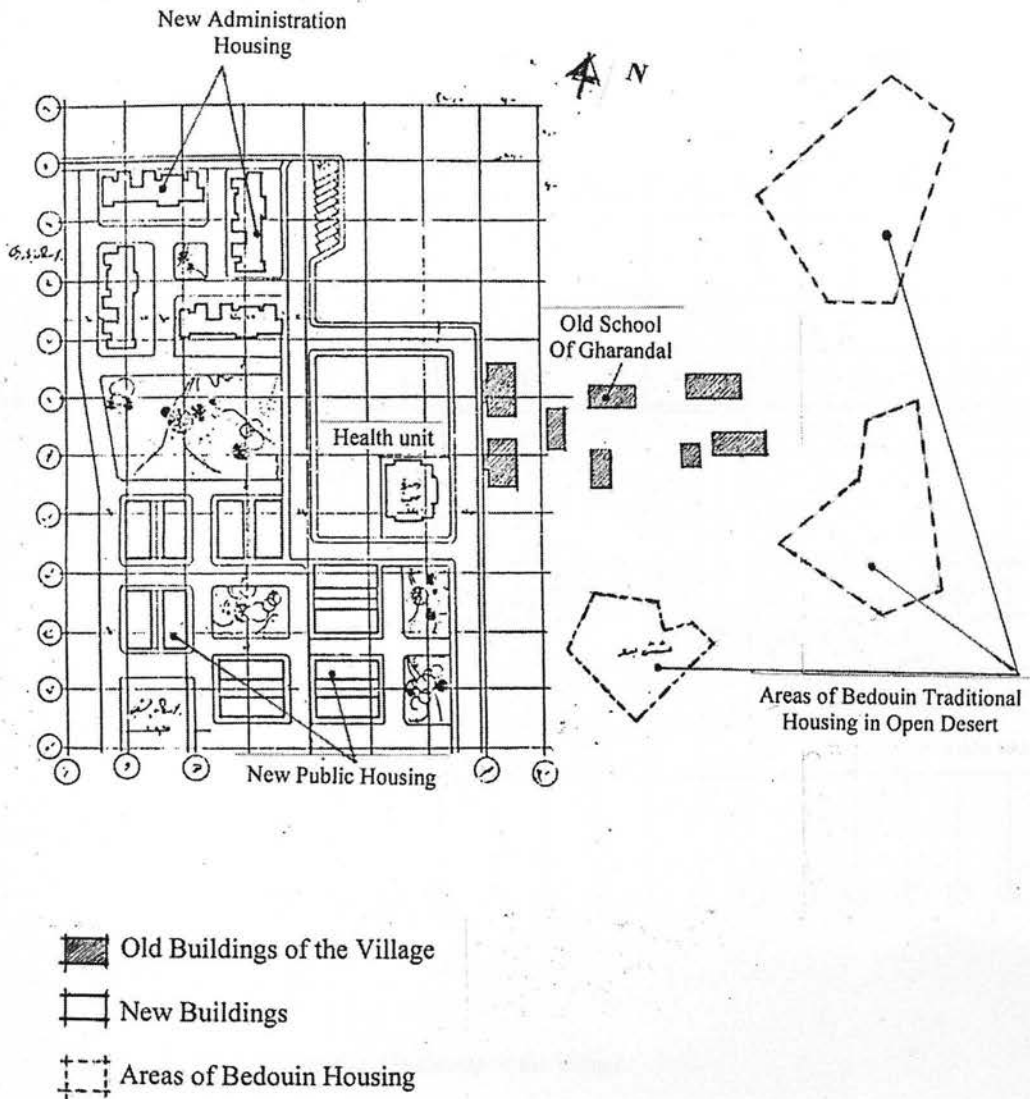


Fig. 9.13
Master plane of 'Gharandal Village'

**Example (1) for relation
 Between old and new Housing**

Source: Construction Agency of Sinai (2001)

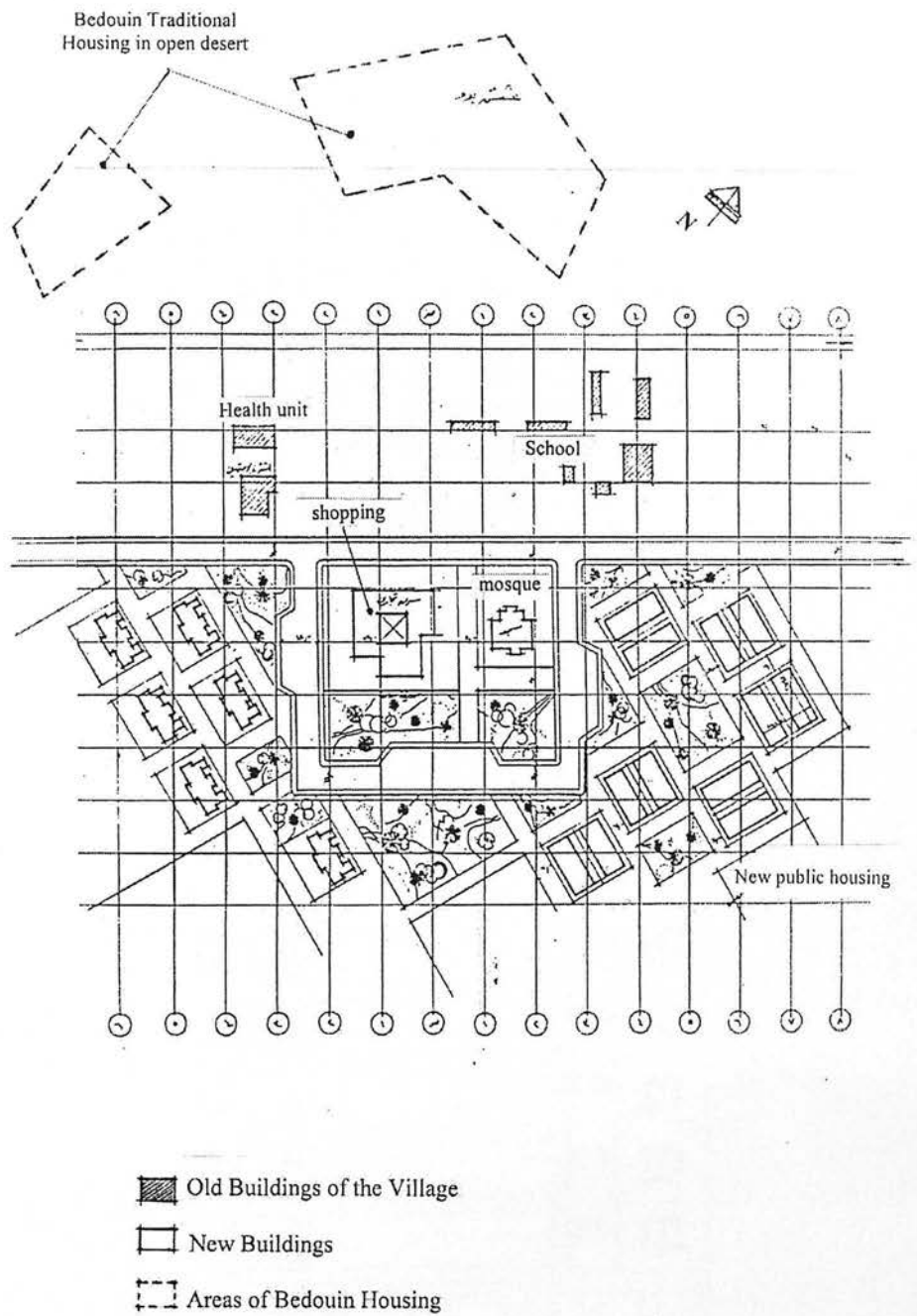
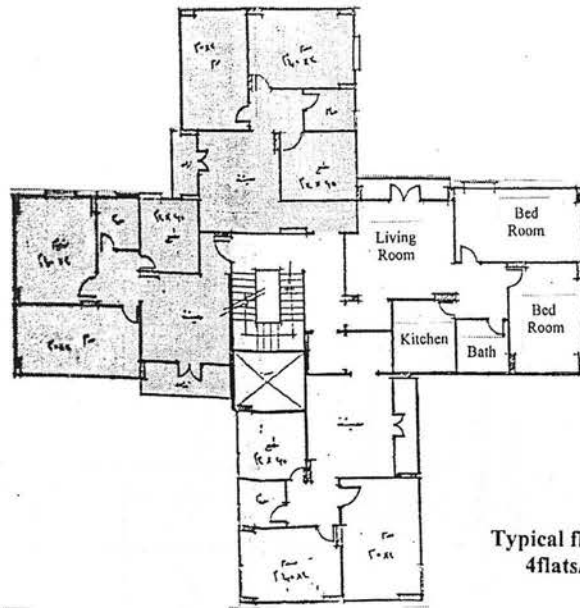


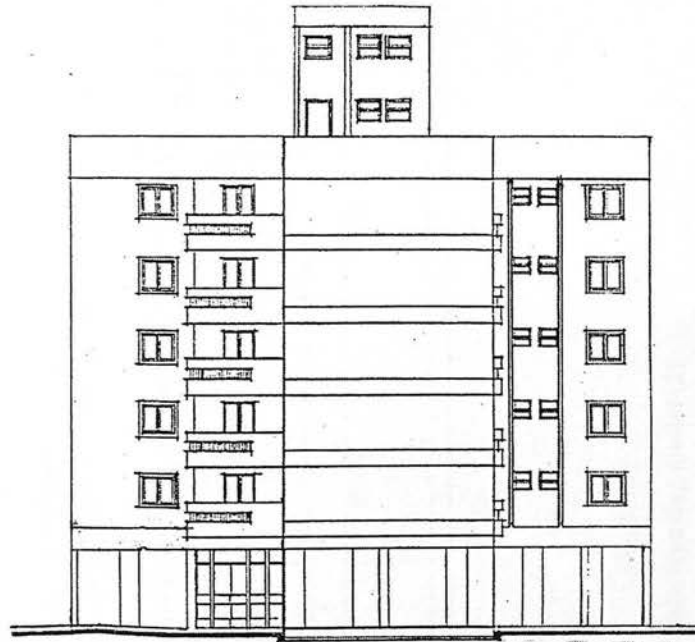
Fig. 9.14

**Master plan of 'Masala' Village
 Example (2) for Relation between Old & New Housing**

Source: Construction Agency of Sinai (2001)

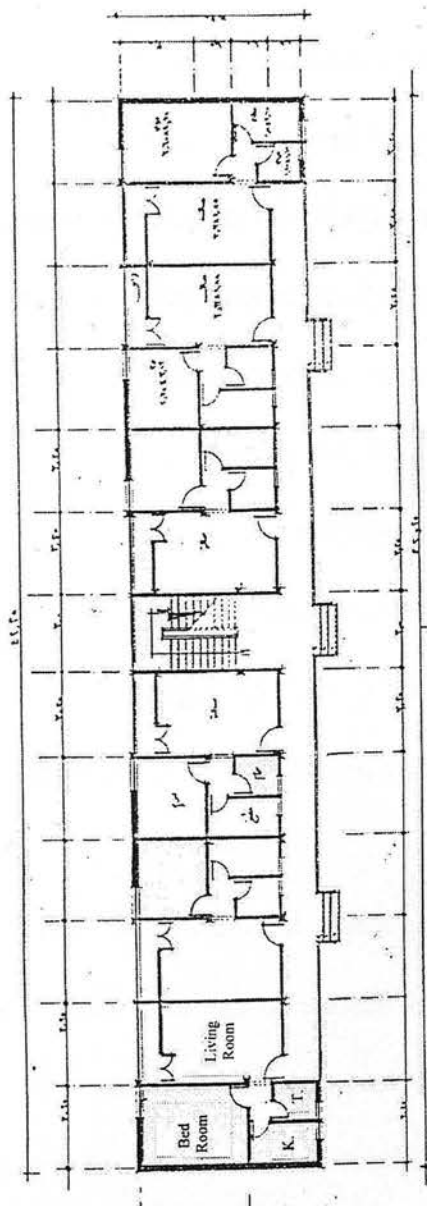


Typical floor plan
4flats/floor



Main Elevation

Fig. 9.15
Public Housing Model (1)
Source: Construction Agency of Sinai (2001)



Typical floor Plan
6 units / floor

Fig. 9.16
Public Housing model (2)

9.7 Conclusion

The findings presented in this chapter illustrate that specific traits identified in one area were not necessarily repeated elsewhere, and while some common characteristics were evident, statistically significant differences were most apparent amongst the new household samples. These, in particular, were seen to vary between localities, with the characteristics of new households in accessible locations being more variable than those of the local sample. By comparison, the characteristics displayed by both samples in more remote environments were largely similar.

In all areas contained a predominantly indigenous population, the size of the local household sample being greater than that of the new household. Whereas many families were brought up within their present D.C.A. and preceding mobility patterns primarily involved an inter- or intra-rural movement, a growing urban-rural flow in North Sinai was associated with areas within commuting distance of a principal settlement. Demographically, the age structure of new households was generally younger than that of the local population and consequently was associated with younger families.

With respect to levels of educational attainment, higher levels of practical environmental skills and greater numbers of unqualified people distinguished "local" residents. By comparison, the qualifications possessed by the most recent mover groups reflected educational changes as a whole, with more individuals in receipt of academic qualifications and fewer possessing no formal level of achievement. The social class of the new and local samples, whether measured in relation to the heads of households or all adults, was found to be largely similar. Importantly, more than a third of new household heads were assigned to the skilled manual social class in El-Salam and El-Matala, and in one only of the five study locations (El-Salam) was evidence obtained to

suggest that rural desert repopulation was associated with an uptake in farming practices. Many in the skilled manual social class were self-employed, often within their current area of residence, but the most salient feature associated with employment status was found to be the greater numbers within new households not economically active. Of those gainfully employed, no disparities were evident between the employment status of both samples in each area. Furthermore, despite an apparent increase in the level of commuting to an urban centre by the most recent movers, journey-to-work patterns were similar. Only in El-Salam and El-Matala was the increased reliance on a neighbouring urban centre found to be statistically significant.

Notwithstanding the general trends identified, the most obvious disparities arising in this chapter concerned residential characteristics. Recent movers were primarily located within different types of recent residential development in North Sinai.

In areas within proximity to a large urban centre or containing a sizeable settlement within its boundaries, new households were predominantly located within private speculative and public sector housing estates, but far from the traditional housing of local inhabitants (Bedouins). These were situated within the settlement or in the more accessible tracts of the ward. In remote localities containing a majority of local Bedouins, i.e. El-Shoahit and El-Hasana, individual house building in the open desert was more in evidence. However, no association was obtained between house building and specific social groups. By comparison, new household samples were located outside local household areas, except in El-Matala, so that only in this settlement, did "new" and "local" residents, in many cases, live side by side. This case may be related to its particular location close to the Egyptian border and to the variety of household activities.

Therefore, while disparities were evident between the demographic and socio-

economic characteristics of specific sub-samples, those on the whole were minor and in many instances were as expected, e.g. with regard to age structure and educational attainment. Further, whereas an increased urban-rural flow and increased urban reliance for employment were identified in specific locations, evidence of these trends was already apparent amongst their more long-term counterparts. Any variation is thus assumed to represent a continuation of previous trends but importantly a continuation of greater magnitude. It was only with respect to the residential characteristics of both samples that marked variations were in evidence.

CHAPTER TEN

**Residential Mobility and
the Relocation Process**

CHAPTER 10

Residential Mobility and the Relocation Process

10.1 Introduction

This chapter focuses primarily on the 'new' households sample and aims to identify the processes responsible for population growth within each of the study areas dispersed throughout North Sinai. It is intended to determine if urban-rural, inter-rural or intra-rural movement is the dominant flow, and to assess the relative importance of in-migration, return migration and rural desert retention in each area. Particular emphasis is placed on the origin of 'new households' and the decision-making processes associated with their most recent move. Attention is then directed towards traditional mobility patterns, examining the immediately preceding place of residence and also past out-migration patterns amongst the more long-term households. Finally, a short section discusses possible future moves to and from the area.

This chapter, therefore, concerns with the identification of past, present and indeed future rural desert mobility patterns, although the emphasis is on current processes.

10.2 Reasons Underlying Migration

With reference to the present study, it is unlikely that a single mobility flow will be found to be responsible for changes in the rural population. Instead, given the variability of rural desert environments included, equally varied patterns of residential mobility are expected. Furthermore, given the almost universal 'law' that the majority of migrants move only a short distance (Ravenstein, 1885), residential mobility may well be found to closely reflect lifetime migration patterns (section 9.4.1). On this basis, an urban-to-rural flow is expected to predominate in localities adjacent to an urban

centre, i.e. El-Salam and El-Matala, whereas in more remote environments it is assumed that the often neglected aspect of mobility, inter- and intra-rural movements will take on a greater importance.

Arguably the most important aspect of residential mobility is the decision-making process, and this behavioural approach to migration theory is highly complex. For some there must be

“...compelling reasons for migration while for others little provocation or promise suffices” (Lee, 1966 p.51).

Lee (1966) further notes four factors which enter into the decision to migrate:

1. Factors associated with the area of origin;
2. Factors associated with the area of destination;
3. Intervening obstacles including distance; and
4. Personal factors.

Rarely are the reasons for a move identical for each individual. Importantly, they vary depending upon life-cycle stages and on socio-economic and personality characteristics. Moreover, in retrospect, many movers find it difficult to explain their actions; there is a certain degree of caution when analysing responses. The reasons provided by a migrant are, therefore, crude simplifications of complex behavioural situations (Portnov, 1998b).

In recognition of this problem, Poot (1996) proposes that the act of migration relate specifically to the availability of opportunities that may include housing or employment, with the number of persons travelling a given distance being proportional to the number of relevant opportunities. Similarly Bennett (1993) identifies three central concepts of migration behaviour; place utility, the field theory approach to search behaviour and the life-cycle approach to threshold behaviour. Accordingly, migrants move within their ‘action space’ and thus perceive and act upon their social economic and physical environment with varying degrees of rationality (Jones, 1990). However, it

has been the systems approach to migration behaviour (Livi-Bacci, 2001) which has increasingly been utilised to describe mobility patterns. Such an approach views migration as a complex of interacting elements, attributes and relationships.

Whereas numerous reasons may be provided for a person's decision to migrate, these are rarely derived rationally and are unlikely to be derived in the same way by each individual. Nevertheless, common factors are important, namely: distance, the presence of opportunities and the presence of obstacles, each of which vary in relation to differing socio-economic, personality characteristics and stage in the life-cycle. These concepts are no different with regard to a rural relocation, although a repopulation of the desert settlements has been associated with a greater awareness of varying motives at each stage of the decision-making process (Bolton and Chalkley, 1990).

The decisions to move, irrespective of the choice of relocation, are widely acknowledged to involve traditional migration decisions (Jones, 1990), but perhaps contrary to other migration sequences, the decisions involved in the choice of relocation and destination are highly variable, involving economic, social and environmental considerations. These again vary widely for individual migrants. However, despite the variability and complexity of the decision-making process, environmental considerations and the expression of residential choices more than most other reasons are particularly associated with repopulation in rural desert areas. This aspect is discussed in greater detail in section 10.6, but attention is first directed towards a more detailed assessment of the magnitude of repopulation trends and the mobility flows involved in the present study areas.

10.3 Duration of Residence

In the previous chapter (section 9.2) the sample in each area was differentiated into 'new' and 'long-term' households resident at their present address. The size of the 'new household' sample, i.e. those resident for less than ten years, was found to be of a relatively high ratio in the more urban-influenced wards under study (El-Salam and El-Matala) where such numbers represented in excess of 25% of the households sampled in each locality. By contrast, the 'new household' proportions accounted for about 10% of those included in the more remote locations of El-Shoahit and Rabaa. In this section, the duration of residence of the most recent movers is differentiated further in order to determine whether the alleged repopulation of the countryside occurred through the ten year period.

Table 10.1 presents the mean duration of residence for the 'new household' sample in each area and, while no statistically significant difference was obtained across areas characterised by durations of between 4 and 5 years, it is observed that the lowest mean duration is associated with El-Salam and the highest with El-shoahit.

With reference to Table 10.2 & Fig.10.1, which further divide the 'new household' sample into those resident for less than and more than 5 years, it is found that not only is movement within 5 years prior to the interview important in all areas, the alleged repopulation also appears as a relatively recent trend and one that is increasing numerically. Only in El-Matala did mobility levels appear stable over the ten year period, but no statistically significant difference between areas was obtained.

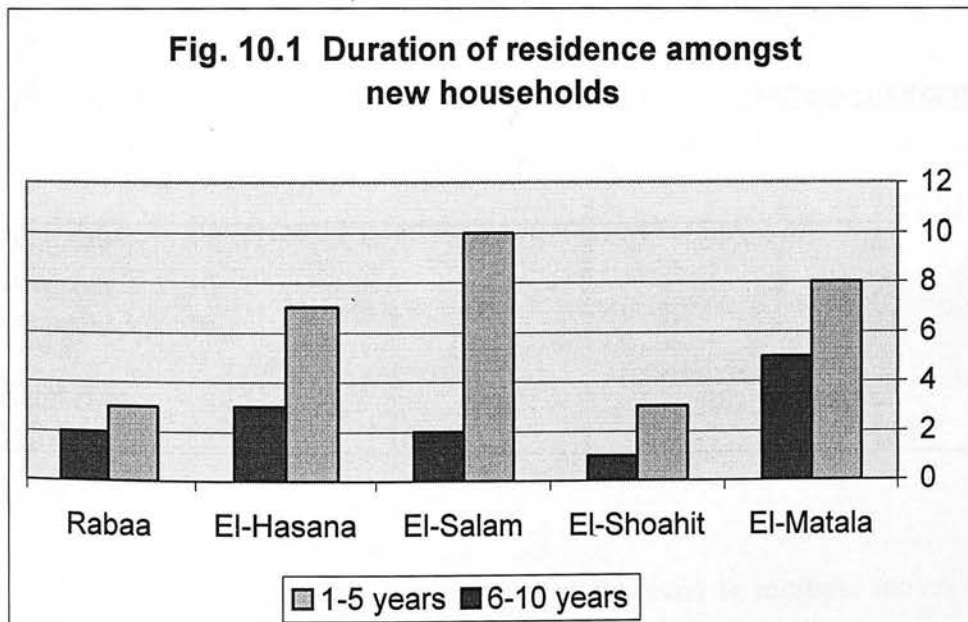
Table 10.1 **New households: Mean duration of residence.**

<u>Area</u>	<u>Mean</u>
Rabaa	4.32
El-Hasana	4.24
El-Salam	4.09
El-Shoahit	5.13
El-Matala	4.47
<u>TOTAL</u>	<u>4.52</u>

Of incidental interest, approximately one-third of the sampled households in El-Salam and El-Matala were found to be resident at their present address for less than two years. Such evidence perhaps verifies earlier suggestions that de-concentration originally involved a move to the larger settlements bordering the conurbation and has progressively moved down the urban hierarchy within individual areas.

Table 10.2 Duration of residence amongst new households numbers and (%).

	1-5 yrs	6-10 years	TOTAL
Rabaa	3 (60.0)	2 (40.0)	5
El-Hasana	7 (70.0)	3 (30.0)	10
El-Salam	10 (83.3)	2 (16.7)	12
El-Shoahit	3 (75.0)	1 (25.0)	4
El-Matala	8 (61.6)	5 (38.4)	13



However, it is not yet apparent within the Province of North Sinai whether the empirical evidence presented may denote the early stages of a more pronounced rural desert growth, which might thus reflect not only a more wide spread rural growth but also a greater number of households involved. In particular, as relatively high proportions of new households are associated with El-Salam and El-Matala, proximity to a large urban centre is an important factor in rural desert population growth.

10.4 Residential History

In an attempt to determine if moves to a rural desert residence were characterised by a number of progressively rural moves culminating in their present location, a section of the questionnaire addressed the residential history of new households within a ten year period prior to interviewing. Three adults within each household were asked to identify a maximum of four moves. While primarily concerned with the 'stepped element' of migration, this has the added advantage of determining if the new household sample was a highly mobile group, thus assessing its potential for 'repeat migration'. Whereas some population studies successfully use migration sequences to determine the principle characteristics and influential forces behind return migration, within the present study a similar investigation could not be applied.

Table 10.3 Frequency of moves ten years prior to interviewing (newcomers)

	Number of moves.				TOTAL
	1	2	3	4	
Occupant 1	32	7	3	2	44
Occupant 2	30	6	2	1	39
Occupant 3	16	3	2	-	21
Number of Individuals	78	16	7	3	104

Firstly, relatively few occupants were involved in multiple moves (Table 10.3), with approximately only 25% having moved on at least 2 occasions during the ten year period. Secondly, as the modal type of move involved a change of residence within the immediate locality (44.3%), it did not support hypotheses pertaining to a sequence of moves resulting in a rural location.

However, Table 10.4, relating to the nature of flows at each move, does suggest that multiple movers included a large intra-urban component. For example, one-quarter of all 'second most recent' moves, one-third of the 'third most recent' move, and

approximately half of the 'fourth most recent' move, involve inter-urban changes of address. By comparison, the immediately preceding change of residence involved a greater variety of moves, of which movement within or between rural-type locations appears to be dominant.

Table 10.4 Multiple movers: Nature of flows at each move (%)

	Most recent	2 nd	3 rd	4th
Rural-rural	47 (45.2)	3 (11.6)	1 (10.0)	-
Rural-urban	10 (9.6)	5 (19.2)	1 (10.0)	1 (33.3)
Urban-rural	28 (26.9)	7 (26.9)	3 (30.0)	-
Urban-urban	19 (18.3)	11 (42.3)	5 (50.0)	2 (67.7)
TOTAL MOVES	104	26	10	3

On the whole, the recent rural revival is not characterised by a highly mobile population, with the number involved in a multiple moves largely reflecting a change of lodgings during third level education or during their early years of employment. Such moves were found to have taken place over relatively short distances and within the same urban centre. Turning briefly to those individuals who originally moved from an urban centre to a rural-type environment, i.e. to dispersed housing in the surrounding desert or to a village location, and subsequently moved again, most could be related to different stages of the life cycle. They subsequently returned to an urban centre upon commencing employment and moved again upon marriage, often returning to a rural-type environment. Several moved twice since their marriage, first into public rented accommodation and then into the owner-occupied sector. This was most notable in El-Salam, where many newly married couples had originally moved to El-Arish city and then returned to their home locality when a house became available.

Finally, in El-Matala ward an additional dimension to this sequence of moves is revealed. Again, each change of address related to a particular stage in the life-cycle,

but each was also accompanied by a progressive move further from the city of Rafah. For example, original changes of address involved a move from the city to urban centres within the 'daily urban system', and then perhaps to smaller centres and, finally, to the village of El-Matala.

While these results are interesting, caution must be exercised due to the small numbers included in the sample. However, the topic does warrant further detailed investigation in future research, particularly in relation to a comparison of flows in different type of rural desert environment.

10.5 Immediately Preceding Places of Residence

Thus far in this chapter repopulation has been seen to involve a significant number of households within five years of the interview and, on the whole, was not found to be associated with a highly mobile population. Instead, relatively few movers were associated with a sequence of moves culminating in a rural desert residence. While the emphasis in this section is placed on the residential mobility of the new household sample and, therefore, recent repopulation patterns, mobility flows pertaining to the long-term households are incorporated for comparative purposes. As in the examination of lifetime migration in the previous chapter, the analysis includes not only the immediately preceding place of residence, but also its locational category. Households are thus tabulated in relation to whether they moved from an urban or rural location. As regards the former place of residence, data are disaggregated into 4 categories, with those moving from elsewhere in Egypt, to form an "outside North Sinai" category of origin. Tables 10.5 and 10.6 relate to the 'long-term household' sample and tables 10.7 and 10.8 to the recent mover group.

Mobility patterns occurring at least ten years prior to the interview display regularity between areas (Tables 10.5 and 10.6). Each is characterised by short distance

moves, within the respective Domestic Council Area (D.C.A.), and in three areas more than half previously resided elsewhere within the immediate locality of their present ward of residence. Accordingly, high proportions originated from rural-type locations – dispersed housing in the surrounding desert or villages – accounting for over 70% in each area.

Table 10.5 Long-term households: Former place of residence number and (%).

	Within ward	Elsewhere in D.C.A.	Elsewhere in North Sinai	Outside North Sinai	TOTAL
Rabaa	37 (65.9)	2 (4.9)	11 (26.8)	1 (2.4)	41
El-Hasana	17 (53.1)	3 (9.4)	7 (21.9)	5 (15.6)	32
El-Salam	19 (57.6)	2 (6.1)	12 (36.3)	-	33
El-Shoahit	25 (67.6)	6 (16.2)	5 (13.5)	1 (2.7)	37
El-Matala	13 (41.9)	13 (41.9)	4 (12.9)	1 (3.3)	31

Table 10.6 Long-term households: Former locational category number and (%)

	Surrounding desert	Urban	Village	TOTAL
Rabaa	26 (63.4)	9 (22.0)	6 (14.6)	41
El-Hasana	13 (40.6)	8 (25.0)	11 (34.4)	32
El-Salam	19 (57.6)	9 (27.3)	5 (15.1)	33
El-Shoahit	27 (73.0)	2 (5.4)	8 (21.6)	37
El-Matala	20 (64.5)	6 (19.4)	5 (16.1)	31

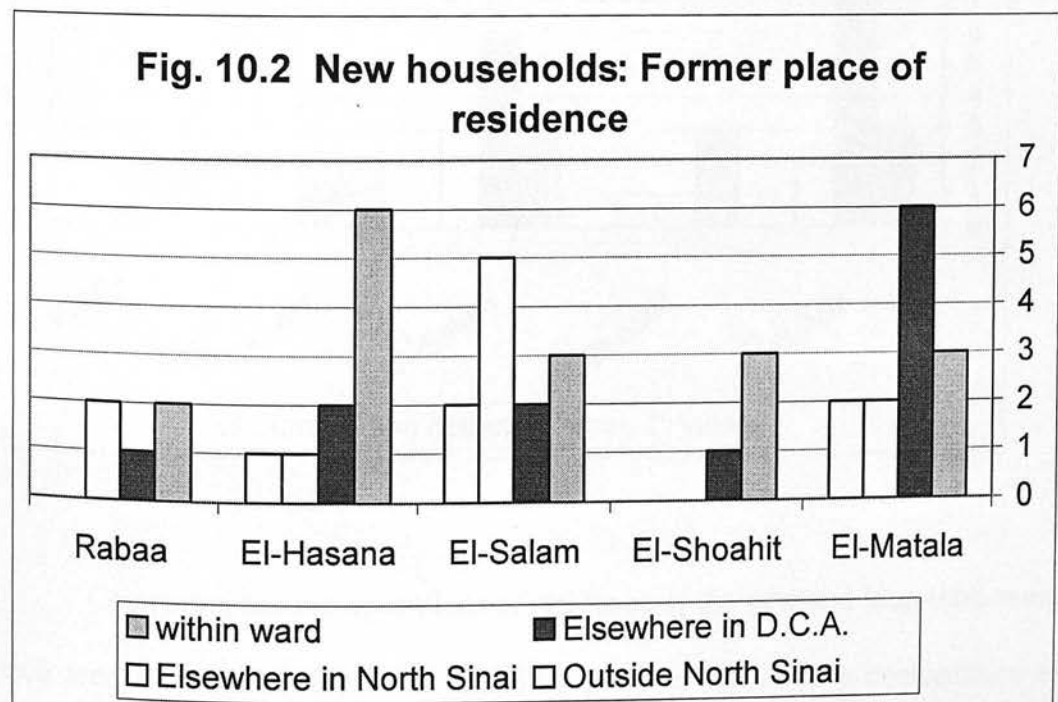
Turning now to more recent mobility patterns, i.e. those which took place no more than a decade prior to the interview, the almost exclusive reliance by some researchers on the in-migration component seems inappropriate within a North Sinai context. Instead, the evidence from the present study suggests that short distance moves, including inter- and intra-rural movements, are more important (Fig. 10.2 and 10.3).

In El-Hasana and El-Shoahit especially, the single most important recent move involved a change of residence within the actual ward boundary of each. New households presently lived within a short distance of their former home, and thus were characterised by rural origins (surrounding desert or village). In four of the five locations (the exception being El-Salam) movement within the local D.C.A. dominated, accounting for more than half of the total changes in residence.

Even in Rabaa, where 2 out of 4 originated from elsewhere within the Province, the categorisation of 'former residence' reveals local moves.

Table 10.7 New households: Former place of residence (number and %).

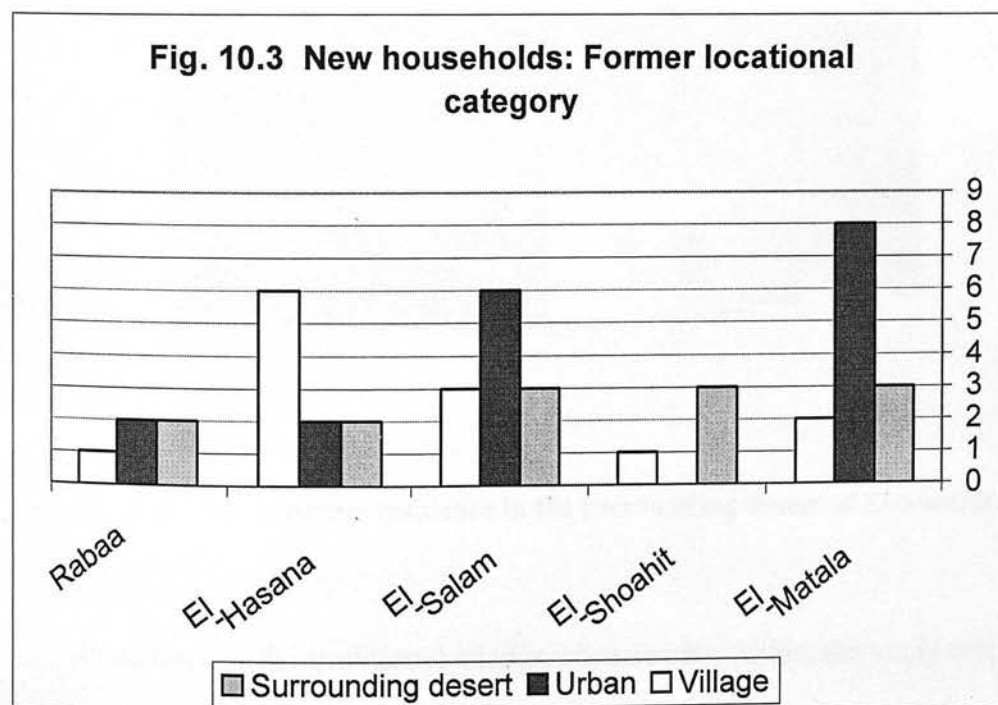
	Within ward	Elsewhere in D.C.A.	Elsewhere in North Sinai	Outside North Sinai	TOTAL
Rabaa	2 (40.0)	1 (20.0)	2 (40.0)	-	5
El-Hasana	6 (60.0)	2 (20.0)	1 (10.0)	1 (10.0)	10
El-Salam	3 (25.0)	2 (16.7)	5 (41.6)	2 (16.7)	12
El-Shoahit	3 (75.0)	1 (25.0)	-	-	4
El-Matala	3 (23.1)	6 (46.1)	2 (15.4)	2 (15.4)	13



More significant is the apparent long distance move associated with El-Salam, where in excess of 50% of new households originated beyond the D.C.A. Of this flow, 80% were found to have formerly resided in an urban centre, most notably within the area of El-Arish (the capital of the province).

Table 10.8 New households: Former locational category (number and %)

	Surrounding desert	Urban	Village	TOTAL
Rabaa	2 (40.0)	2 (40.0)	1 (20.0)	5
El-Hasana	2 (20.0)	2 (20.0)	6 (60.0)	10
El-Salam	3 (25.0)	6 (50.0)	3 (25.0)	12
El-Shoahit	3 (75.0)	-	1 (25.0)	4
El-Matala	3 (23.1)	8 (61.5)	2 (15.4)	13



Comparing the previous place of residence of the new and long-term samples in each area, it is found that recent mobility patterns appear as a continuation of past trends, but importantly involve a greater number of households in all but one area

(Rabaa). While statistical differences are evident between areas in relation to the immediately preceding place and location of new households, a statistical difference was only obtained in relation to the former place of residence of the most recent and established household in El-Salam. Notably, of those who moved to their present address more than a decade prior to the interview, approximately 60% involved a movement within the ward boundary: the attraction of migrants from greater distances (beyond the D.C.A.) representing an emerging trend in more recent years. As expected, an urban-to-rural movement was more important amongst new households in this area. Further differences were apparent between new and long-term households in relation to each's former locational category in El-Matala. Again these results form a greater influx of urban-origin migrants than previously. In this area, the urban centre was within its respective D.C.A.

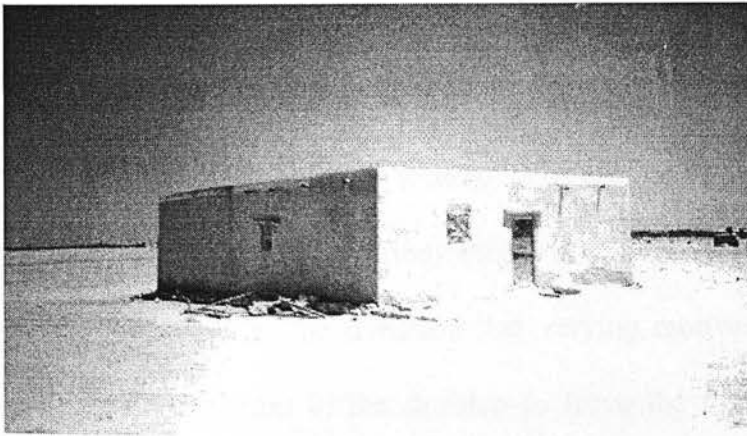


Fig. 10.4 Separate residence in the surrounding desert of El-Shoahit

In summary, the traditional change of residence within the study areas has been accompanied by, and in some cases superseded by, an urban-to-rural flow from a wider geographical area especially in El-Salam and El-Matala.

The immediate results also suggest that the retention of residents is an important factor in the alleged population revival of many rural desert areas. Importantly, this

factor was associated with the more remote and rural localities of El-Hasana and El-Shoahit (Table 10.7). Referring to birthplace data for occupants 1 and 2 in each new household in these two areas, as presented in section 9.4.1, it is apparent that not only are these areas retaining former residents, but 1 in every 2 had been brought up in the ward in which they now reside (Ch. 9, Table 9.3). Varying mobility patterns, therefore, characterise differing rural desert environments. Both urban-to-rural and inter- and intra-rural movement processes are affected by distance, the former by the distance from an urban centre, the latter by the distance between rural settlements.

10.6 The Decision-Making Process

Having noted that new households are characterised by short-distance moves, largely within or between rural desert type environments, with an urban-to-rural flow only significant in the most accessible locations, the research now turns its attention towards decision-making processes of households involved in a change of residence. Several questions were incorporated in the interview schedule relating to a number of possible decisions a 'migrant' might have to make. The change of residence is viewed within the principle reasons stated at various stages of the move and incorporates a growing awareness expressed in the literature that varying motives operate at each stage. Reasons cited as important in the decision to leave the former residence are compared with those for choosing the present locality.

There are differing opinions as to the motivations for a rural-ward move. Some believe historical economic and employment reasons are no longer the dominant influence on migration behaviour. However, Jones (1990) proposed such factors continued unabated. To date, as was observed in relation to the causes for a desert revival, no single set of motives pertaining to the individual migrant has emerged. Instead, the reasons vary between studies and indeed between different stages of the

decision-making process. For example, Abo-Zeid (1996), in his study examining the 'Turnaround' in El-Arish (the capital of North Sinai), found that the decision to move related to non-economic factors, the decision to choose El-Arish as a suitable area for relocation related to economic factors, and the choice of destination within El-Arish was influenced by property availability. Despite, the variability of motives, two trends have commonly been documented:

- Firstly, environmental factors are now widely believed to be an influential force in the repopulation of desert areas, with Livi-Bacci (2001) suggesting that the strongest evidence for environmental considerations and, consequently, residential preference is not the result of any one study; instead it is the striking consistency among the results from all studies.
- Secondly, a prior connection with the area may be an important factor in the choice of destination.

It is expected, bearing in mind that residential mobility in the present study localities were characterised by short-distance moves, with many movers having been brought up in their present area of residence (section 9.4.1), that the decision-making process will include a reference to close personal ties with their present area of residence. Further, as many moves involved a change of residence within the actual study areas, it is hypothesised that the presence of family, both nuclear and extended, may act as a "desert control sub-system" (Portnov and Erell, 1998a). Similarly, because a change of address largely involves a move to a newly constructed dwelling (section 9.6), it is anticipated that property-related factors will be frequently cited with regard to the decision to move. If environmental considerations, including a desire to reside in a desert setting, are divulged, it is assumed that these will be most common amongst movers resettling within the study areas. Moreover, because El-Salam and El-Matala, where farming resources were available, attracted a greater proportion of new

households (section 9.4.2) agricultural migration is potentially most discernible in these areas.

Employment opportunities, availability of property, convenience, or a rural desert preference may influence the choice of relocation, with family ties acting as a potential retaining agent. Thereafter, the choice of actual destination could reflect a variety of reasons including its social attributes (such as community spirit), its desert character and its convenient settings, besides family connections.

Thus far, mobility may involve movement by urban residents to accessible desert settlements or by rural residents within or between rural-type desert environments. Four environments are included: 'remote desert', 'village', 'accessible rural desert settlement', and 'urban centre', with the potential mobility flows leading to a repopulation of rural desert areas. An urban-origin migrant rarely moves directly from 'urban centre' to 'remote desert location'. Conversely, the contribution of rural-origin migrant to repopulating rural desert areas, includes a movement up the urban hierarchy but a continued residence in a rural locality. These flows are now related to specific migratory decisions.

A move for employment reasons suggests relocation within proximity of an urban centre, bearing in mind that relatively few rural desert areas provide employment opportunities. Thus, rural-origin migrants may relocate close to an urban centre and, similarly, those of an urban origin may choose an accessible rural settlement over the urban centre itself. Importantly, both flows are dictated by the migrants' commuting tolerance.

Marriage may 'necessitate' a move, generally towards an urban centre, while the 'desert control sub-system' of family ties may keep the potential out-migrants within their home locality. Similarly, improved facilities may act as a mobility stimulus for some, including elderly movers, with settlements containing a variety of services

appearing more attractive. However, community ties and indeed the presence of family members suggest this group will only move to the next sized settlement within their present locality of residence.

Environmental considerations are an increasingly prominent feature of the repopulation literature and, along with a desire to reside in a desert setting, are assumed to influence the decisions of urban-origin migrants. This suggests a move to an accessible rural settlement or rural village, but rarely to a remote rural location. Finally, return migration is a potential contributing factor to repopulation trends and supports a movement down the urban hierarchy to the migrant's home locality.

In relation to each of these hypothesised stimuli, residential planning policies and the availability of housing are assumed to dictate the choice of destination and, accordingly, in which environment the potential migrant relocates. Using this as a framework for analysis, the principal decisions involved at each stage of the relocation process, by new households in the present study, are now examined.

10.6.1 Reasons for Moving

All 44 new households interviewed provided a reason for their decision to move. These were subsequently categorised into 7 groupings, with the relative importance of each presented in Table 10.9. The most important single reason was property-related (except in El-Shoahit and Rabaa), accounting for at least 20% of the total moves in each area. Such consistency dispels any notion that 'movers' in remote and accessible areas move for different reasons. Employment was generally the second most frequent reason, being most commonly cited in El-Hasana and El-Salam. All in all, over half of the total moves were property- or employment-led. This domination of reasons corresponds to specific stages of the life-cycle. For example, marriage calls for a larger or smaller house and was implicated among largely short-distance moves. Such a

stimulus reflects changes in the family structure rather than a response to any wider economic or non-economic changes in society.

Table 10.9 Principal reasons for moving (%).

Reason	Rabaa	El-Hasana	El-Salam	El-Shoahit	El-Matala
Family ties	20.0	30.0	-	50.0	7.7
Marriage	-	10.0	8.3	-	7.7
Property	20.0	30.0	33.4	25.0	38.5
Environment	-	-	8.3	-	15.4
Facilities	20.0	-	16.6	-	-
Employment	40.0	20.0	33.4	25.0	23.0
Other	-	10.0	-	-	7.7
TOTAL	5	10	12	4	13

While the relocating of employment opportunities in desert areas has been suggested as an important determinant of desert revival elsewhere in Egypt, within the North Sinai Province the rural desert settlements generally lack such opportunities. The workplace, not only for the respondent but also their spouse, was a local town. Of the 12 households that cited employment-led reasons, in only 3 cases did the move coincide with a change in employment.

The importance of property and employment reasons was also evident amongst the long-term residents, being why in excess of 60% in each area had moved. Again, the evidence suggests that present mobility patterns are a continuation of past ones. Of greater interest to this study is not the contrast in reasons provided in each area, but rather the relative importance of specific reasons in each. This is best typified with regard to environmental factors which only achieve importance in El-Matala, accounting for 15% of recent moves in this area. Recognising that an identification of

the principal reason alone may mask more locally important factors in some areas, the responses were regrouped to facilitate statistical analysis into the frequency of moves related to:

- (a) 'employment', (b) 'property' and (c) 'other'.

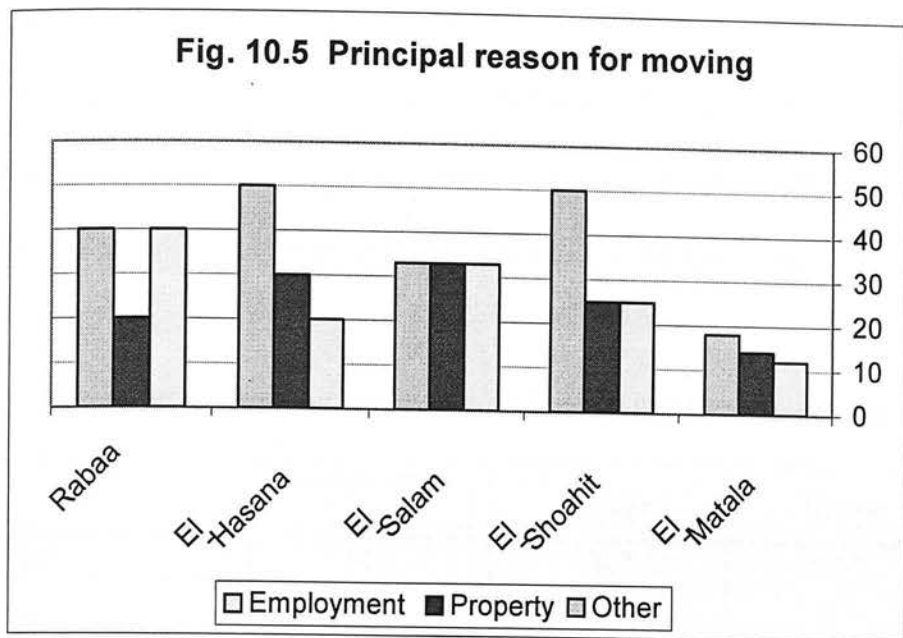
While no significant difference was apparent between areas, 'other' reasons were found to be more important in the remoter areas of El-Hasana and El-Shoahit (Table 10.10 & fig. 10.5), where traditional Bedouin reasons remain important. Non-traditional factors related more to urban-influenced localities. In Rabaa, for example, 'facilities' considerations accounted for 1 in 5 moves.

Facility-related considerations included a variety of circumstances. For example, one household moved to be nearer the children's school; in another, where the spouse was in poor health, they moved to be nearer specialist medical services. It is important to observe that these reasons correspond to the areas attracting more urban-origin migrants and indeed those from beyond the local D.C.A. In El-Shoahit and El-Hasana, 'other' reasons largely represented family ties.

Table 10.10 Principal reason for moving re-grouped (%).

	Employment	Property	Other	TOTAL
Rabaa	40.0	20.0	40.0	5
El-Hasana	20.0	30.0	50.0	10
El-Salam	33.3	33.3	33.3	12
El-Shoahit	25.0	25.0	50.0	4
El-Matala	23.0	38.5	38.5	13
TOTAL	12	14	18	44

Thus, while the most frequent responses reflect traditional reasons pertaining to stages in the life-cycle, in specific locations, facility and environmental considerations were found in evidence.



Unfortunately, the sample size was too small to assess statistically the differences between former place and locational category of residence in each area. However, an aggregation of all areas does suggest that while property-led reasons dominate local moves, a greater diversity of reasons influences those crossing a D.C.A. boundary; employment considerations, in particular job transferrals, are associated with more long-distance moves (Table 10.11). Again in relation to their former locational category (Table 10.12), property reasons influence surrounding desert- or village-origin moves while those related to environmental considerations and employment opportunities relate to urban-origin moves.

Table 10.11 Reason for moving in relation to destination (%).

	Within D.C.A.	Elsewhere
Family Ties	17.4	14.3
Marriage	4.3	9.5
Property	39.2	23.8
Environment	4.3	9.5
Facilities	8.7	4.8
Employment	17.4	38.1
Other	8.7	-
TOTAL (numbers)	23	21

Quite often it is impossible to reduce the complexity of decisions involved in a change of residence to just one factor. Hegazy (2000a) stresses that multiple independent causes underlie migration behaviour. In recognition of this, all reasons provided by the respondents for their decision to move were recorded.

Table 10.12 Reason for moving in relation to former locational category (%).

	Surrounding Desert	Village	Urban
Family Ties	14.3	16.7	16.7
Marriage	14.3	-	8.3
Property	35.7	39.0	16.7
Environment	-	5.5	16.7
Facilities	7.1	11.1	-
Employment	21.5	22.2	41.6
Other	7.1	5.5	-
TOTAL (numbers)	14	18	12

While traditional moves involving employment and property-led decisions are the most commonly cited, a rural desert preference is increasingly becoming important, especially amongst those originating from Bedouin areas. Similarly, family ties became more evident for those who divulged a secondary motive.

10.6.2 Reasons for Relocation.

The second stage in the decision-making process involves the choice of relocation and of all new households, 84.0% (37) stated that their present locality had been their first choice of area to reside in, while generally less than 10% in each area claimed it had not been. The others cited a preferred urban location either elsewhere in the D.C.A. or within North Sinai. Importantly, the lack of suitable property within their price range not only prevented the desired move of those within the ward, but also accounted for half of those whose current residence did not correspond with their preferred residential location.

It is difficult with hindsight to ascertain if the present locality was really their preferred choice at the time of moving, with present 'attractions', rather than those important at the time of moving, representing an inherent problem. Clearly the majority felt it was their first choice and this group is aggregated with the small number (2) who claimed they had "no choice". The reasons provided for the choice of relocation are presented on Table 10.13.

Table 10.13 Reasons for relocation, (numbers and %).

Reason	Rabaa	El-Hasana	El-Salam	El-Shoahit	El-Matala
Reluctance to leave/ desire to return	12 (42.9)	14 (33.3)	8 (17.8)	16 (57.1)	8 (18.6)
Convenience factors	3 (10.7)	2 (4.8)	6 (13.3)	- -	8 (18.6)
Rural desert preference	4 (14.3)	15 (35.7)	16 (35.6)	3 (10.7)	5 (11.6)
Property factors	1 (3.6)	4 (9.5)	10 (22.2)	- -	8 (18.6)
Spouse's home area	6 (21.4)	3 (7.1)	1 (2.2)	7 (25.0)	5 (11.6)
Employment factors	- -	2 (4.8)	2 (4.4)	1 (3.6)	5 (11.6)
Other	2 (7.1)	2 (4.8)	2 (4.4)	1 (3.6)	4 (9.3)
TOTAL	28	42	45	28	43

In contrast to the importance of 'property' considerations as the original stimulus for a change of residence, this was found to play only a minor role with regard to the

reasons for relocation. However, amongst those who stated they had "no choice" of where to relocate, the availability of adequate and affordable property was a major obstacle.

Property factors were also more frequently provided by residents in the more urban-influenced locations of El-Salam and El-Matala where a large scale speculative development has occurred within defined areal limits. This confirms that the presence of such newly constructed dwellings presumably at a lower cost than in the urban centres themselves, is a notable attraction and consequently acts as a determinant of population growth in the most accessible rural desert environments. Moreover, given that these two areas were suggested as possible residential locations for commuters, and identified as such in section 9.5.4 with comparatively greater proportions moving initially for employment factors, their convenience must be emphasised. This priority undoubtedly reflects their ideal location for commuters to the important employment centres of El-Arish and Rafah.

The natural location of El-Matala close to the Egyptian border plays a major part, while the attraction of El-Salam is assumed to be related to the urban area of El-Arish, from where it has been shown the majority moved. In truth, of the total urban-origin migrants included in the survey, the most frequent response referred to seeking a rural desert life and was again the modal category amongst the new households originating outside the local D.C.A.. For example, one household containing a fisherman moved from Alexandria to Rabaa ward because of the excellent fishing opportunities in the El-Bardaweel Lake. He had previously worked in the area.

By contrast local moves (within the respective D.C.A.) and those from rural desert environments (including those moving from a village or dispersed housing in the desert) were frequently related to a "desire to return/reluctance to leave the home area of either the respondent or their spouse", this accounting for 25.0% of moves within the

local D.C.A. and 29.5% of all intra- or inter-rural moves. Such a feature is reflected with specific reference to Rabaa and El-Shoahit (Table 10.13), where short-distance moves dominated. Approximately 40.0% and 50.0% respectively of the new households sampled in these two areas cited the home area as their reason for choosing this locality, Close family ties in fact were very important in all areas where at least 30% provided it as an important determinant in their choice of relocation. At this stage it is worth noting that El-Salam within the 'daily urban system' of El-Arish, is by far the least 'rural' of all study locations and that, while El-Matala lies in close proximity to another urban centre, Rafah, it is still a market town serving a largely rural desert hinterland. As such, close ties with the rural culture are inevitable.

Examining specifically the relative importance of reluctance to leave and a desire to return to the respondent's home area, respondents were classified in relation to their immediately preceding place of residence. Of those who claimed this factor was influential in their choice of relocation, 40% had moved from outside the present ward and were thus 'returnees'. Retention of present residents was therefore more prominent. The relative importance of each in different areas is presented in Table 10.14.

Table 10.14 Classification of rural retention and return migration in each area (%)

	Previous place of residence	
	Elsewhere (returnees)	Within ward (retention)
Rabaa	(50.0%)	(50.0%)
El-Hasana	(50.0%)	(50.0%)
El-Salam	-	(100%)
El-Shoahit	(66.7%)	(33.3%)
El-Matala	(50.0%)	(50.0%)

In summary, the reason for relocation was overwhelmingly influenced by a desire to return to or reluctance to leave the home area of either the respondent or their spouse. A preference for a rural desert environment was noted to be associated with respect to

the most remote Bedouin area (El-Shoahit) and that most accessible to the capital of the province (El-Salam). Over all, such awareness of the desert reflected the wishes of long-distance and rural-origin migrants. Only in El-Matala was a greater diversity of reasons provided reflecting the attraction of this area to a variety of 'mover' types.

10.6.3 Reasons for Choosing this specific Destination.

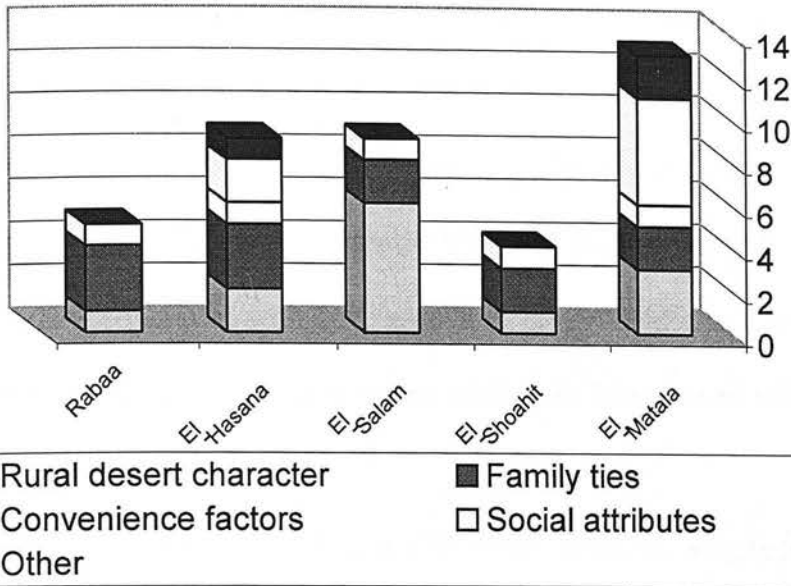
As a further check on the relative importance of factors influential in the choice of relocation (among 'new households'), respondents were asked to comment more specifically on the characteristics of the area which influenced their choice of destination, representing the third stage in the decision-making process (see question 2D of the questionnaire, Appendix A).

Table 10.15 Characteristics of the area deemed important in the choice of destination numbers and (%).

Reason	1	2	3	4	5	TOTAL
Area						
Rabaa	1 (20.0)	3 (60.0)	-	1 (20.0)	-	5
El-Hasana	2 (20.0)	3 (30.0)	1 (10.0)	2 (20.0)	1 (10.0)	10
El-Salam	6 (50.0)	2 (16.7)	1 (8.3)	2 (16.7)	1 (8.3)	12
El-Shoahit	1 (25.0)	2 (50.0)	-	1 (25.0)	-	4
El-Matala	3 (23.0)	2 (15.4)	1 (7.7)	5 (38.5)	2 (15.4)	13

- 1 Rural desert character 2 Family ties
 3 Convenience factors 4 Social attributes 5 Other

Fig. 10.6 Characteristics of the area deemed important in the choice of destination



Responses were subsequently classified as those referring to: (1) a rural desert character; (2) family ties; (3) good facilities (workplaces, schools and shops); (4) social attributes, such as good community spirit; and (5) “other”, including less specific characteristics such as, notably, the availability of suitable property (Table 10.15 & Fig. 10.6).

‘Rural desert character’ responses pertain specifically to a Bedouin life-style promising a more relaxed pace of life, a greater degree of freedom, etc., whereas ‘social attributes’ refer specifically to privacy, helpful and moral nature of traditional desert people and the peaceful atmosphere of desert communities generally.

With the exception of El-Salam and El-Matala, the presence of family connections ranked amongst the top two characteristics, and in Rabaa and El-Shoahit was identified as the principal attraction, stated by over half of the sampled households.

Thus while the initial reasons for a move were property or employment-led, the choice of relocation and the specific attractions of each area, although varying between areas, were on the whole found to reflect close family and personal ties.

10.7 Future Mobility Patterns

Having discussed present and past mobility patterns it now remains to say something of possible future trends. Although a desire to move may not necessarily result in an actual change of residence, some studies viewing such hypothetical moves as “hazardous”, there is growing evidence amongst the literature to suggest that future intentions are a good indicator of residential change (Livi-Bacci, 2001).

This section is concerned with three aspects of future residential change:

- a) the perceived changes expressed by each adult interviewed within the sampled households;
- b) perceived future moves into each of the study locations by relatives;
- c) the residential preferences as a factor for recent population changes.

The latter aspect seems appropriate in determining that, if people did have a choice of residence, where would they choose? Although presenting a hypothetical situation which in reality may never be fulfilled (Portnov, 1998a), this aspect of the study was restricted to the ‘local’ sample. Evidence has already been presented to support the view that recent movers have fulfilled their residential preference (section 10.6.2), for whatever reason.

10.7.1 **Future Plans to Move among Present Residents**

Table 10.16 records the total number of adults (those over the age of 16) who hope to move, representing only 10.6% of a possible 1,129 movers. It is noteworthy that only about 20% of this group had been resident at their present address for a maximum of ten years, a pattern repeated in each locality. Thus, the suggestion by some previous studies, that recent movers are most likely to move again, is verified. The actual number of potential movers was, however, small, with the total number of adults amongst local households considerably greater than the corresponding new household sample. Undue

emphasis should not, therefore, be placed on the proportional variations. In El-Hasana especially, greater numbers were unsure, suggesting that given certain circumstances they would indeed move. A statistically significant difference was obtained between the number of potential movers in each area, with El-Hasana recording the highest number, a reflection perhaps of its isolated location.

Table 10.16 Future plans to move.(numbers)

	Yes	No	Unsure	TOTAL
Rabaa	16	215	12	243
El-Hasana	39	167	21	227
El-Salam	24	166	18	208
El-Shoahit	14	220	5	239
El-Matala	27	171	14	212
TOTAL	120	939	70	1,129

Before commenting more specifically on the characteristics of those who intend to move and their underlying motives, it is important, given the high number who did not foresee a move, to ascertain why they intended to remain.

Of this sub-sample (939), no reason was obtained for 30.7% and it largely represents those not present during the interview, i.e. the respondent knew of no plans for them to leave the family unit, or was not in a position to discuss them. For example, many perceived that a move would only occur at the time of marriage, and as one respondent put it, “none of my ones have any such notions at the moment”. Of those divulging a factor for wishing to remain at their present address for the foreseeable future, the frequency of responses is tabulated on Table 10.17.

Although the modal response in all areas related to ‘other’ factors (ranging from good neighbours, relatives, friends, contentment with their present place of residence and the tribal related reasons), a statistically significant difference was obtained between areas. This was largely accounted for by the higher incidence of responses

relating to "employment ties" in El-Matala, again perhaps reiterating the more indirect connection as a suitable location for commuters. Conversely, only approximately 10% in El-Salam gave employment ties as influential in their decision to remain, an indication of the area's incidental importance as a commuter village. For example, while many were employed in El-Arish, any location within the "daily urban system" would satisfy the commuter role. El-Salam, however, was preferred for its "other" characteristics.

In accordance with general migration theory (Thomas, 1938; Woods, 1979), and again invariably linked to the life-cycle, future movers consisted heavily of the youngest sections of the population, i.e. those under the age of 35 with the one notable exception of El-Shoahit. No explanation for this deviation is apparent although the small number of cases sampled may be a factor. As regards their educational attainment, few of those having completed their years of formal education (104¹), possessed an advanced academic qualification, the modal category accounting for 45% being found to relate to the possession of secondary level at most. Of this group, 75 were presently employed, 7 were retired and only 22 were registered as unemployed.

Table 10.17 Reasons for remaining, (numbers and %).

	Employment	Personal	Property	Other	TOTAL
Rabaa	36 (20.6)	13 (7.4)	29 (16.6)	97 (55.4)	175
El-Hasana	26 (21.0)	4 (3.2)	25 (20.2)	69 (55.6)	124
El-Salam	16 (9.9)	10 (6.2)	17 (10.5)	119 (73.5)	162
El-Shoahit	19 (22.9)	2 (2.4)	10 (12.0)	52 (62.7)	83
El-Matala	42 (38.9)	2 (1.9)	14 (13.0)	50 (46.3)	108

¹ 16 of those intending to move were still at school

While absolute numbers are small, a high level of economic activity is reflected in the principal reason for moving, approximately only 18% were job-related. In El-Hasana, where the isolation of the area was significant, 31% were employment-led. Elsewhere, similar reasons (property and personal) as those presented by the new household sample for their most recent move dominated, the latter including moves to institutions of higher education and at marriage.

In accordance also with results for the most recent mover group, many of those claiming they would definitely move (or were unsure) intended only to move within their present D.C.A. boundary (Table 10.18). Importantly, as regards this thesis, at least one-third of the sample in four areas envisaged remaining within their current locality, the exceptions being El-Hasana. Again mirroring earlier results, most people wished to move to rural-type locations (Table 10.19). Only in El-Hasana and Rabaa did a majority foresee a move to an urban centre.

Table 10.18 Intended destination (number and %).

	A	B	C	D	E	TOTAL
Rabaa	10 (35.7)	6 (21.4)	4 (14.3)	6 (21.4)	2 (7.2)	28
El-Hasana	11 (18.3)	15 (25.0)	10 (16.7)	9 (15.0)	15 (25.0)	60
El-Salam	19 (45.2)	11 (26.2)	7 (16.7)	5 (11.9)	-	42
El-Shoahit	9 (47.4)	5 (26.3)	1 (5.3)	1 (5.3)	3 (15.7)	19
El-Matala	21 (51.2)	12 (29.3)	5 (12.2)	3 (7.3)	-	41

A Within local D.C.A B Elsewhere within North Sinai
 C Elsewhere in Egypt D Abroad E Unsure

Table 10.19 Intended location (number & %)

	Rural	Urban	TOTAL
Rabaa	13 (46.4)	15 (53.6)	28
El-Hasana	24 (40.0)	36 (60.0)	60
El-Salam	26 (61.9)	16 (38.1)	42
El-Shoahit	14 (73.3)	5 (26.7)	19
El-Matala	25 (61.0)	16 (39.0)	41

10.7.2 Future In-migration by Relatives

As with future migration patterns, data pertaining to the possible in-migration of relatives can not be validated without a follow-up study. On the basis of answers by the main respondent, only 10.5% knew of relatives planning to move into the area. Numbers ranged between 9 and 12 in each locality, only 4 in Rabaa were aware of a relative's intentions. Absolute numbers were therefore too small to assess in detail. However, 95.8% were related to the main respondent rather than their spouse. In North Sinai, the Bedouin wife generally moves to the husband's home area. This possibility is particularly interesting as 38.8% of these respondents were brought up outside the present D.C.A., again suggesting a possible "second-wave" of migration. Indeed in-migration from further afield than previously is suggested, as 58.3% of possible future movers into the survey areas presently resided outside the local D.C.A. or in an urban centre. Unfortunately, the size of this sub-sample did not permit an assessment within each study location. Aggregation of these results does support a growing urban-rural flow by Nile Valley population; again suggesting that returns migration is a relatively unimportant component of the future rural desert revival within North Sinai.

10.7.3 Residential Preferences

A growing theme among continued attempts to understand the changing spatial distribution of population within national boundaries has been the emphasis placed on residential preferences, and the ability of a greater proportion of the population to meet them (Jones, 1990). While largely a feature of American studies, it presupposes that people are able to distinguish different qualities, sometimes referred to as the "residential bundle".

This study took a simple approach, asking respondents directly to identify their preferred residence. It relates specifically to those long-term residents, the preferences

of the most recent movers having been discussed in section 10.6.2.

Of the few who favoured urban locations (Table 10.20), most lived in El-Salam and El-Matala. This does not permit an assessment of variations by current location, previous residence or location of birth, factors which are all viewed as influential. However, as the majority of respondents had been brought up in a rural desert setting and had previously resided in a rural desert location, if they had moved from their parental home, it can be assumed that all three factors are interrelated, with such assessments only relevant to studies identifying a greater diversity of backgrounds. Here, as most are of rural desert-origin (however measured), it is more appropriate to examine explicitly the type of rural desert environment favoured (Table 10.21).

Table 10.20 Local households: Preferred residential location (numbers and %)

	Rural	Urban	Unsure	TOTAL
Rabaa	36 (87.8)	4 (9.8)	1 (2.4)	41
El-Hasana	27 (84.4)	3 (9.4)	2 (6.2)	32
El-Salam	24 (72.7)	8 (24.3)	1 (3.0)	33
El-Shoahit	34 (91.9)	3 (8.1)	-	37
El-Matala	23 (74.2)	6 (19.4)	2 (6.4)	31

Table 10.21 Preferred rural location numbers and (%)

	A	B	C	D	TOTAL
Rabaa	9 (25.0)	14 (38.9)	11 (30.6)	2 (5.5)	36
El-Hasana	5 (18.6)	7 (25.9)	9 (33.3)	6 (22.2)	27
El-Salam	9 (37.5)	7 (29.2)	6 (25.0)	2 (8.3)	24
El-Shoahit	6 (17.7)	8 (23.5)	12 (35.3)	8 (23.5)	34
El-Matala	8 (34.8)	6 (26.1)	7 (30.4)	2 (8.7)	23

A Adjacent to an urban centre

B Adjacent to a village

C Close to a main road

D Remote rural desert setting

From the previous statistics, several points warrant further elaboration:

- Where a rural desert preference was stated, relatively few wished to live in a remote setting. Thus, while not wishing to reside in an urban centre itself, the majority wanted to live adjacent to a settlement of whatever size.
- The preferred rural desert locations were related to current locations.
- A preference for a remote desert setting was more frequently expressed amongst residents interviewed in the remote study locations. Similarly, the modal location amongst respondents in Rabaa was proximity to a village centre.
- While one would have anticipated areas adjacent to urban centres to be frequently cited in El-Salam and El-Matala, it is important to note that proximity to a village and main road were also frequently referred to characteristics of these two areas.
- With respect to El-Hasana and El-Shoahit, where most respondents were brought up within their present administrative boundary, a preference for a remote desert location correlates to the ratio of respondents familiar with such environments.
- In all areas of study, all four categories were represented, reflecting the varied environments within this ward.

10.8 Conclusion

Generalisation severely oversimplifies the processes responsible for desert population growth of North Sinai, however, common processes are evident. Although less important numerically, such processes may mark the beginning of a break from more traditional mobility patterns and appear most notably in accessible locations. At present, it is not that different processes operate in different localities, but rather that similar processes operate to varying degrees. All localities record movement from a variety of sources: however, in the more accessible areas movement from a wider geographical area and from urban centres is more pronounced. In remoter locations,

intra-rural movement dominates, with native residents continuing to reside in their D.C.A.

Initial reasons for moving were similar in all areas, corresponding with specific life-cycle stages, which require domestic and personal changes. Such motives are typical of largely short distance moves. The availability of property and a desire to live in a rural desert setting were largely typical of movers from a wider geographical area, mostly originating within rural area. Overwhelmingly the choice of where to relocate was largely associated with the presence of kin and included a desire to remain in the home locality. Close personal ties in the present area were again reflected in why an area might be chosen as a destination, especially in remoter locations. In more accessible locations, characteristics pertaining to the rural character, facilities and social attributes were much more common, although many possessed some prior tie with the area, most notably through the presence of relatives.

Thus, a retention of the rural population was the most prominent process of change affecting these study locations, with a variety of accompanying processes evident (to varying degrees) in the less remote environment: most notably a "rejection" of urban residential models largely influenced by new housing developments on the outskirts of many towns. These trends seem set to continue, for, while relatively few intend to move, a sizeable proportion desired a desert or village destination.

On the whole, present mobility processes appear to suggest that if property, or the means to acquire property, is available, rural residents will move only a short distance, preferring to remain in a rural setting where they possess close family ties. Even where an urban-to-rural flow is detected for environment-related reasons, this largely involved a move to an area where other family members had already relocated, mobility patterns which clearly reflect the close family structure of North Sinai generally.

CHAPTER ELEVEN

Community Perception and Prospects for the Future

Community Perception and Prospects for the Future

11.1 Introduction

The present field of study proposes that four basic questions about desert repopulation that must be addressed: Who are the migrants? Why did they migrate?, Where did they migrate? and What are the consequences? The first three concerns have been documented in the preceding two chapters; it now remains to report on the possible impacts or consequences of the repopulation process. This aspect is normally analysed in relation to: the migrants themselves; their area of origin; and their area of destination. However, in this thesis, attention is solely directed towards the resulting consequences in the area of relocation, that is, within the present study areas. It is not intended to assess the repercussions in any comprehensive manner, but rather within the general confines of the present study, putting emphasis on residential mobility and the relocation process.

A range of topics could be explored under this heading. The analysis begins by assessing the local perception of the community, participation of newcomers, the friendship patterns of new and local residents and compares these results with their actual involvement in local community-based activities. The impact on local service provision is assessed through the attitudes of the respondents, providing a review of existing services in each area and examining public opinion towards their adequacy. Finally, attention is directed towards the perceived impact of the repopulation of the desert of North Sinai, and the desire by respondents for such processes to continue.

11.2 Social Interaction

A common theme regarding migration within the realms of counter-urbanisation or repopulation studies has been the impact on many desert communities. The term 'community' has many interpretations. It generally refers to a particular spatial or geographical unit (Worsley, 1977) and to the immediate social context of an individual's life (Livi-Bacci, 2001). However, these are far from simple interpretations, as Arensberg and Kimball (1968) demonstrate. A town-land, a group of town-lands or a parish are all communities. Furthermore, an individual may have allegiance to a number of communities: he/ she may live in one town-land, send their children to school or college in another and work or shop in yet another. However, in this thesis 'community' refers to the social group with which they reside.

The most commonly reported impact on desert communities relates to the resulting social polarisation. Abo-Zeid (1996) refers to the description of in-migrants as 'strangers' or 'foreigners' because of their lack of affinity with the host community. He documents that households who had recently moved to the hinterland of El-Kharga city (Western Desert of Egypt) took little active part in the local social life, preferring to retain social links outside their present place of residence. This, in many cases, involved a continuation of former social ties and was found, by Hegazy (2000b), to be most prominent within the first few years following a move. He also says of the social links between new and established residents in remote desert areas that there are no feelings of animosity, but simply disinterest.

In the present sample, social strains leading to conflict between the two groups are unlikely to exist. A number of findings confirm this approach:

- *Firstly*, the great majority of households involved in a repopulation of the desert not only had close personal ties with the area prior to their most recent move (section

10.6), but had only changed address within the immediate locality (section 10.4). Moreover, particularly in the more remote study locations there was a return or retention of local residents (section 9.4.1).

- *Secondly*, the 'newcomer' group was smaller than the corresponding local samples in all study areas (section 9.2) and thus, in relation to sheer numbers alone, potential polarisation is not discernible in any location. However, given that a degree of residential segregation, which can represent social isolation from the established community, was identified within the study areas, a harmonious social environment, especially in the predominantly Bedouin localities of North Sinai, is unlikely. Also, while similarities were apparent between the social class and journey-to-work patterns of new and local residents in the present study (Chapter 9), the increased level of commuting to an urban centre, by the most recent movers especially in El-Salam and El-Matala, may reflect a level of separation from their place of residence.

The establishment of friendship patterns between the two groups and the perceived levels of community participation by the new household sample are studied next. These serve as a useful introductory section to the social integration of new and local residents in each area.

11.2.1 Friendship and Participation Perceptions

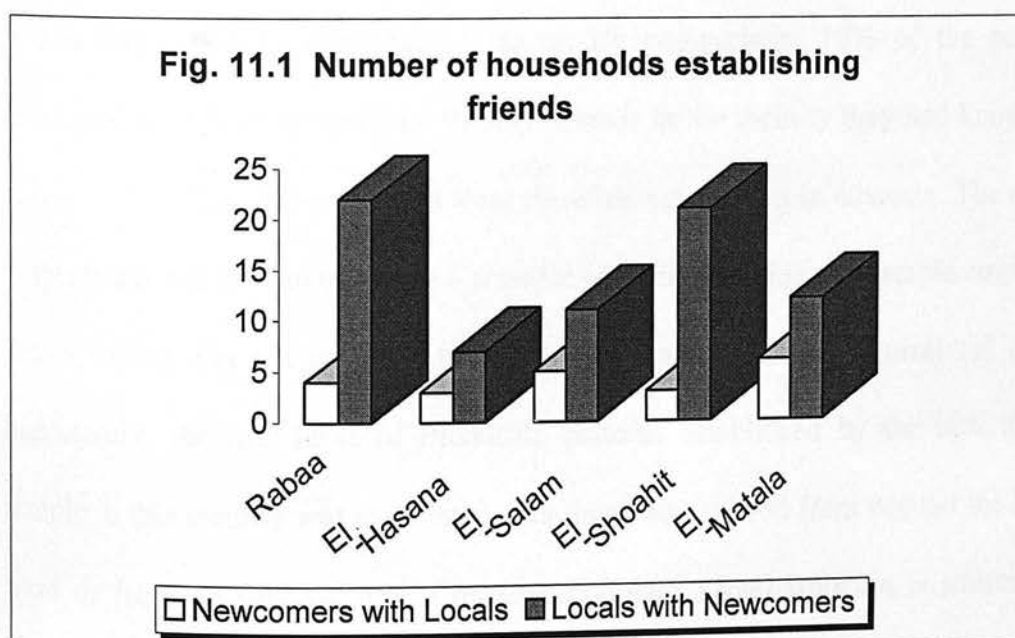
Whether individuals do or do not participate in local community activities (section 11.2.3) this alone says little about the overall harmony of the area. More appropriate indicators are the perceptions of newcomers and locals, and indeed how newcomers themselves view their involvement within the community. The data presented in this section relate to section 'D' questions of the interview schedule (Appendix A), and were designed specifically to focus on the relationship between newcomers and locals.

Perhaps the most basic indicator of the relationship between the two groups is the establishment of friendship patterns between each. Friends normally apply to non-relatives especially within desert Bedouin communities. Thus, during the interview, non-relatives were emphasised and the answers shown in Table 11.1 & Fig. 11.1.

Across every area, far more among the 'new household' sample believed that they had established close friends amongst the local population than the reverse. However, about 50.0% of the total new households identified in the sample had had close personal friends residing in the area prior to their most recent change of address, with the ratios particularly high in Rabaa and El-Shoahit.

Table 11.1 Number of households establishing friends (numbers and %).

	Newcomers with Locals	Locals with Newcomers
Rabaa	4 (80.0)	22 (53.7)
El-Hasana	3 (30.0)	7 (21.9)
El-Salam	5 (41.7)	11 (33.3)
El-Shoahit	3 (75.0)	21 (56.8)
El-Matala	6 (46.2)	12 (38.7)



Similarly, amongst local respondents, frequent reference was made to the fact

that newcomers, classified in this study, were not necessarily 'strangers' to the host community. For example, the local population previously knew them or knew other members of their family. Likewise, others were known to say hello to, but could not be described as close personal friends.

Amongst both samples, the development of friendship ties was lowest in El-Hasana that the author tentatively attributes to low levels of prior local-newcomer acquaintances (section 10.6). Moreover, while no noticeable hostility was apparent in this area, both groups appeared to live in social isolation. Elsewhere, the greater retention or return of local residents prevented such negative repercussions on community relations.

Local households which had not acquired close friends amongst the newcomers emphasised differences in traditions and norms which doesn't necessarily mean a lack of friendliness towards them, but not a particularly close relationship with them. With specific reference to the former, and particularly in El-Hasana, where the fewest new friendships had been formed, newcomers were commonly referred to as 'sleepers', i.e. they were employed and socialised outside the area but, as they only slept in El-Hasana, it was impossible to form acquaintances. By comparison, 70% of the newcomers developed their 'social relations' through friends in the vicinity they had known before moving. Their friendship patterns were therefore established in advance. The exception to this trend was El-Salam, where a sizeable proportion of this sub-sample emphasised a 'know to see, but not to speak to' relationship, and a 'keep to ourselves' approach. Importantly, the low level of friendship patterns established by the new household sample in this locality was associated with those who moved from beyond the El-Salam ward or from an urban centre. Consequently, such social isolation is assumed to be associated with those originating from the Nile Valley.

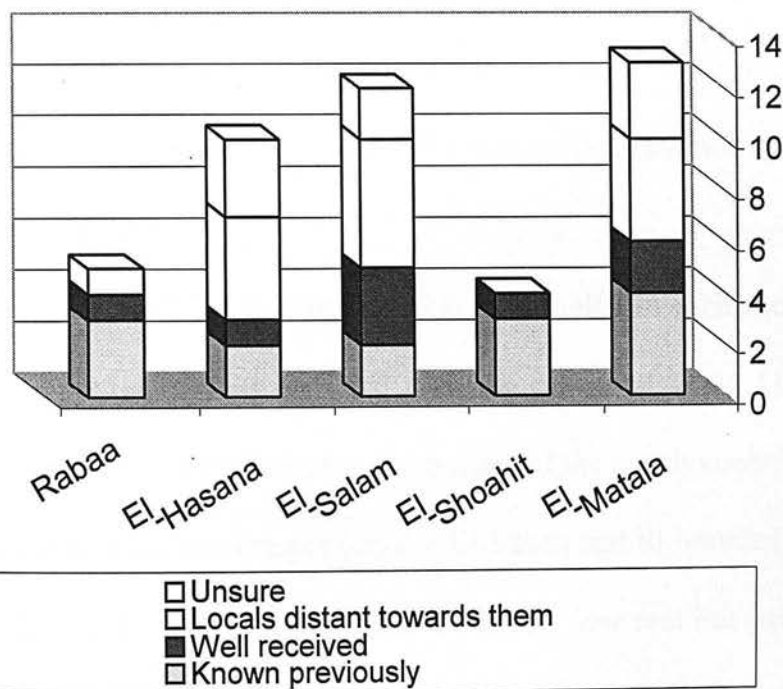
However, 14 families of the new households (irrespective of their localities)

perceived that problems had accompanied their arrival. While this did not lead to animosity, this newcomer group perceived that the local population were reticent, did not welcome them into the local community, but rather viewed them as 'outsiders'. This feeling did not wane with time. Instead, as one respondent who had been resident in El-Hasana for 8 years explained, "unless you are born in this village, you never feel part of it".

Table 11.2 New households: Perceived levels of acceptance in their community of residence (numbers and %).

	Known previously	Well received	Locals distant towards them	Unsure
Rabaa	3 (60.0)	1 (20.0)	1 (20.0)	-
El-Hasana	2 (20.0)	1 (10.0)	4 (40.0)	3 (30.0)
El-Salam	2 (16.7)	3 (25.0)	5 (41.6)	2 (16.7)
El-Shoahit	3 (75.0)	1 (25.0)	-	-
El-Matala	4 (30.8)	2 (15.4)	4 (30.8)	3 (23.0)

Fig. 11.2 New households: Perceived levels of acceptance in their community of residence



As an additional check on the friendliness and cohesiveness of each area, the interviews asked whether it was common to borrow something from a neighbour if the

need arose (Question D6, Appendix A). This common aspect of close-knit desert communities was not restricted to any particular need, but was left to any object or requirement the respondent cared to mention. As such, responses referred to a variety of possibilities: cooking utensils, tenting tools, agricultural machinery etc.

Although only about 30% of respondents in each area claimed that they would borrow an urgent requirement from a neighbour, no statistically significant difference was obtained between areas in relation to the new household sample. By comparison, the responses to this question were found to be statistically different between areas amongst the 'local' samples ranging from 60.0% in Rabaa to 20.0% in El-Hasana.

Bearing in mind that a desert community is dependent upon the involvement of its residents (Abo-Zeid, 1996) the preceding analysis demonstrates that a repopulation here has had no negative impact on the harmony of the communities studied. However, a core aspect pertaining to the social interaction between new and local residents is their active involvement in community-based events, and the perceived involvement of new residents, not only by the local population, but by the new families themselves. This aspect is discussed below, whereas actual involvement is examined specifically in the following section (11.2.2).

Table 11.3 presents the number of local households in each area who believed that newcomers participated in the local community, while Table 11.4 & Fig. 11.3 present the corresponding view from the perspective of the new household.

Under 50% of the local respondents in El-Salam and El-Matala (Table 11.3), the most urban-influenced study localities considered that new families participated in the local community. While many who said so were definite that newcomers had not become involved, quite substantial numbers were unsure, representing little detailed knowledge of the new household group and again suggesting limited social interaction between new and local residents. Importantly, this uncertainty was greatest in El-Salam

- accounting for almost one-third of the responses. The principal reason for such uncertainty, perhaps also for why new households had not participated in the local community, was found to relate to a belief that newcomers were reluctant to become part of the host community, preferring instead to travel beyond the area for recreational and social activities. Where the participation of new residents was perceived to be high (Rabaa and El-Shoahit), certain major factors were evident: many were described as actively involved in the local community prior to their most recent change of address. Long-term respondents generally perceived the present involvement of new residents as a product of prior or lifelong participation in the community.

Table 11.3 Local households: Perceived involvement of newcomers in the community life of their area (numbers and %).

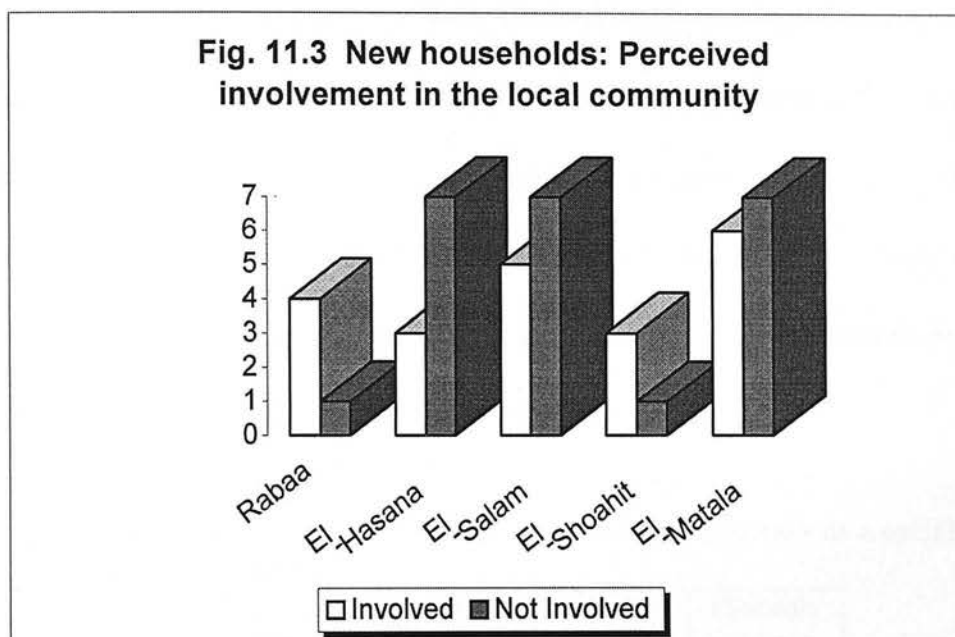
	Involved	Not Involved	Unsure	TOTAL
Rabaa	21 (51.2)	14 (34.1)	6 (14.6)	41
El-Hasana	7 (21.9)	17 (53.1)	8 (25.0)	32
El-Salam	13 (39.4)	9 (27.3)	11 (33.3)	33
El-Shoahit	30 (81.1)	3 (8.1)	4 (10.8)	37
El-Matala	13 (41.9)	12 (38.7)	6 (19.4)	31

Table 11.4 New households: Perceived involvement in the local community (numbers and %).

	Involved	Not Involved	TOTAL
Rabaa	4 (80.0)	1 (20.0)	5
El-Hasana	3 (30.0)	7 (70.0)	10
El-Salam	5 (41.7)	7 (58.3)	12
El-Shoahit	3 (75.0)	1 (25.0)	4
El-Matala	6 (46.2)	7 (53.8)	13

How did newcomers themselves (Table 11.4 & fig. 11.3) view their involvement in the local community? Only in El-Hasana did the responses of newcomers verify the negative claims of the local sample in one of the remote localities. Less than one-third of the new households surveyed in this area perceived an involvement in the community life of El-Hasana, the principal reason behind their alleged social isolation relating to a

dearth of activities of interest. Other frequent responses emphasised limited recreational time due to domestic and employment commitments and a reluctance to mix socially. For example, families with young children and those who commuted to work found it hard to attend local events on a regular basis, while some that could, preferred not to. Where higher levels of participation were registered, as in Rabaa and El-Shoahit, comparable numbers in the former two locations had either some prior community connection (a reflection of the repopulation process evident in these areas), or joined a local-based activity following their move.



11.2.2 General Household Involvement in Social Events

While friendship had not necessarily been forged between in-migrants and the local population, no strain upon community relations had developed either. Rather, both groups resided in a state of mutual disassociation unless the local community had previously known the new residents. Similarly, the perceived involvement by new residents themselves in the local community was greatest in Rabaa and El-Shoahit, and again related to prior association with local community activities. The lowest perceived involvement of and by newcomers was observed in El-Hasana, an area that attracted

proportionally more migrants from beyond the immediate area, who had fewer prior connections. This section therefore, examines social activity rates for each area and, specifically, the types of associated activities and their location.

Irrespective of the precise activity referred to or its location, Table 11.5 presents the number of households where at least one occupant participated in a social-based endeavour. These data, therefore, indicate actual social activity. Encouragingly, 1 in 2 households in four areas had some social-based interest with the highest level of household activity obtained for the most urban-influenced study areas (El-Salam and El-Matala). These results may, therefore, reflect a better quality or variety of recreational-type activities in these areas. At this stage, one can hypothesise that the recreational pursuits enjoyed by households in these two locations are more likely to be urban-based, especially with respect to newcomers in El-Salam where some 70% perceived a lack of community participation. The lowest level of active social involvement was recorded in one of the more remote study locations, El-Hasana.

Table 11.5 Households where at least one occupant participated in a social activity (numbers and %).

	Rabaa	El-Hasana	El-salam	El-Shoahit	El-Matala
Yes	30 (65.2)	14 (33.3)	37 (82.2)	24 (58.5)	35 (79.5)
No	16 (34.8)	28 (66.7)	8 (17.8)	17 (41.5)	9 (20.5)
TOTAL	46	42	45	41	44

However, a comparison between the perceived participation in the local community and the actual involvement of the new household group did prove illuminating.

Of the total 21 new households who perceived that their family participated in the local community life of their respective area (Table 11.4), about 30.0% contained no

occupant associated with any activity (irrespective of its location). Thus, formal social involvement in local-based activities is not a necessary requirement to participation in, or identification with, the local community. For example, support for local fund-raising events, or a general friendliness towards other members of their community may equally represent community participation as does active involvement. Similarly, among the 23 new households who perceived a lack of involvement in their local community, about 40.0% did participate in a social event. This sub-sample had moved from outside their respective ward of residence or from an urban centre. These findings may represent a failure to recognise such activity as important or a recognition that they could contribute more. This trend was most obvious in El-Salam, where, of the 7 households that perceived no contribution to the local community, 4 contained at least one occupant associated with a social activity. A further consideration, and one supported by the findings above, is that, if individuals have been brought up in the area or moved from within the area, they almost automatically feel a greater sense of belonging to the community. Conversely, new residents to an area with few personal ties, notwithstanding their involvement in local activities, are acutely aware - perhaps for the first time - of their lack of community attachment, resulting in a perceived sense of social isolation.

Likewise, households situated within village limits or on the outskirts of a larger town could have been expected to display greater levels of involvement by virtue of their presumed proximity to such facilities. However, no such variations were apparent.

Finally, it was expected that households containing children of school age (under 16) would experience higher levels of participation. School children are most likely to be involved in several social or leisure-time pursuits, be it a football team, a youth club or a mosque activity, and have been observed as influential in the development of social interactions. Although this was generally observed in each area, the difference between

households with/without school-aged children could not be statistically verified, a trend which perhaps reflects the demise of primary schools in many rural areas (section 11.3.1).

While this analysis has proved useful in relation to identifying overall levels of participation, which appear to be influenced by varying demographic, socio-economic or residential characteristics, attention is now more specifically directed towards the types of activities participated in and their location. Only through this type of analysis can an overall picture of the impact of repopulation be assessed.

11.2.3 Specified Social Activities and their Location

The specified activity undertaken by a maximum of five individuals within a household was aggregated by duration of residence (Tables 11.6 and 11.7), and the location of each tabulated in relation to whether it was undertaken in an urban centre, a local village or in the open desert (Tables 11.8 and 11.9). Although many individuals had more than one recreational interest, only that which they identified as their principal social interest was utilised. These were subsequently classified into several all-embracing categories: sporting activities (indoor and outdoor); voluntary interests including connections with the Red Crescent; activities organised by the local mosque; artistic pastimes, including Bedouin dancing, poetry and language classes; and finally, other activities, including keep-fit classes, Girl Guides, family planning etc.

Table 11.6 Local households: Specified activity (numbers and %)

	Rabaa	El-Hasana	El-salam	El-Shoahit	El-Matala
Indoor Sports	57 (57.6)	20 (25.0)	21 (28.8)	19 (20.0)	9 (13.0)
Outdoor Sports	24 (24.2)	38 (47.5)	18 (24.7)	30 (31.6)	24 (34.8)
Voluntary	-	1 (1.3)	10 (13.7)	4 (4.2)	13 (18.8)
Mosque	15 (15.2)	12 (15.0)	12 (16.4)	32 (33.7)	20 (29.0)

Artistic	1 (1.0)	5 (6.3)	8 (11.0)	1 (1.1)	-
Other	2 (2.0)	4 (5.0)	4 (5.5)	9 (9.5)	3 (4.3)

Irrespective of the duration of residence, statistically significant differences were obtained between areas in relation to the leisure activities associated with individuals. Overall, sporting activities dominated; however, amongst local households (Table 11.6) in El-Shoahit and El-Matala, mosque-going was a significant activity.

A more common observation amongst older individuals was that attending the mosque prayer on Fridays represented their only activity outside the home. This was less common amongst the new household samples and may reflect their overall younger age profiles. In El-Salam and El-Matala, a higher proportion of people was associated with voluntary organisations.

Table 11.7 New households: Specified activity (numbers and %)

	Rabaa	El-Hasana	El-salam	El-Shoahit	El-Matala
Indoor Sports	8 (44.4)	6 (25.0)	10 (20.8)	4 (25.0)	9 (19.6)
Outdoor Sports	6 (33.3)	14 (58.4)	12 (25.0)	3 (18.8)	14 (30.4)
Voluntary	2 (11.1)	-	9 (18.6)	3 (18.8)	6 (13.0)
Mosque	1 (5.6)	2 (8.3)	7 (14.6)	4 (25.0)	9 (19.6)
Artistic	1 (5.6)	2 (8.3)	5 (10.5)	2 (12.5)	4 (8.7)
Other	-	-	5 (10.5)	-	4 (8.7)

Comparisons between the activities of new and local residents for each area demonstrate a similarity of recreational pursuits. For example, in Rabaa a high proportion of all residents was found to share interests in indoor sports. Outdoor sports were more frequently cited amongst the new household samples in Rabaa, El-Hasana and El-Salam. While this may be interpreted as a reflection of a more energetic younger population, it is accompanied by excellent outdoor sporting opportunities available

there.

As regards the location of the specified activity, the preceding discussion demonstrates that similar recreational or free-time interests enjoyed by both new and local residents may not necessarily involve a social interaction between the two groups. The emphasis here, however, is directed towards the extent to which the residents participated in local activities and, consequently, the presence of local (within or near to the settlement) recreational opportunities. Given that many new households were economically dependent upon urban centres, with several (in El-Salam and El-Matala especially) involved in a move from an urban-type environment, it could be expected that leisure time was more likely to be spent in neighbouring towns, rather than the rural area of residence.



Fig. 11.4 The mosque of El-Shoahit Village

Little indication of such social isolation was obtained (Tables 11.8 and 11.9). While a 'desert-based' activity could feasibly be located in another desert community, care was taken during the data collection stage to limit such locations referred to the immediate area of residence. The frequency counts presented in Tables 11.8 and 11.9 indicate a high reliance upon local activities. Greater numbers of individuals in the more

urban-influenced locations travelled to an urban centre (approximately one-third), but still the modal location represented those in El-Salam. Similar local-based involvement characterised the new household samples with an increased urban dependence noted in El-Salam and El-Matala.

Table 11.8 Local households: Location of social activity (numbers and %).

	Open Desert	Urban	Village
Rabaa	28 (28.3)	10 (10.1)	61 (61.6)
El-Hasana	1 (1.3)	1 (1.3)	78 (97.5)
El-Salam	14 (19.2)	23 (31.5)	36 (49.3)
El-Shoahit	10 (2.1)	4 (4.2)	81 (85.3)
El-Matala	17 (24.6)	23 (33.3)	29 (42.0)

Table 11.9 New households: Location of social activity (numbers and %).

	Open Desert	Urban	Village
Rabaa	5 (27.8)	2 (11.1)	11 (61.1)
El-Hasana	3 (12.5)	-	21 (87.5)
El-Salam	5 (10.5)	19 (39.0)	24 (50.0)
El-Shoahit	6 (37.5)	-	10 (62.5)
El-Matala	7 (15.2)	27 (58.7)	12 (26.1)

Thus, with the exception of sporting activities in the most urban-influenced wards, sources of recreation were predominantly found within the immediate area of residence.

In summary, a repopulation of the desert has had few negative repercussions on the existing communities. However, a central theme in the analysis has been the importance of prior social links with the area. Conversely, interaction between the two groups was lowest in those areas attracting more long-distance urban-origin migrants, who had little prior knowledge of the area. While both groups claimed they had forged close friendship ties, this overwhelmingly referred to neighbours only.

11.3 Service Provision

An important aspect in sustaining the development of desert communities is the availability and accessibility of service provisions. In North Sinai, prolonged depopulation has resulted in their gradual deterioration between the 1950s up to the early 1980s. For example, many desert areas have experienced the closure of schools, shops, post offices, bank branches, doctors' surgeries etc, hastened by government policy. Furthermore, reductions in an already meagre public transport service have been particularly evident in desert settings. Today, what services are available is concentrated within settlement limits. Two findings in this study thus far already suggest that the provision of services has important consequences for a desert revival.

Firstly, a positive correlation was established between population growth and settlement size; thus one can suppose that those areas which have retained high levels of service provision are associated with desert repopulation. Unfortunately, to test such an assertion in relation to the province as a whole is outside the scope of this study.

Secondly, it was noted in sub-section 10.6.1 that the availability of services and facilities was a principal factor in the decision to move for a small, but significant, number of households. This group moved from dispersed dwellings in the desert to a nucleated settlement or relocated on the periphery of an urban centre. Where the move was characterised by re-location from beyond the limits of a settlement, their present home was notably more adjacent to such centres than previously.

The provision of services not only directly affects population revival, but growth desert populations also have important consequences on the level of service provisions. For example, newcomers may help revive rural desert businesses or their arrival may justify a greater retention of local services. Alternatively, high levels of private mobility, coupled with urban-dependent employment (section 9.5.4) and leisure-time activities

(section 11.2.3) in some areas, may result in the continuation of service losses accompanying population growth. For example, a village that has become a commuter haven might experience a reduction in trade as commuters purchase their goods near their workplace. Some villages have consequently ceased to function as centres of trade altogether, or retained only basic services.

In this thesis no attempt is made to review consumer behaviour, although invariably some reference to this is made. Instead, the emphasis is directed towards the availability and adequacy of particular services in each study location. Five services are examined: schools; shops; entertainment; medical provision; and public transport, with the general aim being to review and compare primary service provisions.

11.3.1 The Provision of Schools.

Up until two decades ago the most conspicuous desert service to decline in North Sinai as a result of a dwindling and ageing desert population, and especially because of the 1967 war, has been the closure of many schools. For example, in the area of El-Arish (the capital of the province) one-half of all primary schools were closed during the period 1956-82. It is the reduction of this service that has most fervently discouraged the continuity of local communities.



Fig. 11.5 Model of the primary school which applied in many settlements of North Sinai

Abo-Zeid (1996) examines the social functions associated with local schools in North Sinai region, and assesses the very different perceived and actual effects of their closure. After schools' closure, the community did indeed lose a social centre and a sense of identity. Resistance to such closures was primarily related to a perceived attack on the local community, against major decisions taken without local consent.

Within the present study, although school closures have occurred in the past with some buildings now renovated and converted into another functions, each study area possessed at least one primary school and (except El-Shoahit) a preparatory and/or a secondary school.

With respect of government policy, it is important to recognise that a repopulation of the desert settlements is always accompanied by an increase in the population of local schools. Potentially, the repopulation process may overload existing services especially if it involves young families, as has been identified in section 9.4.4.

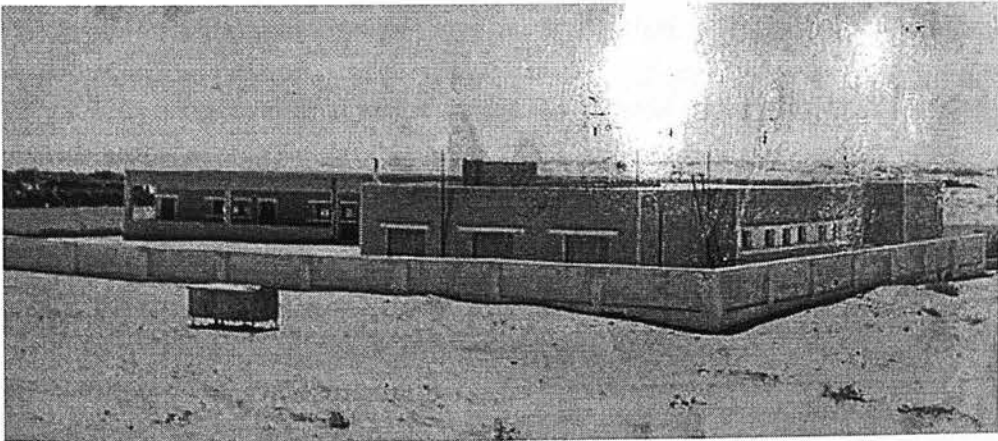


Fig. 11.6 Secondary school of El-Hasana

Four major features are prevalent from this survey:

1. The majority of parents stated that the costs of their children's education were

acceptable.

2. Several schools, notwithstanding the population growth experienced, recorded a steady decline of pupils, especially in El-Hasana and El-Shoahit. Both, however, are located beyond village limits where sizeable shares of the new household sample were located.
3. In general, only the larger urban schools have recorded an increase in enrolment during the recent period.
4. At present, small village schools are the most likely candidates for future closure, necessitating the transfer of pupils to other schools in the neighbouring settlements.

11.3.2 Shopping Facilities

There are few local shops in rural desert locations. A checklist of the shopping and business facilities available in each study locality is provided in Table 11.10. The provision of services was variable between areas, and appeared dependent upon the settlement size and its proximity to a large urban centre.

El-Shoahit possessed a very limited range of shops within the ward, perhaps due to both its limited population and its remote location. This contrasted markedly with the level of provision available in the larger settlements especially of El-Salam and El-Matala.

In particular, the greater the autonomy of a settlement the greater its variety and specialisation of shops, e.g. pharmacy, hairdresser, butcher, bakery, etc. Notably in El-Matala, the local pharmacy had been taken over by a migrant family from Suez Canal region in 1989. Although within reach of an urban centre, El-Salam and El-Matala possessed a variety of more specialised retail outlets. With respect to both areas, the recent opening of a video shop highlights not only the affluence of present residents, but also the demand for customary urban services.

In each study area a bimodal distribution was apparent; however, the combined “adequate” responses accounted for a greater share of the individual samples. These primarily referred to the accessibility of a shop (in excess of 55% in each sample) and the variety of goods which could be purchased locally (in excess of 20% in each). By comparison, those respondents dissatisfied with their local shops emphasised exorbitant prices (over 40% in each), with one respondent jokingly remarking that “there are no bargains in El-Hasana”. Other common replies related to the limited range of goods offered, especially amongst residents in El-Hasana and El-Shoahit.

Table 11.10 A checklist of the shopping facilities available in each study area.

	Rabaa	El-Hasana	El-salam	El-Shoahit	El-Matala
Service station	+	+	+	-	+
Grocery –General Store	+	+	+	+	+
Newsagent	+	+	+	-	+
Bakery	-	+	+	-	+
Butcher	-	+	+	-	+
Fruit & Veg.	+	+	+	+	+
Pharmacy	-	+	+	-	+
Hairdresser	-	+	+	-	+
Coffee Shop	-	+	+	-	+
Video Shop	-	-	+	-	+
Electrical Shop	-	-	-	-	+
Post Office	+	+	+	-	+
Banking service	-	+	+	-	-

+ service available

- service not available

Overall, the highest level of satisfaction was recorded in El-Matala, and is assumed to reflect the variety of retail establishments in nearby city (Rafah). Although

no direct question was asked concerning shopping patterns, it became evident during this part of the interview (question D8, Appendix A) that few households relied solely on local shops. Most preferred a weekly shopping trip - normally at the weekend - to the nearest urban centre or large town, for a greater variety of goods at lower prices, and used local shops only for "extras" or daily requirements. Local shops, therefore, unable to compete with the urban centre, served as a useful back-up service for everyday needs.



Fig.11.7 Post office of Rabaa

11.3.3 Entertainment and Social Facilities

All enterprises are primarily concerned with profit margins and this is reflected in their choice. No where is this more apparent than in entertainment and social venues, e.g. cinemas, restaurants etc., hence their predominantly urban locations which can command not necessarily a greater catchment area, but an appropriate threshold population. The facilities available in desert areas serve, as is identified in the previous sub-section, primarily as a back-up service. This is not to say that rural desert areas do not possess such facilities but, where they do, it is the exception rather than the norm.

The perceived adequacy of these facilities varied highly between areas. About 20% of respondents, mainly elderly residents who no longer participated in social events and knew little of the facilities available for a predominantly younger population were unsure. Where a definite opinion was voiced, these were favourable in El-Salam and El-Matala, especially in the new household sample, and emphasised the variety of opportunities available in the nearby urban centres, El-Arish and Rafah respectively. However, such responses related to what was convenient and not necessarily located within the designated study area. Likewise, the dominance of inadequate responses obtained for Rabaa, El-Hasana and El-Shoahit, also referred to the variety of facilities; however, this time the lack of both accessibility and choice was emphasised, even in the new household sample.



Fig. 11.8 Youth centre in El-Hasana (under construction)

Although asked specifically about the social/entertainment facilities available in their general area, to some their frame of reference was limited to the immediate locality, while for others it appeared to include neighbouring villages, towns and cities, which constituted their social environment or community. It is significant that interest in social and entertainment facilities in the rural desert areas increases proportionally with relation to the level of education and the available commuting distances.

11.3.4 Medical Facilities

Medical provisions in North Sinai, in particular doctor's surgeries, have undergone several changes since the 1980's. The most important of these, as it effects this thesis, has been the centralisation of doctors' surgeries in urban areas especially El-Arish. The percentage of doctors operating from single-handed practices declined from 25.6% to 12.7% during the 1976-86 period, and the percentage of those in practices of 5 or more partners declined also from 20.3% to 7.6%. During the 1986-96 period, 27 new health centres were opened and by 2001, 41 were in operation throughout the Province. The percentage of general practitioners that worked in health centres increased from 12.4% to 38.8% (Hegazy, 2000b). Invariably, the combined effect of these measures has been to concentrate doctors into specific locations - primarily large towns and urban centres - which has created many problems of accessibility especially for remote desert populations.



Fig. 11.9 Hospital of El-Salam

Not surprisingly, given these changes, medical facilities were not prominent in many of the study areas. Only El-Matala possessed a local doctors' surgery (2 partner practice), a dentists' surgery and until recently a small hospital. Elsewhere, residents

were dependent upon the larger health centre practices associated with neighbouring large settlements. For example, that one in El-Hasana containing 4 doctors and covering some 2000 square kms including all smaller settlements in the ward. In El-Shoahit, a GP from the nearby Health Centre had held a branch surgery only one day per week. In El-Salam, a baby clinic is now also available. This latter service is undoubtedly a forceful reminder of the recent development that has occurred within the village, and the influx of families in their childbearing years (sections 9.4.2 and 9.4.3).

In contrast to the varying proportion who expressed uncertainty about the provision of other services in their area, very definite opinions had been formed in relation to medical facilities - an indication no doubt of its importance to all.

Although the majority divulged a positive response in El-Hasana and El-Salam, sizeable proportions, 41% and 40% respectively were dissatisfied. Several even described the service as "very inadequate" especially in Rabaa and El-Shoahit, and on the whole these responses referred to their particular circumstances as well as the actual shortage in the medical service provided.

11.3.5 Public Transport Services

Given the limited shopping, medical and entertainment facilities available within each ward, the quality of public transport services is particularly important. It was identified in Chapter 9 that, while car ownership was relatively high in each study locality compared to rural settlements in the Nile Valley, private cars in desert areas were primarily used for commuting to work. Although no precise figures were obtained, many rural desert households did not possess access to private modes of transport during working hours, and on average between 15 and 25 sampled households in each area did not possess private transport at all. This was found to include older residents and those living alone (section 9.5.4). These groups were therefore dependent upon public

transport services. All frequencies of opinions towards the service refer to bus services.

The numbers "unsure" represent those who rarely used the service and were highest in El-Hasana and El-Shoahit. In these two areas, general opinions were found to be heavily skewed towards the inadequacy of the service, where in excess of 25% viewed the service as "very inadequate". Their justification related to the infrequency of the scheduled provision, 83% of such responses in El-Shoahit and 52% in El-Hasana, where the unsuitable timing of the service was equally important. However, it was El-Salam which, notwithstanding general opinion, was found to possess the most frequent service. Five buses travelled daily from El-Arish to Cairo and back with a regular bus service operating between El-Salam and El-Arish (approximately every half-hour). The responses of sampled residents, who described the service as 'inadequate', were not, therefore, substantiated.

In remote locations, some residents took comfort from the fact that they had a service at all. "Many areas are worse off ... as most people use cars and taxis, you couldn't expect a better service...", one respondent explained.

The flexibility that private transport affords could never be replaced by a public service no matter how frequently it was available. Instead, public transport serves as a supplementary form of conveyance and, as such, was viewed as adequate and satisfactory. Where strong opinions, especially from the new household sample, were voiced against the service (in El-Hasana especially) these may relate to comparisons with their former place of residence. Alternatively it may reflect an inherent trait of younger sections of the population at large to emphasise public service deficiencies. Overall, however, public transport services were adequate as a supplementary service for the majority of respondents. For those who relied solely on this means of travel (especially non-car households) the choice of destination and the flexibility of timing were severely restricted in most desert localities.

During this study, three of the study locations, Rabaa, El-Salam and El-Matala, were serviced indirectly by rail transport through the nearby urban centres. Since the end of 2001 this has been reconnected to the north of the Province, linking, over a bridge crossing the Suez Canal, the cities of North Sinai (El-Qantara, Romana, Bir El-Abd, El-Arish and Rafah) with El-Esmailia city on the eastern bank of Suez Canal and consequently with the Nile Valley cities. This new, fast and high quality public transport service was hoped to give a huge push for sustaining the population growth of North Sinai and encourage the in-migration process from the Nile valley.

11.3.6 Summary of Service Provisions.

This largely descriptive section has served as a useful indicator of the services and facilities available in desert areas undergoing a repopulation. The quality of rural desert services, primarily concentrated within nucleated settlements, was found to depend upon the size of the rural desert settlement and its proximity to a larger urban centre. Provisions were particularly poor in El-Hasana and El-Shoahit because of their remote locations, where residents were dependent mainly on the available local facilities. All study areas contained primary school facilities; however, in El-Shoahit as well as all small settlements of North Sinai, daily travel is the only choice for children residing more than 5 kilometres from places of secondary education.

In general terms, rural desert service provisions perform as a standby to those available in urban centres. Few sampled households appeared to rely solely on local utilities. Undoubtedly, it is the non-car households that were particularly disadvantaged in such areas as El-Hasana and El-Shoahit, where public transport was observed to be sporadic. The actual effect on these households may, however, be minor, with many undertaking weekly shopping trips to urban markets. Indeed, several car-owning respondents claimed that a relative or a friend who did not have access to private

transport often accompanied them.

The consequences of a repopulation of the desert to local service provisions have appeared to be negligible. Only in El-Salam and El-Matala had several new shops opened - a video shop and coffee shop. Elsewhere there is a slight growth in retail outlets, although in several cases a migrant family had taken over the running of a local facility.

11.4 A Repopulation of the Desert: Perceived Impacts and Desired Future Form

Thus far, attention has been directed towards the integration of “newcomers” into the local community and the adequacy of service provisions in each area. In relation to both, a population revival does not appear to have had any significant negative or positive consequence. However, perhaps a more important avenue of inquiry is how residents themselves view the changes occurring in desert localities, and the types of new residents they would most like to see.

In the present study, respondents were not asked directly to comment on the most desirable future form of the process, but rather through an assessment of the perceived effects of recent changes and the nature of future desirable growth patterns - through an identification of the types of households perceived as most welcome in their locality (questions D4 and D5, Appendix A) - they were in effect commenting upon the types of repopulation most acceptable to their area. The latter aspect of this topic relating to specific types of households was most problematic during the questionnaire design and piloting stage (section 8.5.1).

11.4.1 The Perceived Effects of the Repopulation of the Desert

The potential consequences of repopulation processes are both varied and numerous. Potential benefits may include a revitalisation of desert communities, especially if they have been associated with prolonged depopulation in the past, and the

resulting growth in base populations may not only raise population thresholds towards those necessary to sustain an increased number, and much improved level, of service provision, but demographically population growth involving young married families has a self-generating element. Alternatively, detrimental impacts have included the loss of rural desert communities and their replacement by dormitory and more urban-type settlements. Increased acts of vandalism have also been reported. Unfortunately, it has been the negative repercussions which have received most documentation in the academic literature and media at large. Most are related to the influx of urban-origin migrants, who upon arrival either want the desert preserved or developed. More often than not, the wishes of the new and established resident are believed to differ despite a paucity of relevant documentation.

In the present context, the greater importance of an intra- and inter-rural desert flow suggests that a desert revival may be more favourably received by the host population, especially as many of the actual migrants possessed close personal ties to the area. Further, as many moved within the area, the perceived retention of local residents may be seen as a welcome change from previous depopulation trends. However, equally important, the increased movement of urban-origin migrants with few or only weak previous ties, especially in El-Hasana, El-Salam and El-Matala, may be received with reservations.

Rather surprisingly, not all local households were aware that a repopulation of their area had occurred (Table 11.11). For example, approximately one-third of respondents in Rabaa and El-Shoahit claimed that no newcomers resided within a 5 km radius of their home, despite being aware that the term "newcomer" referred to anyone who had moved to their present home within the past ten years. Possible explanations for this finding are that both areas registered the lowest number of sampled new households (section 9.2), and as they were largely associated with dispersed single

dwellings in the desert, especially El-Shoahit, the process may not have been as obvious as in other areas where it was characterised by large-scale residential development, i.e. El-Salam and El-Matala. In all areas this group were asked what effect the movement of people into their area may have.

Table 11.11 Local households: Awareness of new households (numbers and %).

Rabaa	22 (53.7)
El-Hasana	12 (37.5)
El-Salam	27 (81.8)
El-Shoahit	15 (40.5)
El-Matala	25 (80.6)

Combining the perceived and actual effects given by all respondents, irrespective initially of their duration of residence, a statistically significant difference was obtained between areas (Table 11.12). The modal category in each emphasised that recent trends were or would be desirable, accounting for at least 50% of responses in three areas. The exceptions were El-Hasana and El-Shoahit where more than one-third viewed the process as undesirable. Indeed in all areas, except El-Salam, approximately one in four households had not formed an opinion, suggesting that the recent demographic changes had no obvious positive or negative effect. Categorising the data by duration of residence, it became apparent that the variations noted above related to the new household samples and El-Hasana area specifically.

Table 11.12 The perceived impact of the repopulation of the desert (numbers and %)

	Desirable	Undesirable	Unsure	TOTAL
Rabaa	25 (54.3)	9 (19.6)	12 (26.1)	46

El-Hasana	14 (33.3)	17 (40.5)	11 (26.2)	42
El-Salam	27 (60.0)	11 (24.4)	7 (15.6)	45
El-Shoahit	16 (39.0)	15 (36.6)	10 (24.4)	41
El-Matala	24 (54.5)	8 (18.2)	12 (27.3)	44

Whereas more than 50% of both local and new sampled households gave a positive response, in El-Hasana only 30.0% of the most recent mover group shared this opinion, with 40.0% emphasising its undesirable effects and the remaining households expressing a degree of uncertainty. Only in this area were the perceived negative consequences of the repopulation process found to be statistically the same in both new and local samples.

The perceived favourable consequences of a population revival covered an array of responses. While some gave no particular reason and several felt it caused no harm, the most frequent specified effect related to an increased demand for local services and facilities, ranging from 51.3% in El-Matala to 15.9% in Rabaa. Thus, while local services in the previous section were viewed as limited, but on the whole adequate as a backup facility to those available in urban centres, this suggests that residents believed local facilities could be improved. Others emphasised the demographic consequences of a repopulation, which was particularly evident in the remoter locations of El-Hasana and El-Shoahit, accounting for some 20.4% and 35.6% of the respective responses. This group referred to the presence of young people who were perceived to revitalise the local rural desert community. The fact that such consequences were dominant in these two localities is assumed to relate to their traditional loss of younger residents. Others simply claimed that their area was now 'less lonely' than previously. It is noteworthy that few respondents perceived that a repopulation of the desert would bring about a corresponding employment revival. In fact, this was only noted as important in El-Matala, where 28.6% viewed this as the case, and was found to relate to the positive

effects of the process accruing to the construction sector.

Undesirable consequences associated with the changes were found to relate to four factors: firstly, the negative impact on the local Bedouin character; secondly, villages were being transformed into "urban" centres; thirdly, additional families in rural desert environments were undesirable unless accompanied by an expansion of employment opportunities; and finally, population growth was having a detrimental impact upon local house prices.

The first two factors are undoubtedly related, and were particularly emphasised in the most urban-influenced study areas of El-Salam and El-Matala, where they accounted for at least 45% of all negative responses. Most referred to the loss of a rural desert community, i.e. its privacy, traditions and tribal system which had now been replaced by a largely urban way of life, characterised by a commuting population whom local residents neither knew or had any direct contact with. Commuters were perceived as having no positive impact on the local area, with the once typically rural desert villages now having become overdeveloped, and essentially serving as dormitory settlements rather than settlements in their own right. Small acts of vandalism had accompanied the development. In Rabaa, El-Hasana and El-Shoahit, 20%, 40% and 50% respectively, of those emphasising the negative aspects of the process, expressed disquiet concerning the residential development of rural desert areas without suitable employment opportunities and a further 30% in El-Hasana showed concern for the impact on the local housing market. Affluent newcomers were perceived as increasing local property values beyond a rate at which local residents could compete and, consequently, forced local young people to leave the area. Although undoubtedly this affected all areas to varying degrees, in the ward of El-Hasana, building sites were a particularly scarce commodity. Furthermore, this area was within a development control zone and, consequently, newcomers and local residents alike had to compete for available houses. In other areas,

where individual private constructions occurred in the open desert and large-scale residential development within village limits, the competition between in-migrants and local young people was not as severely felt. Rather surprisingly, this house price argument in El-Hasana was solely put forward by residents living at their present address for less than ten years, while local residents were more concerned with the lack of local employment opportunities. The responses were from local residents acquiring their first home, either immediately following marriage or after residing with parents for a period of time. Furthermore, the majority moved to public sector properties and suggested that, they would have preferred to purchase a house, but were unable to afford new private sector dwellings.

In general terms the repopulation of rural desert areas was viewed as desirable to a considerable degree across each locality. However, several were uncertain as to any potential impact and many emphasised that this depended upon the social class and behaviour of new residents involved.

11.4.2 Preferred New Residents.

The proposed undesirable effects associated with the present study areas appear to support this view. For example, in El-Hasana rising property prices were related to an influx of affluent migrants and elsewhere the detrimental effects pertaining to a loss of desert character and typically rural desert settlements were undoubtedly allied to their transformation into dormitory settlements and extensive commuter belts. Both suggest that the arrival of a largely commuting population had few positive consequences for the local community.

In relation to the categories of newcomer who were perceived as unwelcome by small proportions of the samples, these were found to refer to those originating from an urban centre, especially from the Delta of Nile Valley, and were mostly prominent in the areas of El-Salam and El-Matala. The proportions for El-Salam, were unexpected as it was identified in section 10.3 that many local residents upon marriage moved into public sector housing in El-Arish, and subsequently returned to their home area when a house or the means to build a house became available. However, the 59% who viewed local-origin newcomers as “very welcome”, suggests that replies to the housing estate tenant or urban-origin migrant excludes this group.

Table 11.13 The frequency of opinions towards different categories of newcomer (%)

a. *Rabaa*

	Very Welcome	Welcome	Unsure	Unwelcome	Depends
Agricultural area.	17.4	51.1	25.0	-	6.5
Brought up in area.	30.4	42.4	20.7	-	6.5
Professional people.	1.1	52.2	34.8	5.4	6.5
Urban-origin.	-	47.8	37.0	6.5	8.7
Housing estate.	-	45.7	34.8	12.0	6.5
No family connections.	-	44.6	38.0	9.8	6.5

b. *El-Hasana*

	Very Welcome	Welcome	Unsure	Unwelcome	Depends
Agricultural area.	8.2	68.2	21.2	-	2.4
Brought up in area.	35.3	42.4	20.0	-	2.4
Professional people.	9.4	62.4	21.2	2.4	4.7
Urban-origin.	2.4	54.1	30.6	10.6	2.4
Housing estate.	1.2	52.9	32.9	9.4	3.6
No family connections.	1.2	58.8	36.5	1.2	2.4



Fig. 11.10 Farmers from Nile Valley sharing work with Bedouins in North Sinai.

The preferred nature of a continued desert revival was explored through question D5 of the interview schedule (Appendix A). Respondents were requested to comment on how welcome they thought each of six pre-defined categories of newcomer would be in their locality (Table 11.13). Each related to a specific form of repopulation, i.e. immigration, return migration or a rural desert retention, and the types of people associated, i.e. those of professional standing, those with no family connections in the area, etc. Obviously, any migrant household could display more than one of the specified characteristics, but it is the largely stereotyped image associated with each category that is assessed. The frequency of responses obtained for each area are presented in Table 11.13 (a-e).

Notwithstanding the statistically significant difference between the acceptance of distinctive categories of newcomer in each area, relatively few gave an unwelcome response to any potential migrant group. This had been anticipated. It is a commonly observed trait of similar studies that respondents are reluctant to reply with reference to the extremes. Indeed, it was the “welcome” and “unsure” opinions which accounted for the greatest share of responses. However, although frequencies were low, the incidence of “unwelcome” and “very welcome” replies proved illuminating.

c. *El-Salam*

	Very Welcome	Welcome	Unsure	Unwelcome	Depends
Agricultural area.	28.6	53.8	16.5	-	1.1
Brought up in area.	30.8	52.7	15.4	-	1.1
Professional people.	6.6	70.3	15.7	6.0	-
Urban-origin.	3.3	56.0	24.2	15.4	1.1
Housing estate.	3.3	52.7	24.2	16.5	3.3
No family connections.	3.3	73.6	19.8	2.2	1.1

d. *El-Shoahit*

	Very Welcome	Welcome	Unsure	Unwelcome	Depends
Agricultural area.	57.8	30.1	12.0	-	-
Brought up in area.	59.0	28.9	12.0	-	-
Professional people.	16.9	61.4	15.7	6.0	-
Urban-origin.	12.0	48.2	21.7	18.1	-
Housing estate.	12.0	51.8	26.5	9.6	-
No family connections.	12.0	55.4	20.5	12.0	-

e. *El-Matala*

	Very Welcome	Welcome	Unsure	Unwelcome	Depends
Agricultural area.	47.7	44.3	8.0	-	-
Brought up in area.	50.0	44.3	5.7	-	-
Professional people.	20.5	62.5	10.2	6.8	-
Urban-origin.	15.9	56.8	12.5	14.8	-
Housing estate.	15.9	59.1	12.5	11.4	1.1
No family connections.	15.9	55.7	10.2	18.2	-

Likewise, small proportions viewed migrant families without relatives residing in the area as “unwelcome”, representing at least 1 in 10 respondents in four areas, with ratios particularly low in El-Salam and El-Matala. It is noteworthy, that in El-Salam, 58.3% of the sampled new households could be described as non-connected in this sense. Thus, where “strangers” had participated in the recent repopulation trends, these categories on the whole were more favourably perceived. However, with respect to El-Matala, the low proportion (6.3%) disapproving of this group’s arrival was unexpected, given that an in-migration component was associated with rising house prices. The small but higher, incidence of comments in the “unwelcome” pertaining to professional and urban-origin migrants suggests that the impact of these groups may be more directly related, especially with regard to the former categories (Table 11.13). Importantly, within this context, approximately one-third were ‘unsure’ as to how non-connected migrants would be received in this area.

Further tests as to differences in opinion between the new and local samples yielded variations in relation to unwelcome responses in El-Matala only, and was found to relate to three additional categories of newcomer; those of professional social standing, of urban-origin and without family connections residing in the area. With regard to each, although the modal response for both samples represented a welcome reply, a greater proportion of the local sample viewed them as ‘unwelcome’.

Examining now the categories of newcomer which received more “very welcome” responses, two were particularly prominent in each area, i.e. those originating from an agricultural, and consequently a rural area, and those who had been brought up within the respondents’ present area of residence. The high proportion of responses favouring these groups suggests that a retention of local and rural residents as opposed to a large-scale in-migration of non-rural households was the most favoured form of future repopulation. Further, as this has been the nature of repopulation processes in

several localities (Chapter 10), the limited negative repercussions accruing to these communities testifies to its overall acceptance and desirability. Variations amongst new and local samples were not particularly dominant, and largely reflected the demographic and socio-economic similarities of both. In relation to newcomers originating from an agricultural area, or from within El-Matala ward, greater ratios of the local sample perceived they would be "very welcome".

Thus, notwithstanding the inherent problems associated with this question, namely that respondents displayed a reluctance to divulge extreme opinions, an analysis of these extreme responses did suggest some notable considerations. Firstly, a greater proportion of overall "very welcome" responses characterised those groups of newcomers who were most typical of rural areas, i.e. those of rural or agricultural backgrounds, and specifically favoured a retention or return of local residents. Secondly, the most common "unwelcome" responses related to newcomers either professional people and those without family connections in the area, or the in-migration of urban residents. Taking these results a step further, one can infer that an urban-rural movement by a largely middle-class population is not necessarily a welcomed form of repopulation. By contrast, if a rural desert revival is to continue, preferences appeared to favour an in-migration by rural-origin families or the return or retention of local residents. This was found to reflect the wishes of both the established and new respondent, and where variations were obtained, as in El-Matala, this mirrored the process variations which had occurred within the ward itself. In other words, the opinions of the largely mixed and varied socio-economic and mobility groups associated with the extensive development on the suburban fringe differed markedly from the uniformity of origins and socio-economic characteristics associated with the more peripheral tracts of the ward.

11.5 Conclusion

At the outset of this chapter, it was suggested, given the nature of the repopulation process in several localities that few negative results would accrue. If present at all, polarisation was potentially most likely within areas where the repopulation process included a greater number of migrants from a greater diversity of backgrounds, i.e. El-Salam and El-Matala.

Overall, irrespective of the principal repopulation process responsible, community relations appeared not to be affected in an adverse manner, although the prior association of many newcomers was found to be an influential factor. Those who had been brought up in or moved within their present area of residence, or importantly had relatives already residing locally, appeared to be more easily assimilated.

Where the desert revival included large-scale in-migration, the presence of two communities became apparent. Although the majority of newcomers had been well received, little direct contact had developed between the two groups. No hostility was apparent but in-migrants choosing to reside in a rural desert area continued to rely on an urban centre, not only for employment but recreational pastimes, and on the whole had not become acquainted with established residents, even on a neighbourly basis. In El-Matala, many had become actively involved in the local community, but this included activities run by newcomers for newcomers, with few perceiving that they participated in the local community. Furthermore, in El-Hasana the isolation of the two groups was most pronounced and, in effect, newcomers to all intents and purposes formed an 'urban community'. This contrasted with the overlap between the local population and 'connected' newcomers situated in dispersed dwellings in the open desert.

Few positive consequences accrued to local service provision and, except for the opening of more specialised retail units in some areas, the repopulation of the desert has not been associated with a marked improvement in rural desert services. The most

obvious positive impact related to an increase in school enrolment, but importantly this was mainly associated with large village schools.

On the whole, the present repopulation of essentially rural desert environments had been favourably received, with the few adverse consequences dominated by loss of desert character and rising property values, more commonly associated with Rabaa and El-Salam.

Trends for the future appeared to favour a continuation of present processes. The majority of respondents displayed preferences for migrants of local or rural origin, and while professional, urban migrants lacking local relatives would not be best received, they were more favourably perceived in localities where large numbers had already relocated, i.e. El-Hasana and El-Matala.

Conclusively, it is demonstrated that a repopulation of desert environments has had few positive or negative repercussions for the communities concerned. Whether involving large-scale in-migration or a retention of local residents, community hostility and polarisation has been minimal. The retention of local residents appeared less disruptive of community relations and on the whole was most favoured by the rural desert residents surveyed in this study.

CHAPTER TWELVE

Conclusion and Recommendations

Chapter 12: Conclusion & Recommendations

12.1 Overview

Egypt faces ongoing problems in its population distribution. While heavily populated areas of the Nile Valley continue to attract migrants, depopulated areas remain largely empty. In North Sinai, in spite of governmental support, in terms of new infrastructure and many urban and investment projects, there exists a tremendous under-population problem. Meanwhile, the urban centres of Egypt are suffering worsening social, economic, infrastructural and environmental problems exacerbated by overpopulation.

This thesis addresses the concept of sustaining population growth in desert settlements. It argues that the socio-economic needs of desert settlements are, to a large extent, overlooked, thus contributing to their failure to attract and retain large numbers of people.

This research was initially conducted and motivated by the problem referred to above, with a key aim being to explore the urban problems and obstacles that are encountered when sustaining population growth in desert communities. Equally, another aim was to define those factors that should be taken into consideration and implemented in planning population policies for new desert communities, especially in North Sinai, Egypt the area of case study. Discussion of these topics was structured through a group of objectives.

The author has tried to attain a comprehensive understanding of human settlements in deserts through Part One of the thesis. This entailed a synoptic approach to the impact of the desert context, as a specific environment, on the settlement population across its social, economic and environmental dimensions. To measure the effectiveness of current policies in achieving and sustaining the target population

growth of desert settlements, Chapters 5 and 6 in Part Two, describe several approaches taken to evaluate the effect of population policies, their intended impacts and the cumulative differences between the values of selected measurable indicators (availability of employment or housing, extent of infrastructural development and so on), and the expected values in the absence of such policies. From this, the researcher was able to explore the different aspects that would express the effects of policy on population growth and dispersal.

To contribute to the formulation of a new and general approach in dealing with desert settlements, a comparative analysis was conducted, as detailed in Chapter 7, between the policies that have been applied in three different countries, Egypt, the USA and Israel. This comparison represents the three main themes of desert settlements in the world today: traditional, liberal economic, and military/ideological.

These first two parts of the research address the indicators of sustaining population growth. These investigations support a view that it is not sufficient for governments to use only economic, employment and infrastructural means to attract people to desert settlements. These do not tackle the problem of public attitudes towards living in remote communities, nor do they provide settlements that are adaptive to the desert environment, which might invite settlers to remain there and bring up their families. These insights construct the analytical background to the field study in Part Three, which outlines the research techniques in Chapter 8 and the case study, field survey and questionnaire conducted with the assistance of residents of five chosen desert settlements in North Sinai. This analysis examines the attitudes among 'local' and 'newcomer' households, looking at their residential mobility, the relocation process, and the consequences for the community and prospects for the future. This part of the thesis contributes to developing a general assessment of the Egyptian experience in establishing desert settlements, especially in North Sinai, the case study.

This work is therefore more oriented to determining the reasons for a lack of success, rather than drawing up a formal evaluation, and it contributes to providing reliable recommendations for planning, policy formulation and decision-making institutions in Egypt, as will be shown at the end of this chapter.

12.2 Research Hypothesis and Questions

From the research problems and objectives mentioned above, the research hypothesis, the main argument of the thesis, considers that an actual and balanced approach that integrates the economic, social, cultural, political, spatial and ecological dimensions in the development process, is necessary to achieve sustainable population growth in desert settlements.

This hypothesis has been tested and confirmed through a structured group of questions that lead the research through its parts and chapters, trying to produce comprehensive results and findings.

The first question, addressing the main dimensions of sustainable development in desert settlements, has guided this study to the conclusion that sustainable development of desert settlements is very complex and multidisciplinary in nature. This can be recognised across three dimensions: social and cultural, economic, and environmental and physical. Furthermore, these dimensions, which represent the main core of all chapters of Part One of this thesis, are so intrinsically interlinked that any effective intervention process should address them collectively within a holistic approach.

The desert context was considered as the primary ecological force that impacts on the different dimensions. Each dimension was investigated in response to this primary ecological force and its interactions with the other dimensions. A comparison of traditional and current characteristics of desert settlements established the main framework of the discussion and from this, the general features of an adaptive study

emerged.

The second question addressed the quality of the previous and current dispersal policies in Egypt, which have failed to achieve their population targets. One outcome is that it inspired an in-depth analysis focusing more on the Egyptian context. In Chapter 7, analysis of the Egyptian experience, shows that the impact of the unidimensional population dispersal policies, combined with the impact of a broad range of economic, socio-cultural and socio-political contexts, has shifted the whole dispersal process from its initial rationale of being merely a large-scale governmental economic enterprise, heavily dependent on a single, unproven economic base to add to the sophistication of the problem.

This unidimensional approach to what is a multifaceted and complex process of development, indicates a lack of consideration of the many factors involved, such as human psychology, the social fabric, culture, socio-political and institutional structures, among others. The obstacles to the development of land use and under-utilised resources are mostly social and institutional. Furthermore, the nature of interdependencies and interactions between these factors, especially within the characteristic environmental context of desert, were wholly overlooked.

Moreover, because of the nature of this investigation, sustaining population growth in desert settlements, statistical methods and their review emerge as essential tools to monitor, manage and plan for that growth. This necessitated the third research question, investigating the statistical methods that can measure the sustainability of population growth for a certain settlement.

While the actual changes in regional development over time can easily be estimated using a system of statistical data, the main question whether these changes can be attributed to a policy itself (rather than to other exogenous and endogenous factors) lies in to what extent the actual values of selected development indicators differ

from those that would have been achieved in the absence of such a policy.

Egyptian national institutions lack any forward planning approaches to the gathering and analysis of statistics that might allow the viability of new settlements, in terms of sustaining their population growth, to be determined. The research explains the new methods of measurement that are applied already in other countries, such as 'MB/NG index' (Fig. 5.1, Chapter 5), 'Private construction indicator' and 'Index of Clustering' (Chapter 6).

Furthermore, addressing the viability of new desert settlements depends on the ability to recognise the motivations that inspire people to live in desert areas. Such a question is addressed and investigated in Chapters 3 and 6. Communities that have successfully relocated to the desert were those that had social ideals and sufficiently strong motivations to channel their energies appropriately to overcome the inherent difficulties of initiating and stabilizing new habitats in the desert. The fusion of formal and informal institutions is also necessary to sustain a higher level of public participation and collective responsibility.

Generalisation severely oversimplifies the motivation processes responsible for desert population growth. As an example, Chapter 10 concludes that present mobility processes in North Sinai (the case study) appear to suggest that if property, or the means to acquire property, is available, residents will move only a short distance, preferring to remain in a rural setting where they possess close family ties. Even where an urban-to-rural flow is detected for environment-related reasons, this largely involved a move to an area where other family members had already relocated, mobility patterns which clearly reflect the close family structure of North Sinai generally.

Egypt's current experience of desert settlement could gain many useful lessons from its previous phases and from other models, like the USA and Israel, of how to

construct social, environmental and economic motivations that can attract newcomers to the desert settlements as mentioned in detail in Chapter 7.

Current patterns of population concentration in Egypt are exerting severe pressure on its urban and societal ecosystems. Establishing settlements in the desert has become essential to absorb the predicted population growth, ameliorate the distorted spatial pattern and fabricate new vistas for social and economic development. Another question arises here: what is the best spatial settlement pattern to achieve sustainable population growth in the desert? The research, through analysis of the case study in Part Three, explains that the Bedouin themselves prefer a small agricultural, rural type of settlement (Table 10.20). In effect, they want to legitimise their spontaneous settlements. This might meet Bedouin social needs but it involves great difficulties in planning a pluralist society, since to exploit the available resources in these large areas, the hundred or so spontaneous settlements would inevitably encroach on some of the planned settlements yet to be established.

The characteristics of the migrants of existing new desert settlements were determined by asking why did they migrate? where did they migrate to? and what are the consequences? This represents the main core of the field survey and the questionnaire in the third part of the research. Chapter 9 explains the characteristics of the newcomers through clarifying their duration of residence, place of birth, age of heads of households, household composition and size, economic activity, employment status, acquisition of homes, etc. The reasons for and locations of migration is discussed in Chapter 10 by identifying the frequency of moves ten years prior to interview, the nature of flows at each move, former location category, principle reasons for moving and for relocation, future relocation plans and preferred locations. At the end of this part, the research highlights the consequences of that migration, including: the perceived levels of acceptance of the newcomers in their new community; the number

of households which have established friends; the perceived involvement of newcomers in local and social activities; and the opinions of local Bedouins regarding the different categories of newcomer and towards the repopulation process as a whole.

12.3 Research Findings

Based on the above, it is more convenient to classify the research findings into three headings to formulate a comprehensive perspective of the North Sinai depopulation phenomenon. These broad headings (levels) are: *policy*, *implementation* and *social*. The *policy* outlines suggestions, in terms of strategic intentions; *implementation* considers the physical and environmental realisation of the policies. The final aspect, *social*, represents the core of the recommendations and covers the wide range of structural circumstances found in this research that underlie existing settlements. The three broad headings are, to a large extent, related to the complex system of the desert.

- ***Policy***

The findings led to the conclusion that much of the deviation from achieving national and regional population dispersal policies can be explained through studying the socio-economic and socio-cultural dimensions of desert settlements.

The analysis indicates that, although the gap in population size between the centre and periphery of the country will tend to increase, the policy of population dispersal, and specifically government involvement in construction in development areas, is required to prevent a further increase in this gap. This means that spatial public policy can, in fact, ease the severity of the core-periphery imbalance and encourage more sustainable regional development.

Urban overpopulation in Egypt, and its spectrum of manifestations should be

reconsidered from the standpoint of spatial arrangements, under-utilised resources, and the geopolitics of investment allocation. An explicit policy of population dispersion to under-populated and unpopulated desert regions seems essential to securing the economic and social stability of the nation.

Desert settlement planning problems in Egypt and elsewhere can be attributed to three main factors:

- Indiscriminate application of concepts and trends transferred from different environmental contexts;
- Lack of understanding of the desert as a human habitat; and,
- Lack of a comprehensive approach that functionally and collectively integrates different aspects of human habitation within the desert setting.

Egyptian policies of population dispersal have failed to address the objective of building a distinctive cultural identity, one that is unique in the cultural mainstream of the society. During the early phases of improvisation, experimentation and innovation, conserving and reviving the positive aspects of the traditional desert culture can be a starting point for gaining a distinctive cultural identity.

Most of the construction and development plans in desert areas, and especially in North Sinai, were undertaken to meet the pressure of sudden military needs or other political and economic stimuli. Most of this first generation of planners and architects had insufficient acquaintance with the special environmental constraints of the desert. Lack of previous building history in the recent past enabled the area to be treated as a 'guinea pig' and made possible the implementation of innovative theories and practices. As a consequence, experimentation was undertaken on a relatively large scale, something that would have been impossible in any existing settlement.

- *Implementation*

Throughout the case studies, problems arose when policy attitudes, poorly related to the special constraints of the desert and suggestive of theories and fashions which had been developed in vastly different environments, were confronted with desert conditions. Thus North Sinai was filled with low-density settlements dispersed within the large desert, creating a fragmented urban mass.

Economic development of the desert will always be constrained by water shortages unless there are structural changes to achieve greater water-intensive economic activities. In the case of North Sinai, after the El-Salam Canal is completed, future desert settlements, as mentioned in Chapter 8, are more likely to be rural/agricultural rather than urban/industrial. However, an agro-urban setting is necessary for diversifying the economic base and sustaining a stable, low-cost food supply.

In spite of a desert revival that has allowed for large-scale migration, the presence of two different communities became apparent. Although the majority of newcomers had been well received, little direct contact had developed between the migrants and the local Bedouin. Typically, the social links between new and established residents in remote desert areas can be easily expressed as 'there are no feelings of animosity, but simply disinterest'. In many instances in the survey it was found that:

- The factor of close family ties was decisive in influencing people's choice of settlement, both in recent and intended moves, with many eventually settling near to their place of birth. On the other hand, the present repopulation of essentially rural agricultural environments had been favourably received. This suggests that any policy needs to take a long-term view, allowing sufficient time for trust and good connections to become established and genuine integrated communities to form.

- Mobility levels, assessed by the size of the new household sample in each area, were found to be highest in the most urban-influenced localities under investigation, reiterating the importance of proximity to an existing settlement for desert repopulation. By comparison, the remote desert wards included in the study registered, not only had the smallest new household sample, but also the largest proportion of non-movers.
- 'Dispersed concentration' characterised rural settlements, with movement from district towns most apparent in accessible settlements. Movement from dispersed dwellings in the desert is also associated with these localities. Finally, in more remote tracts of the desert, lateral mobility flows are evident. The study area of El-Hasana provides useful examples.
- New households in each area were largely associated with people under the age of 35, and were comprised predominantly of young family units.
- Higher levels of educational attainment were associated with the largely younger new household samples. Local residents tended to be qualified in practical skills, whereas academic attainment characterised recent movers.
- Detached and semi-detached residences, largely within village limits or on the outskirts of an urban centre, characterised the most recent mover group, with local households occupying more dispersed dwellings in the surrounding open desert. The exceptions were El-Salam and El-Matala villages, both close to existing urban areas and where new and local residents lived side by side within the village.
- The decision-making process associated with a change of address within desert areas was examined at various stages of the relocation process. The stimuli behind the decisions were found to relate almost exclusively to stages in the life cycle. Property considerations and employment opportunities were also

identified as principal reasons for moving, especially in the more urban-influenced localities.

The differences between the environmental values of newcomers and local inhabitants are also important. It was found that, while newcomers value spatial qualities offered by an urban environment (access to an urban centre, recreational facilities etc.), local dwellers pay more attention to ecological and functional issues (structural conditions of development, social facilities and services in the area).

- *Social*

The analysis carried out in this study, looking at a spectrum of settlements of different size and location, demonstrates that the indicators of social attractiveness rather than the objective qualities of the environment influence people's preferences. As a result, settlements that are less developed, as indicated by their physical qualities, may still exhibit a higher level of social attractiveness than more prestigious and developed alternatives. Social attractiveness, although related to the whole range of settlement phenomena, is greatly affected by the level of integration among residents. Again and again, the surveys highlighted social separation between newcomers and Bedouin, particularly in those settlements far from existing urban cores.

In new settlements closer to the existing cities, the newcomers tended to be characterised by commuters. They had no need to rely on public transport services nor on locally available shopping and other facilities, thus they regarded these as being very much secondary to their requirements. In terms of employment and skills, the newcomers are more typified by non-manual, professional labour. Those engaged in agriculture made use of the government policy of granting 5 or 10 *feddan* of land in new settlements to recent agriculture graduates, but their lack of practical experience with

farming that was adaptive to the arid environment, made them entirely dependent on heavily subsidised, artificial water supplies. Although some places exhibited an encouraging level of community participation, in almost every case, the activities covered were divided along the lines of the newcomer and Bedouin communities.

These findings demonstrate that the new settlements have not been successful in realising the potential to extend the knowledge and way of life developed by traditional desert dwellers to create viable communities positively adapted to their natural context.

Analysis of their respective economic activities shows there is a significant difference between the local Bedouin inhabitants and the newcomers. The newcomers, traditionally non-landowners, were more open to other economic activities, besides cultivating the lands they did not own. Wages gave them more independence than they had had before. The newcomers were less attached to a traditional economy and therefore were much more prepared to adopt modern work patterns; whereas, the 'real' Bedouin, the landowners, retain a dual economy pattern. Their traditional economy, based on agriculture and animal raising, is a source of financial stability and security against work discrimination.

An important conclusion to be drawn from this is that any wider economic integration of Bedouin into a centralised urban labour market would diminish the status and value of traditional agriculture and the role of the land as a safeguard against economic insecurity. Waged work would be an incentive for them to change and improve their traditional lifestyle.

Although the research limits itself to the context of the desert environment, the author suggest that its findings may offer valuable insights applicable to other parts of the world, where national policies are seeking to counter the global problems of rural/urban or periphery/core unbalanced migration.

12.4 Recommendations

The desert settlement experience in Egypt could gain momentum if it became a core national initiative rather than only a sporadic and partial government initiative. Leadership and governmental commitment, policy orientation and skillfully planned media and information systems have a fundamental role to play in instigating nationwide implementation.

A national plan for population dispersion should address the objective of directing continuous investment toward establishing new settlements in the desert regions, especially in North Sinai. A structure of progressive incentive systems in new desert regions should be matched by a comparable disincentive system in the congested primary cities.

Planning new desert settlements should follow a gradual, experimental approach of establishing a primary network of dispersed, compact, small-scale settlements based on the available local resources.

A major transformation from the traditional centralisation of power to decentralised political systems of efficient local/regional structures seems necessary for the objectives of desert development as well as for socio-economic development at the national level.

The author suggests that an increase in the economic potential of peripheral desert areas can be achieved by the combination of the following development policies:

- *Stricter land use regulation in central non-desert areas (the Nile Valley).* The reduction in available land in central non-desert areas is a natural process, which may be accelerated by progressive land taxation and strict zoning. In turn, this would increase the relative attractiveness of undeveloped land in peripheral regions by 'pushing' the land availability threshold towards the spatial frontier of

development areas;

- *Further improvement in the means of transportation and expansion of existing transport networks.* These measures can contribute not only to increasing the competitiveness of the local enterprises in terms of production expenses, but also to making skilled labour more available. As the transportation network develops, improving accessibility to the country's central regions, and moving the threshold of land availability deeper into the peripheral desert region, the population growth of these areas may become more intensive and sustainable;
- *Development of a progressive system of investment incentives* (tax exemptions, favourable loans etc.), which increase with distance from existing urban centres;

Unlike small population size and spatial isolation, the *remoteness of desert settlements* with respect to any major urban metropolis in the country, is a geographical fact. In order to reduce *spatial isolation* of peripheral desert settlements, the following patterns of urbanisation in peripheral desert areas, as mentioned in Chapter 6, could be employed:

- *Development clusters with a clearly expressed urban core:* This urbanisation pattern may be relevant to desert areas that already have existing regional centres represented by relatively big urban localities. The process of urban development in this case may represent the consecutive formation of a group of satellite settlements situated within the distance practicable for daily commuting, and which may form a single economic unit with the regional centre.
- *Development clusters of small urban settlements having no dominant urban core:* This pattern of urbanisation may be relevant to desert areas where current settlement patterns are less intensive, and where existing small settlements are widely scattered across the area. Under such circumstances, development of the

region may lead to the establishment of new settlements so as to form development clusters with existing small urban localities. The settlements in such clusters are expected to share some essential functions (employment, educational, cultural, recreational services etc.), which each of the small localities cannot individually sustain.

Water is the most significant limiting factor of desert development. Establishing the municipal and legal structures of new desert settlements should be based on a new framework of strict water conservation measures.

El-Salam Canal in North Sinai and El-Shiekh Zaied Canal in Toshka (in southwestern Egypt), which represent the current large-scale water transfer projects, should adopt sustainable approaches to avoid previous problems and obstacles. New desert settlements in these areas should depend on conservation and use of existing local resources to ensure a safe yield from them over time.

Transplanting many of the functions of the congested primary cities to new desert settlements can substantially accelerate their rate of development and growth. Administrative, educational and cultural facilities, for instance, can readily be transferred to the desert setting.

There should be an obligation among planning teams not to repeat existing models of public housing in desert settlements. Such an approach to housing does not revitalise a place nor does it allow either local Bedouin or newcomers to express their individual or group identity. If these new settlements are to achieve their target population and be self-sustaining in the long term, they should be considered as legitimate distinct communities, whose members' views should be heard, whose needs should be taken into account and with which public housing decision makers should

engage actively. The occupants of desert settlements should not be seen just as passive recipients that can absorb the population and housing crises.

The media and governmental information agencies should play an important role in attracting migrants to the new desert communities. Information campaigns should be based upon identifying the many positives in moving to the new desert settlements, as a contrast to the quality of life available in the old cities.

Allowing home ownership to be realised through a programme of easy payment plans, as well as offering rental units, should be considered as an inducement to strengthen people's motivation to move to new desert settlements. Wages and opportunities to increase income have been found to be factors that encourage people to stay.

Individual land ownership promotes a high level of engagement with the land. It encourages people to transform the desert landscape into a green area and to prioritise efficient land use. Encouraging feelings of belonging to the house, land and place must be considered as crucial to establishing successful and self-sustaining new settlements.

To gauge the actual impact of any policy of population dispersal in Egypt, it is necessary to establish an advanced system of population statistics that facilitate the use of a set of quantitative indicators. These include:

- a) Criteria indicating population change (population size of peripheral areas, and the annual rate of population growth);
- b) Policy measurements (the rate of public construction and infrastructure development); and
- c) Development controls (overall migration rate, employment change, and the rate of private construction in the area).

The thesis recommends methods of measurement that are already applied in other countries such as 'MB/NG index' (Chapter 5), 'Private construction indicator' and 'Index of Clustering' (Chapter 6).

An important recommendation for meeting the social needs of the Bedouin in the plan-making process can be drawn up as follows: every plan should take into account the dual economic activities of the Bedouin, allocating areas for agriculture and animal raising, along with preparing sites for new economic enterprises. This would address their cultural needs in allowing for the continuity of their way of life in the desert, and would also allow the development of economic enterprises similar to those in the Nile Valley settlements. Additionally, it would allow planners to learn from these long-held traditions, as they comprise a centuries-old fount of knowledge on living in and sustaining the desert environment.

While architects, social planners and economists can all contribute their expertise to the translation of Bedouin social needs into several alternative plans, they must recognise that Bedouin people have a wealth of knowledge of how to live in the desert, built up over centuries. Their values must be honoured in any settlement models designed for them. Planning experts can make cost estimates for each alternative, ascertaining its financial, social and political applicability and investigating practical ways of implementation. Only alternatives that are respectful of Bedouin traditions, way of life and values should be introduced.

The new desert settlements should be characterised as offering a 'unique selling point', in other words, present some factors that will attract new migrants. The most obvious selling points should focus on the spatial and environmental qualities of the desert, compared to the overcrowded, high rise, noisy and polluted old urban settings, the economic opportunities to exploit the desert resources and also the challenge implicit in being able to participate actively in the community. This thesis has

concluded that the policy of population dispersal should encourage and maximise the participation of people in all aspects of new peripheral settlements. If this becomes central to strategic thinking and implementation, then remoteness and aridity would become positive forces of attraction and allow the adaptation of sustainable communities within the desert environment.

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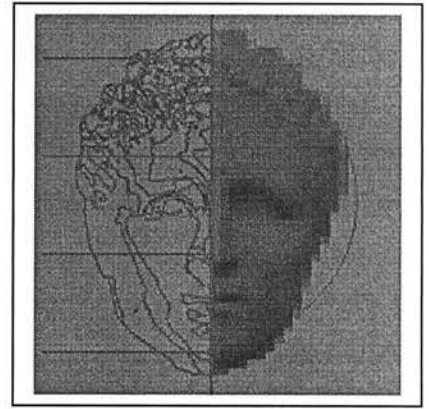
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**Questionnaire on
Sustaining the Population Growth of Desert Settlements
(Using North Sinai, Egypt as a Case Study)**

Dear Respondent,

There are currently major national efforts being concentrated on repopulating the arid desert zones of Egypt. For many decades people have been abandoning these areas and concentrating into over-populated urban centres. Agriculture, mining and other industrial sectors that favour wide geographical distribution can no longer rely on an available work-force. This leads to the unsustainable misuse of the country's resources.

In order to address this, many new and huge Government-sponsored infrastructure projects have been attempted in the desert areas but statistics, generally, show that these areas are failing to attract long-term residents, even from the overcrowded cities. This situation damages the quality of life in both urban and rural old areas.

This questionnaire is part of a research project into this problem. Its purpose is to listen to your suggestions as to what might make desert settlements more attractive to long-term residents. Your contribution is seen as an essential component of this research. If you are able to take the short time necessary (approximately 30 to 45 minutes) to complete this questionnaire and participate in a brief interview with myself you would be helping in the search for policies addressing the problems outlined above.

All information provided by yourself will be treated as confidential. The results of this research will be made available to you on request.

Thank you for your time,

HOSSAM RIZK
Mobile Cairo: (002) 0101556634
Mobile U.K : (0044) 07766026597
E-mail: hosamrizk@hotmail.com

SECTION A: Your Basic Household Profile

This section asks for background information concerning people who live at this address. It requires the involvement of people other than the main respondent who also live at this address.

Demographic And Social Characteristics

A.1. Please complete the following table, beginning with the respondent, and continuing for all other occupants, in DESCENDING order of age.

Resident	Relationship to Respondent	Gender (m/f)	Age (years)	Marital Status	Area of Birth ²	Level of Education ³
1. (Respondent)						
2.						
3.						
4.						
5.						
6.						
7.						

NOTES:

- Marital Status:** (1) Single (2) Engaged (3) Married (4) Widowed (5) Divorced
- Area of birth:** Please state the area in which you were brought up. Also indicate whether this was an urban or a rural (U/R) area.
- Level of education:** Please use the following categories:
(1) None (2) Supplementary or equivalent (3) Secondary or equivalent (4) Professionally Qualified Graduate (5) Graduate without Professional Qualification (6) Still at School / under School Age (7) Don't know.

Economic Characteristics

A 2. Please complete the following table for each adult living at this address, in DESCENDING order of age.

Adult	Occupation ¹	Nature of employment ²	Place of work	Distance to work (km)	Means of travel ³
1. (Respondent)					
2.					
3.					
4.					
5.					
6.					
7.					

NOTES:

- Occupation:** Please specify your job title.
- Nature of employment:** Please use the following categories:
self-employed (1); Full-time Employee (2a); Part-time Employee (2b); Unemployed (3); Paid Absence for Medical or Other Reasons (4); Retired (5); Housewife (6); Student (7).
- Means of Travel:** Please use the following categories:
Own Private Motor Vehicle (1); Given a Lift by a Colleague or Other (2); Company Transport (3); Train (4); Walk (5); Bicycle (6); Bus (8); N/A (9).

Section B: Residential Mobility During The Last Ten Years

B 1. Please complete the following table for each adult living at this address, in DESCENDING order of age. Exclude the present address.

A record of all moves for each adult living at this address within the last ten years

Occupant	Addresses left ¹	Approx. date	Marital status (m/s)	Nature of tenure ²	Occupation	Reason for leaving	Prior experience of area ³
1 (Respondent)	1						
	2						
	3						
2	1						
	2						
	3						
3	1						
	2						
	3						
4	1						
	2						
	3						

NOTES:

- Addresses left: Please state whether urban or rural.
- Nature of tenure: Please use the following categories:
 - Rented from the Domestic Housing Executive.
 - Rented privately.
 - Owner-occupied.
 - Tied ownership.
- Prior experience of area: Please use the following categories:
 - I have relatives in the area.
 - I have previously worked in the area.
 - I have previously lived in the area.

B 2. Do you anticipate moving away from this area in the future (to be answered by all adults living at this address in DESCENDING order of age)?

Occupant.	Plans ¹	Destination ^{2,3}	Reason for moving/staying
1 (Respondent)			
2			
3			
4			
5			
6			
7			

NOTES:

- Plans: Please indicate as follows:
(1) Yes (2) Don't Know (3) No.
- Destination: Please state whether urban or rural and state your actual destination.

- All following questions are addressed to the main respondent. I would like to thank the other members of the household for their time and their contributions to this research.*

SECTION C: Residential Information

C 1. What is the type of place you live in (tick one box)?

- City
- Town
- Village
- Open Countryside

C 2. What is your house type (tick one box)?

- Separate
- Detached
- Semi-detached
- Flat
- Mobile home/tent

C 3. Is your home part of a housing estate? Y N

C 4. What is the name of your nearest town or village? _____
Roughly, what is its distance (in km)? _____

C 5. What is the name of your nearest urban centre? _____
Roughly what is its distance (in km)? _____

C 6. a) How long have you lived at this address? _____
(If you have always lived at this address, please proceed to question C 9.)

b) Where did you live previously? _____
Was it urban or rural (u/r)? _____

c) Why did you move here? _____

d) What was your occupation before moving to this address? _____

e) How long have you lived at this address? _____ (years) _____ (months)

C 7. Before moving to this area had you:

a. Relatives here? Y N Who? _____

b. Worked here? Y N How long ago? _____

c. Once lived here? Y N How long ago? _____

C 8. Was this your first choice of area to live in? Y N

a) If yes, why did you particularly want to live in this area? _____

b) If no, where was your first choice (please specify whether it was urban or rural)? Give reasons for your answer _____

c) What stopped you moving there (please include any reasons specific to the place)? _____

- C 9. a) If you have always lived at this address, have you considered moving away from here?
 Y N . If yes, why? _____
 b) To where did you consider moving (please specify whether it was urban or rural)? _____

 c) What stopped you moving there? _____

- C 10. a) Do you own land? Y N
 b) If yes, what is its approximate acreage? _____

- C 11. Is your home (please tick one box):
1. Owner-occupied
 2. Rented Privately
 3. Rented from the Domestic Housing Executive
 4. Under tied ownership

- C 12. If house is owner-occupied, how did you acquire it (tick one box)?
1. Bought
 2. Built by you
 3. Inherited

- C 13. What is the area of your home (please tick one box)?
 40m² or less 41-80m² 81-120m² 121-160m² More than 160m²

- C 14. If your house was built by you, please tell me:
- a) Had you difficulty obtaining Planning Permission? Y Don't know N
 - b) Were there any special requirements you had to fulfil? Y Don't know N
 - c) If yes, please provide details of these _____

- C 16. Please rate the given qualities of your house (please tick one box per category):

	Excellent	Good	unsure	Not good	Poor	Don't know
Location						
Orientation						
House views						
Overall appearance						
Building material						
External landscape						
Spaciousness						

SECTION D: Social interaction and attitudes towards population growth

Your Participation in Social Activities

D 1. a) Do any members of this household participate in any social activities (include any charitable and social work)? Y N

b) Please provide details recording the answers in the boxes below, arranging them in DESCENDING order of age

Resident	Activity	Location ¹
1		
2		
3		
4		
5		

NOTES:
1. Location: Please also indicate the nature of where this takes place using the following categories:
1. Town; 2. Village; 3. Surrounding desert.

Your thoughts about 'Newcomers'

In the following questions, 'newcomers' refers to people who have been in the community for less than ten years, and 'community' refers to an area approximately 5 km in radius about your house.

D 2. a) To your knowledge are there any 'newcomers' in your community? Y N

b) If yes, in your opinion, do they participate in the life of the community? Y N

Please explain your answer _____

b) Have you any close friends (*not* relatives) who are new to this area? Y N

Please explain your answer _____

D 3. If you are a 'newcomer' (i.e. have moved into the area during the last ten years):

a) Do you believe you/family participate in the community life of this area? Y N

Please explain your answer _____

b) Since moving here, have you/your family established a close friendship with any of the local residents? Y N

Please explain your answer _____

c) Would you please comment on how you think, you and your family have been received in the community: _____

D 4. What effect do you think the 'movement of people into this area' is having/would have on the area generally (please tick one box)?

Desirable

Don't know

Undesirable

Please explain your answer _____

D 5. How welcome do you think the following categories of 'newcomers' would be in this area (please tick one box per category)?

Category	Very Welcome	Welcome	Don't know	Unwelcome
Those originating from an agric. Area				
Those who had been brought up in this area				
Professional people				
Those moving in from a large town				
Those moving in from housing estates				
Those who have no family connections in this area				
Those of a nationality other than yours				

D 6. Would you borrow a piece of equipment, tools etc. from a neighbour? Y N
Please explain your answer _____

Neighbourhood Characteristics

D 7. How would you rate the following neighbourhood characteristic in your area?

	Excellent	Good	Okay	Not good	Poor	Don't know
Generally as a place to live						
Sense of security						
Street life						
Privacy						
Variety of facilities						
Social interaction						

D 8. Please use this part of the questionnaire to give your assessment of the quality of the public services in your area. Give to each category a score of 1-5, as detailed below:

1 Very adequate; 2 Adequate; 3 Don't know; 4 Inadequate; 5 Very inadequate.

Then please add any comments you would like to make

a) Public transport Score

Comments _____

b) Provision of Schools Score

Comments _____

c) Shopping facilities Score

Comments _____

d) Entertainment/social facilities Score

Comments _____

e) Medical facilities Score

Comments _____

D 9. If you have lived at your present address for over ten years and had to choose a new residence, which characteristics would be important to you? Please indicate whether it would be rural or urban and give specific reasons. _____

D 10. If you have lived at your present address for under ten years, which characteristics of this area were important in your decision to move to it? Please try to refer to advantages that are specific to this area.

D 11. a) If you had the chance to re-select your residential area, please indicate to what degree being close to the following amenities would affect your choice (tick the boxes that best apply):

	Most important (one only)	Very important	Would be taken into account	Would not affect my choice	Would discourage me	Don't know
A city centre						
A good school						
Desert enviro.						
My work place						
Friends, relatives						
Public transport						
Better neighbours						
Other (specify)						

b) Please explain your choice for most important amenity _____

c) Please choose *one* amenity you considered to be Very important and explain this: _____

D 12. How do you normally go to the shops and how long does each journey take (please indicate one option only)?

- Walk Duration _____ minutes
- Bus Duration _____ minutes
- Car Duration _____ minutes
- Taxi Duration _____ minutes
- Train Duration _____ minutes
- Other (please specify) _____ Duration _____ minutes

D 13. a) Which best describes your work-home relationship (please tick one option)?

- I work and live in the same area
- I work within walking distance of my home
- I take a short ride / drive to go to work
- I work far from my home

b) How satisfied do you feel about the location of your workplace (please tick one option)?

- Very satisfied
- Satisfied
- Neither
- Dissatisfied
- Very Dissatisfied
- Don't know

SECTION E: Characteristics of Your Settlement

E 1. a) Is your new town / city what you expected it would be? Y N
b) Did you expect it to be more modern or more like a traditional desert settlement ?

E 2. a) How does your new town / city compare to your hometown (please tick one box only)?
Much better
Better
The same
Worse
Not applicable
b) Please explain your choice _____

E 3. a) Do you feel that the establishment of new desert settlements, like your new town / city, have a positive effect on the development of Egypt? Y N
b) Please explain your answer _____

c) Having now moved to the new town / city do you feel that you are, in any way, helping to solve some of Egypt's problems? Y N
d) Please explain your answer _____

e) How would you convince more people to move to the new town or city? _____

E 4. If you were able to change or to add something to your town / city what would it be (please be specific)? _____

Your Relationship with your Neighbours

E 5. a) How extensively do you know your neighbours (please tick the option that suits your situation)?
I know the whole neighbourhood
I know everybody in the street
I only know my immediate neighbours
I only know people who live in this building
I do not know other people here
b) Please add any comments you wish to make _____

- E6. a) Which of the following options best describes your relationship with your neighbours?
- We often visit each other and talk
 - I borrow things from them (or *vice versa*)
 - I usually say hello to them
 - I know them by name
 - I can recognise them
 - I cannot recognise them

b) Please add any comments you wish to make _____

SECTION F: Your Future Mobility Intentions

- F 1. a) Have any members of your immediate family who at one time resided with you moved elsewhere? Y N

b) If yes to the previous question, please complete the following table:

Person	Area moved from	Relationship to you	Date of leaving	Age at leaving	First (intended) destination ¹
1					
2					
3					
4					

NOTE:

First (intended) destination: Please indicate whether this was urban or rural.

- F 2. a) Have you any relatives planning to move into this area in the near future? Y N

b) If yes, who are they and from which side of the family do they come? _____

c) Where are they living at present (please indicate whether they are living in a rural or urban area)? _____

SECTION G: Planning Policies

- G 1. a) Are there any Planning Regulations for house building in this area?
 Yes Don't know No

b) If yes, please give details of any Planning Regulations of which you are aware: _____

- c) How did you come to know about these policies (tick one box)?
- 1. From your own dealings with the Planning Department
 - 2. From neighbours' or friends dealings
 - 3. Other (please specify) _____

G 2. a) Are there any changes to the Planning Policy that you would like to see in you area in the future (please tick one box)?

1. Tighter policies (please specify)
a) Designated areas of no growth
b) Designated areas for private development
c) Other tighter or new policies (please specify) _____
2. More relaxed policies
3. Policies should remain as they are
4. No opinion

b) What reasons do you have for stating the above (please try to give specific details)?

• *The following two questions are to be answered by owner-occupiers only.*

G 3. a) Have you undertaken any renovations since moving into this address? Y N
b) Please provide details (whether you answered yes or no) _____

c) Have you ever had any difficulty obtaining Planning Permission? Y N
If so, what were these problems (please be specific)? _____

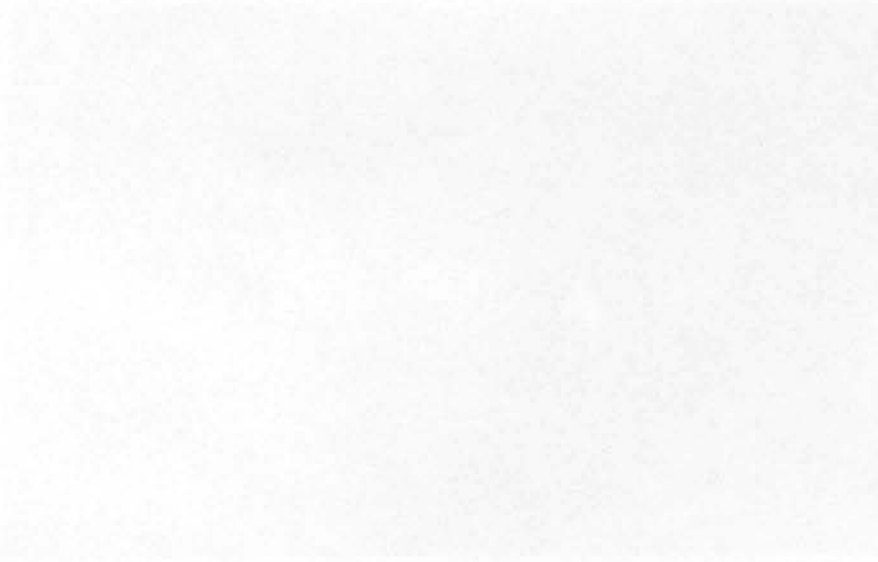
G 4. a) Do you envisage applying for Planning Permission in the near future? Y N
b) If so, what will this be for (please be specific)? _____

c) Do you foresee any problems in obtaining Planning Permission? Y N
d) If so, what problems do you foresee (please be specific)? _____

To all participants, I would like to say again THANK YOU for the positive contributions you have made to my research. Again, all information will be treated as strictly confidential.

Hossam Rizk

Case Study Background



Appendix B

Case study Background:

Bedouin Culture & Natural Resources

Bedu, the Arabic word from which the name Bedouin is derived, is a simple, straightforward tag. It means ‘inhabitant of the desert’, and refers generally to the desert-dwelling nomads of Arabia, the Sinai, and the Negev. For most people, however, the word ‘Bedouin’ conjures up a much richer and more evocative image of lyrical, shifting sands, flowing robes, and the long, loping strides of camels.

For several centuries, such images were not far from the truth. In the vast, arid expanses of the Sinai, as in the Negev and the deserts of Arabia, the many tribes of the Bedouin journeyed by camel from oasis to oasis, following a traditional way of life and maintaining a pastoral culture of exceptional grace, honour and privacy.

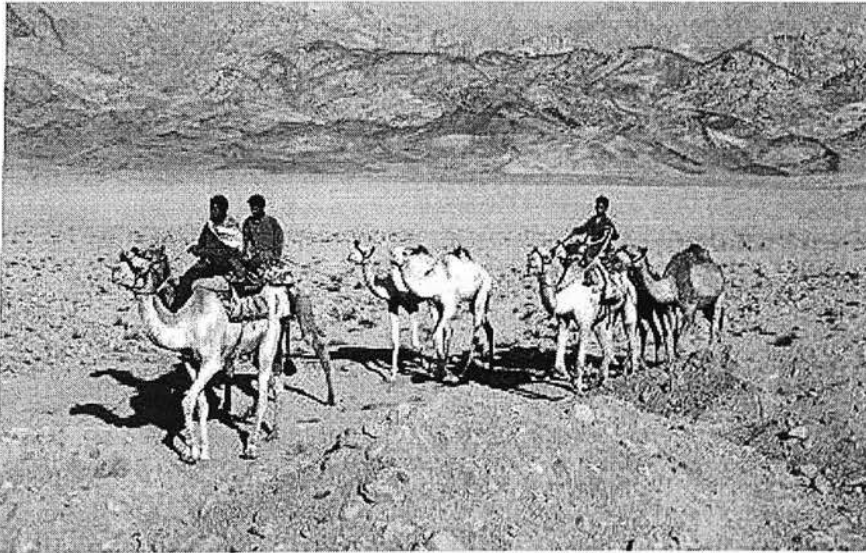


Fig. B.1 Bedouins traveling on camel in the Central-North Sinai desert

Most of the Bedouin tribes of the North Sinai are descended from peoples who migrated from the Arabian peninsula, deserts of Egypt, Transjordan and Syria

between the 14th and 18th centuries, making the Bedouin themselves relatively recent arrivals in this ancient land. Recently, many of the Bedouin of the Sinai have traded their traditional existence for the pursuits and the conventions of the modern world, and startling changes over the last two decades have irrevocably altered the nature of life for the Bedouin and for the land they inhabit. Nonetheless, Bedouin culture still survives in the Sinai, where there is a growing appreciation of its value and its fragility.

Few places in the desert are capable of supporting the life of even a small community for an extended period of time, and so, many of the Bedouin of the Sinai, like those of Arabia and the Negev, would stay on the move. With herds of sheep and goats as well as camels, the Sinai Bedouin migrate from one meagrely fertile area to another, each offering sustenance and shelter for time, while the others become naturally replenished. In such an unforgiving environment, any violation of territorial rights was viewed with severe disfavour. It is a hallmark of Bedouin culture that such trespasses were neither easily forgiven nor quickly forgotten. At the same time, a shared respect for the dangers and hardships of the desert imbued Bedouin culture with a profound and justly celebrated sense of hospitality. In the vast silence and brooding solitude of the Sinai, simply encountering another person was, and in some regions still is, a rather unusual and noteworthy event. A new face was cause for great interest, for generosity, careful etiquette and common civility, all values celebrated in Bedouin poetry, sayings and songs.

The Bedouin of the Sinai share with other Egyptians the *jalabiyya*, a long, hooded robe that is a standard form of clothing both in the teeming metropolis of Cairo and in the solitary plains of the Sinai.

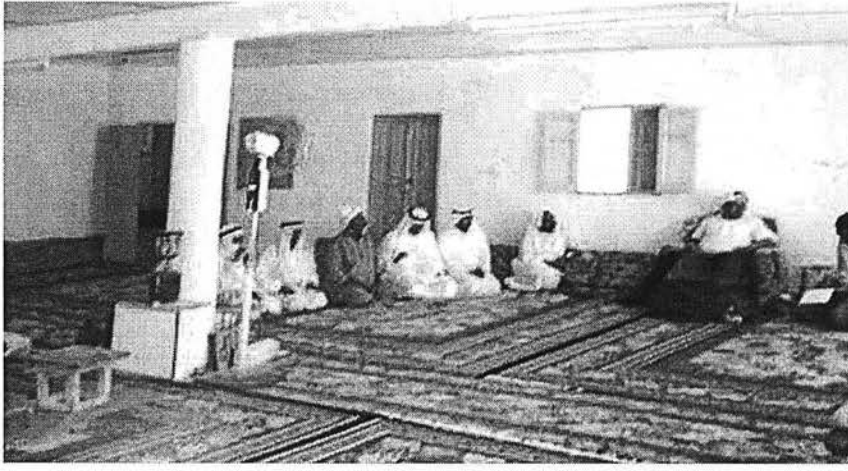


Fig. B.2 Meeting in the *mag'ad* or sitting place

The most easily recognised aspect of a Bedouin's attire is his headgear--which consists of the '*kufiyya*-cloth' and '*agal*-rope' that constitute proper attire for a Bedouin man. The headrope in particular carries great significance, for it is indicative of the wearer's ability to uphold the obligations and responsibilities of manhood. Bedouin women, too, signal their status with their headgear; while all women are required to keep their hair covered, married women in particular wrap about their forehead a black cloth known as '*asaba*'.

Bedouins mark their graves with exceptional simplicity, placing one ordinary stone at the head of the grave and one at its foot. Moreover, it is traditional to leave the clothes of the deceased atop the grave, to be taken up by whichever needy travellers may pass by.

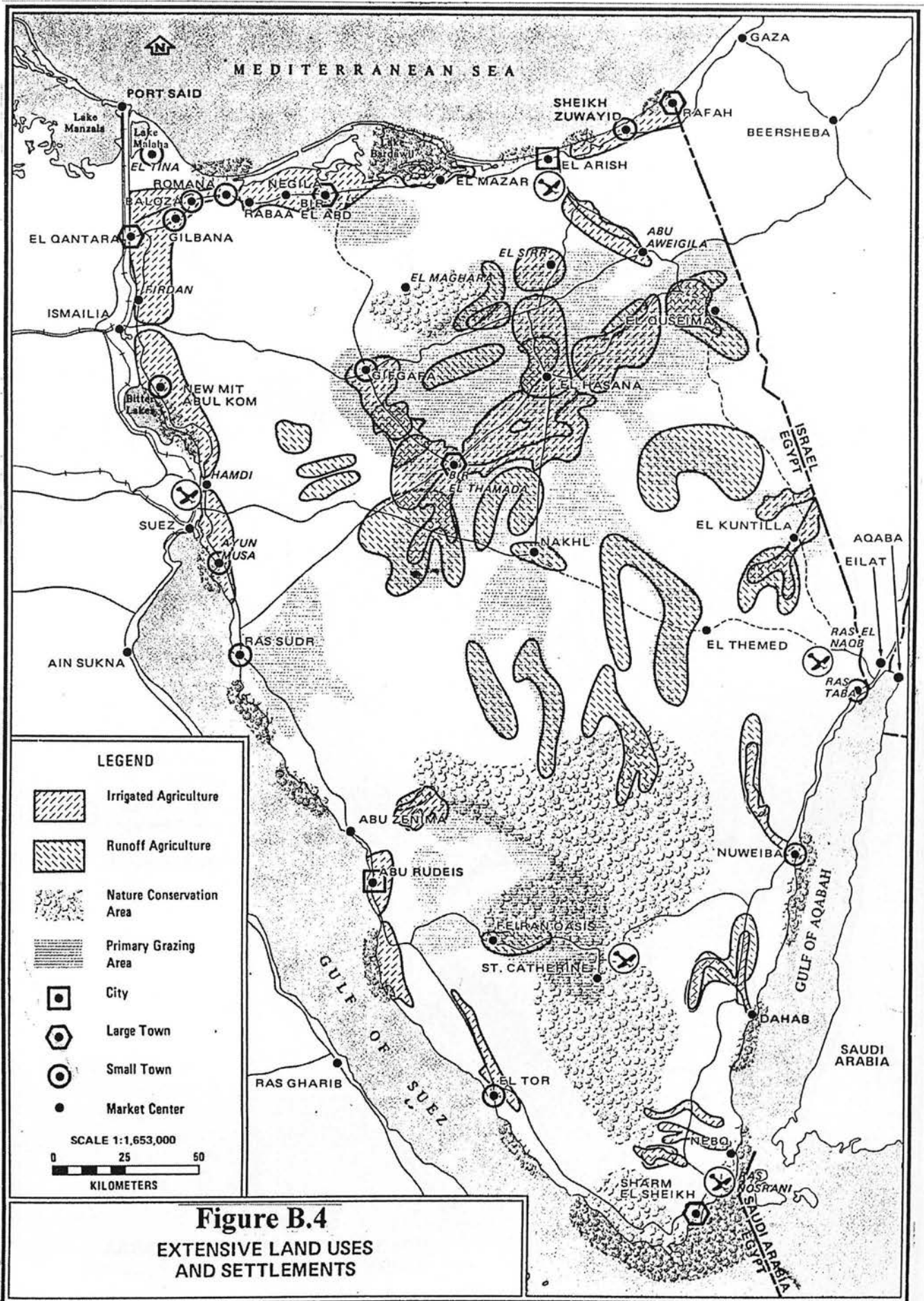
A Bedouin tent is customarily divided into two sections by a woven curtain known as a *ma'nad*. One section, reserved for the men and for the reception of most guests, is called the *mag'ad*, or 'sitting place'. The other, in which the women cook and receive female guests, is called the *maharama*, or 'place of the women.' Having been welcomed into a Bedouin tent, guests are honoured, respected, and nourished, frequently with copious amounts of fresh, cardamom-spiced coffee.

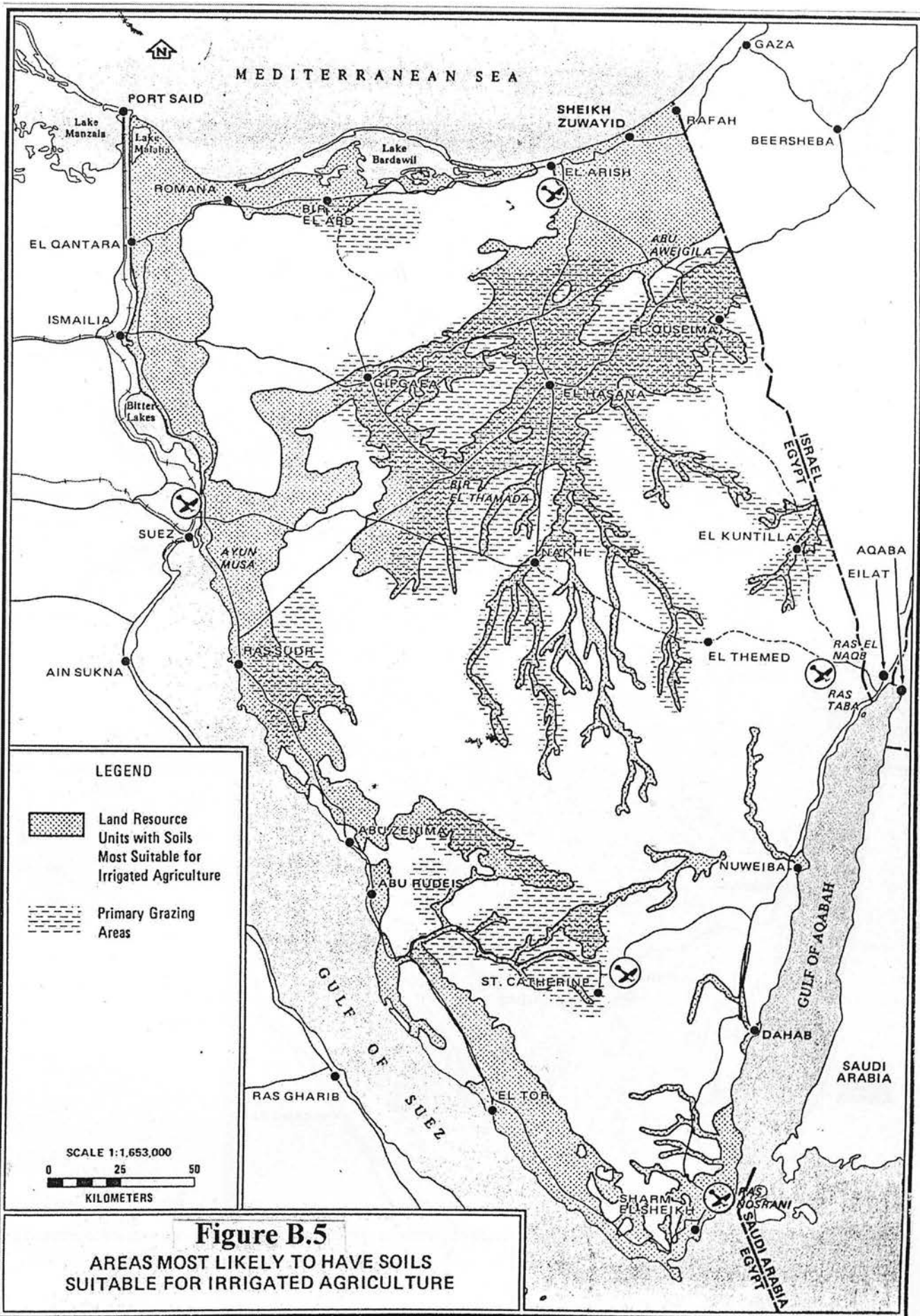


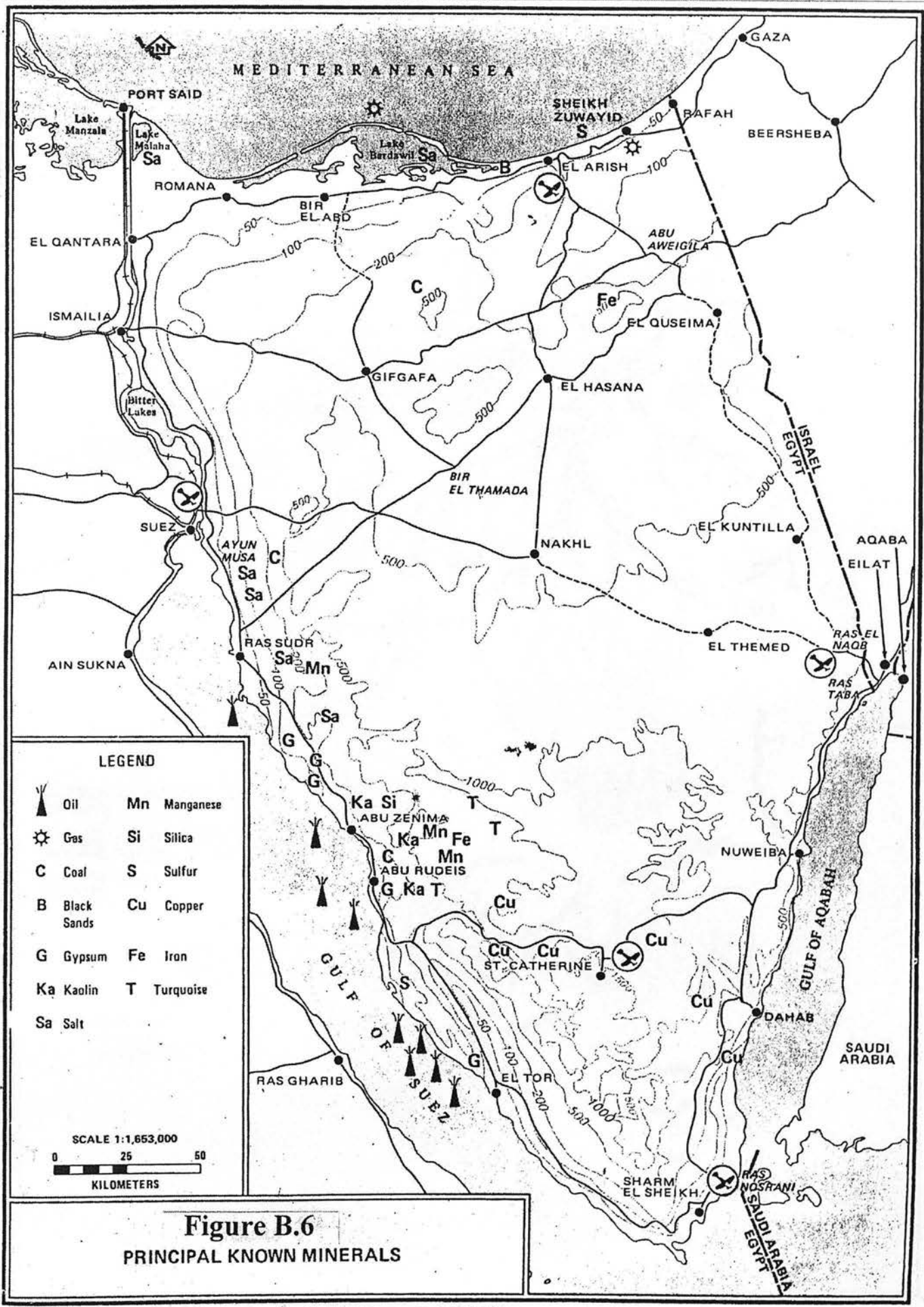
Fig. B.3 Shaded area outside Bedouin home to set with foreigners.

Visitors are also cause for some festivity, including music, poetry and, on special occasions, even dance. The traditional instruments of Bedouin musicians are the *shabbaba*, a length of metal pipe fashioned into a sort of flute, the *rababa*, a versatile, one-string violin and, of course, the voice. The primary singers among the Bedouin are the women, who sit in rows facing each other to engage in a sort of sung dialogue, composed of verses and exchanges that commemorate and comment upon special events and occasions.

Bedouin women play an essential role in shaping the population outlook of a Bedouin community. In addition to bearing and rearing children, they frequently take care of the sick and the elderly. Women are also responsible for gathering water and fuel for household consumption, and food production as well.







Source: Construction Agency of Sinai (2001)

