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ASSARAH, SAUDI ARABIA:
CHANGE AND DEVELOPMENT IN A RURAL CONTEXT

A.A. MUGHRAM

Ph.D. Thesis
October 1973

Department of Geography
Durham University

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ABSTRACT

Assarah is a physiographic region comprising the upper parts of the linear mountain chain extending from Al-Hada northwest of Taif in the north to the Yemen borders in the south. This region is characterized by a semi-arid climate in which the winter is the main rainy season, although some rain falls in spring and summer. High elevation makes summer temperatures milder than in the surrounding regions. Terrain is rugged. Arable land and settlements are scattered along the narrow wadies and dispersed flatlands in the upper watershed areas close to the high escarpment, and because of the dominance of steep slopes most cultivated land is artificially terraced. Human occupance is of a sedentary peasant village type based on mixed farming.

Up to the last few decades the whole community of Assarah lived in near isolation from the world at large. The whole way of life was based on traditional concepts and values. A case study of Ghamid and Zahran (as a small sub-area of Assarah) shows that farming activities were geared to a subsistence system, social organization was based on tribal codes and traditions and culture and technology remained at a low but functional level.

Following the creation of Saudi Arabia in the 1920's and the economic expansion which the country experienced after 1946, new factors of change began to affect the whole traditional system. As in most underdeveloped areas traditional values in Assarah are losing validity while modern factors are adopted haphazardly. Some of the new changes are beneficial, some are not and some are even detrimental. Shifts from subsistent to commercial production, from traditional to modern technology, and from tribal to national social organization are the main features of the trends of change as recorded in this study.

Many development theories have been advanced to deal with the problems of the underdeveloped countries, but with a surplus of capital, low population density, and particular geographic attributes, Saudi Arabia differs from most other underdeveloped countries. Within Saudi Arabia, Assarah appears as a unique region with its own ecological, economic and social characteristics. Within the national framework, a comprehensive and integrated understanding of these characteristics is required if planned regional development is to be successful.

ACKNOWLEDGEMENTS

Many people have helped me at various stages and in many different ways in bringing this thesis to being. I am grateful to His Royal Highness the Deputy Prime Minister for allowing me access to some of the airphotographs needed and for exempting me from payment. The Ministry of Education gave me valuable recommendations to various authorities. I have received also indispensable assistance from the Ministry of Agriculture and Water both at the ministry in Riyadh and through its regional offices in Assarah. I am also indebted to the Minister of Petroleum and Minerals not only for taking my petition concerning airphotographs to the Deputy Prime Ministry, but also for his general sympathetic attitude and for arranging access to the airphotographs. The Directorate General for Mineral Resources provided a Land Rover which I used for some time during the field work. A great many officials of government agencies gave considerable assistance in a variety of ways and although they cannot all be named I wish to record my gratitude to them.

In Assarah itself many people have helped me - government employees and individual farmers, too many to be mentioned by name, but I am grateful to them all.

Here at the University of Durham, in the Department of Geography, headed by Professor W.B. Fisher and the Centre for Middle Eastern and Islamic Studies headed by Professor H. Bowen-Jones I found an academic atmosphere conducive to serious learning and most encouraging.

I am indebted most of all to my supervisor Professor H. Bowen-Jones not only for the valuable advice he gave me, but also for the continuous encouragement he inspired into my work from the very beginning. However, since the teacher cannot be blamed for the mistakes of his pupil, the responsibility for all the shortcomings of this thesis is mine.

Finally I am grateful to Mrs. B. Jurdi for her ceaseless efforts in typing this dissertation.

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S E C T I O N O N E

INTRODUCTORY

CHAPTER ONE

GENERAL INTRODUCTION

When Saudi Arabia is mentioned, the stereotype image that jumps to one's mind is that of a vast desert where uninterrupted sand dunes form the typical landscape. The image is usually embroidered by a silhouette of a camel caravan, a tent and a couple of date palm trees implying nomadic population and far-apart oases agriculture. If however one ventures to add a touch of modernity to that image, it does not usually go beyond impressing an oil rig on the same old picture. Although the proceedings which led to the formation of such an image is partly true, the picture itself is naively oversimplified, for not all the country is sand dunes nor are nomads a majority of its population. The other extreme which is equally wrong is to view Saudi Arabia as a country without a resource base that woke up to find itself overwhelmed by the oil wealth. Here is an attempt to reveal another facet of the country that has been ignored for too long. Assarah, the study area of this dissertation, is the exception to many blanket generalizations that have been made about Saudi Arabia. This peculiarity is certainly one reason why I chose Assarah as my study area.

It would not be unreasonable to say that in many ways Saudi Arabia has suddenly plunged into the twentieth century. Consequently every aspect of socio-cultural or economic values and behaviour is undergoing a major change to a magnitude never experienced before. The whole fabric of the society is highly tensed between traditional and modern

values. Individuals and institutions are pulled toward the industrial ethic while they are still strongly tied to their traditions. In the former there is a novelty and thrill, and in the latter there is comfort and reassurance. In the process, progress is made, but also sacrifices are incurred.

If the country is to wield any authority in order to influence the shaping of its own destiny, it seems that an accurate understanding of the country's norms, its problems and potentials and how all these affect its response to the process of change and its adjustment to the everchanging circumstances, is a prerequisite.

So many theories are aired and so many models are constructed in an attempt to explain and solve the problems of the underdeveloped areas of the world; yet, more often than not, these theories and models get shattered on the rock of reality of each individual case.

It is becoming increasingly evident that development studies whether in an advanced or a backward area of the world require, to be effective, a wholistic multidisciplinary approach based on a positive dialogue rather than on a self-seeking attitude.

The underlying approach in this dissertation is to view the region, and indeed the whole country, as a system with many interdependent variables which cannot be isolated from one another except in an academic sense. Hence, I have tried to widen the scope of discussion to include, beside many physical and human branches of geography, a good deal of sociology, anthropology, history and economics. But, it is impossible for anyone to speak with impregnable authority in any branch of these disciplines, let alone all of them. This approach which tries to encompass the whole system is necessary and a prerequisite to any specific detailed study in that it reveals, however dimly, the general perspective of events, phenomena, and problems in the light of which any specific study becomes meaningful.

It would be vain and pretentious to claim that this thesis is more than an attempt to make a modest contribution to the understanding of a region little known even to its people, much less the world outside. As one still early in a geographical career, if I succeed in drawing some light on the rock of reality of Assarah, I will be satisfied. If further, this thesis contributes to the assertion of the need for a holistic approach in dealing with problems of similar underdeveloped region of the world I should be more than pleased.

It is the general theme of this thesis that physical and human factors interplay in the forming of the norms of a society's response to and capacity for change and hence influence the mode of its development and progress. It is not the claim of this thesis to formulate development policies but rather to reveal some of the physical and social aspects of the background that ought to be the starting point of any development policy formulation.

This dissertation is divided into five sections. After the introductory section, the following two sections deal with the physical and human components of the study area separately while the last two sections treat major facets of their integration.

In Section One, Chapters I and II are general and technical introductions respectively, while Chapter III is an introduction to Assarah as the study area and as a geographical region. In Section Two the physical environment is described; Chapter IV deals with the land's physical characteristics: geology, topography and soil; Chapter V analyses climate and its components, and Chapter VI discusses hydrology and vegetation. The emphasis in this section is placed on climate, terrain and hydrology, factors that are believed to have the most significant bearing on the general theme of this study and on the discussion that follows in consequent chapters.

Section Three deals with the human environment in three chapters.

In Chapter VII an attempt is made to synthesize a community model which would fit, in general principles, the community of Assarah and which would explain the major linkages of interaction between physical and human factors. Chapter VIII deals with the people of Assarah, their ethnology, history and population characteristics. Chapter IX discusses the settlement patterns as they are influenced by physical and human factors.

Section Four is a case study of the process of change in Ghamid and Zahran as representative of the whole area of Assarah. Chapter X describes the traditional period in which a state of near isolation and static equilibrium prevailed, while Chapter XI describes the transitional period which is now in the making. Chapter XII attempts to extrapolate into the future some of the more important trends.

Section Five deals with the development problems of Assarah. Chapter XIII discusses the main theme and problems of development in a global context with particular emphasis on agricultural development in the underdeveloped world. Then the case for the agricultural development of Saudi Arabia in general and of Assarah in particular is discussed. Chapter XIV discusses the geographical dimension in the development of Assarah where an attempt is made to integrate Assarah and its neighbouring regions into a whole spatial network.

CHAPTER TWO

TECHNICAL INTRODUCTION

The undertaking of a broad based research such as this in an area as little known as Assarah entails many problems and difficulties, some of them general to all researches and some particular to this study. Here a brief mention will be made to the major technical problems which I encountered in the course of this work.

From the very beginning I had very little in the way of basic reference materials. The only basic material was four sheets of the geographic and geologic maps 1:500,000 series which cover the south-western part of Saudi Arabia. Although these were the most detailed maps available, they were greatly limited by their lack of contour lines.

Realizing the difficulty, I started by eight months of field work from May to December 1970 in which I tried to collect every bit and piece of information I could. During that period I spent two months in Riyadh, the capital of Saudi Arabia where I obtained some data, reports and other materials from different government agencies, among which was the agricultural survey for the whole country. The most important deficiency remained, however, the lack of any detailed map of any use with regard to land use or topography. The obtaining of air photographs, which could partly compensate for the absence of maps, proved most difficult, but eventually I succeeded, with the help of his Excellency the Minister of Petroleum and Minerals, to take up my petition to the Deputy Prime Minister who granted me permission to have access to some of the airphotos that were needed.

Equipped with a landrover, a driver and occasionally an assistant,

I made, in July 1970, a reconnaissance trip through Assarah from north to south and its neighbouring areas following which I made my headquarters in a secondary school in Baljurashy. From here I made numerous field trips, checking information, interviewing, sketching maps, cross-checking the airphotos and recording observations. In addition I had also to make two other trips to Riyadh and Jeddah. All my collected material, air-freighted from Jeddah to London, was held up for three months by a strike on arrival.

Field travelling in Assarah is time consuming because of the very rugged terrain to be covered and my need to cover areas away from the new main roads. Even more time consuming was the interviewing of inhabitants; questionnaire surveys are unknown and therefore in order to obtain meaningful information questions and answers have to be hidden in prolonged discussion.

It was particularly difficult to conduct research of this kind without proper maps. Apart from the basic map (Fig. 3.2) with all its shortcomings there was no other detailed map. In order to give an idea about the right geographic perspective within Assarah itself and the village to village spatial relationships, I had to construct a generalized land use map (Appendix 1). This map is based on eight plates of uncontrolled photomosaic. The making of the map involved airphoto interpretation partly checked during the fieldwork. Each sheet was drawn separately and later all sheets were joined and photographically reduced. The fact that this type of mapping requires a qualified cartographer, which I am not, made this map take a disproportionally long time to produce.

In some instances I had to use low quality provisional maps, and in others I had to construct my own sketch maps, especially when a very large scale was required. However, the greatest difficulty throughout and which could not be solved was the absence of any large

scale contoured topographic map, this is particularly serious because the study area is a mountainous area in which the topographic differences and factors such as slope are particularly important.

One of the misfortunes which I very much regret was the loss of three reels of exposed films containing about a hundred photographs, a good number of these taken in the southern part of Assarah.

This research, therefore, was not based on a specific body of data that was available prior to the initiation of the research, it was rather a start from scratch and an attempt to find, use and evaluate whatever meagre data there was, and also to develop new data within the research scope and constraints. It goes without saying that the lack of funds and personnel assistance in fieldwork were major constraints.

I was aware from the very beginning that owing to the lack of data and maps I might not be able to accomplish the task, but I realized too that even against such blank background somebody has to make a start, and somehow I felt that it was my duty to make that start. Thanks are due to the continuous encouragement I received from my supervisor Professor Bowen-Jones which used to come in times when it was most needed and without which my zeal and patience could have been exhausted before I made any progress.

There is, however, a significant advantage that helped me keep going against all the above mentioned odds, namely my personal knowledge of the region of Assarah in particular and the rest of the country in general. Being a Saudi national myself I can draw on wider first hand knowledge and experiences. With regard to Assarah in particular, I can say that I grew familiar with it and its people and their customs having lived there for some years and having frequented it many times over the past twenty years. This familiarity also provided me with a background knowledge which was useful in much of the interpretation and

analysis. Thus what might appear to be unqualified assumptions in this thesis becomes less so when judged against this prior knowledge.

The choice of Assarah as delineated in the following chapter, involves some advantages in that it presents a homogeneous region on which much of the discussion can proceed without having to recognise many exceptions or anomalies. Yet there are some difficulties, the most considerable of which is that although Assarah is a geographical region, its boundaries do not coincide either with the main administrative districts nor with the major tribal domains. Great care has therefore to be taken in the use of data.

Acknowledgements have been made to the various authorities who have assisted with the finding of relevant information. In Assarah much still remains to be done on a fundamental survey level in addition to that work which is now being carried out and the results of which are not yet available.

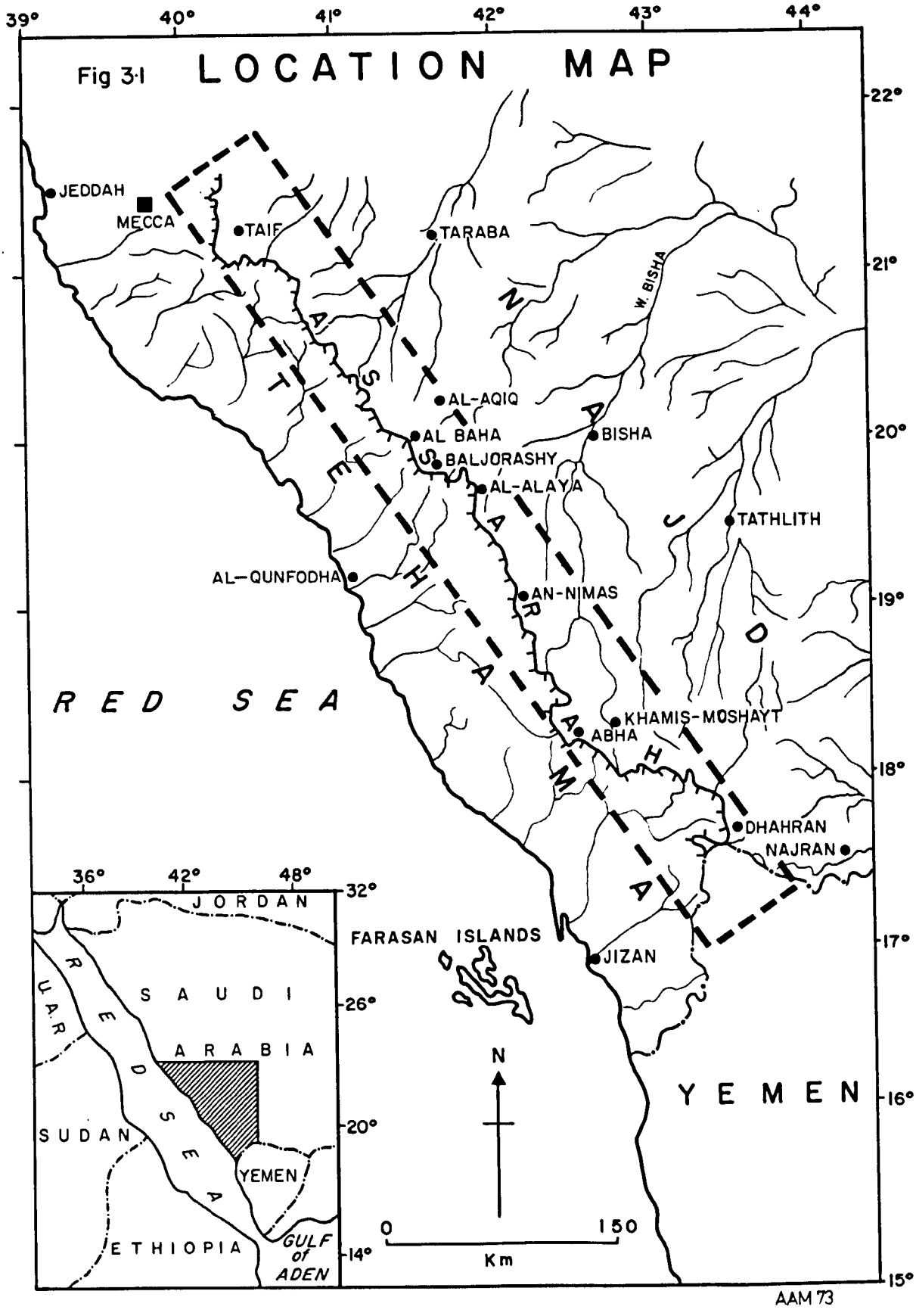


Fig 3·1 LOCATION MAP
39°
40°
41°
42°
43°
44°
22°
21°
20°
19°
18°
17°
16°
15°
JEDDAH
MECCA
TAIF
TARABA
W. BISHA
AL-AQIQ
AL BAHA
BISHA
BALJORASHY
AL-ALAYA
TATHLITH
AL-QUNFODHA
AN-NIMAS
KHAMIS-MOSHAYT
ABHA
DHAHRAN
NAJRAN
JIZAN
FARASAN ISLANDS
RED SEA
YEMEN
N
0
150
Km
36°
42°
48°
32°
26°
20°
14°
JORDAN
SAUDI ARABIA
UAR
RED SEA
SUDAN
YEMEN
ETHIOPIA
GULF of ADEN
AAM 73

CHAPTER THREE

ASSARAH THE REGION

DELIMITATIONS:

Assarah, the study area of this dissertation, is a narrow and elongated stretch of rugged land that runs along the top and to the east of the fault escarpment of the Red Sea Rift in the south western part of Saudi Arabia. The area extends from the Yemeni borders in the south to Al-Hada northwest of Taif, where the physical continuity of the chain of the mountains breaks into less elevated terrain. The general alignment is NNW to SSE, parallel to the Red Sea Coast. This orientation will, however, be referred to as north to south not only for the sake of simplicity but also because it is often referred to locally in this manner. The eastern limit of Assarah, can be said to be the limit of rain-fed settled agriculture, which nearly coincides with the areas where the high mountains give way to more denuded and more dissected terrain. This change in physiography tends to take place along a zone lying somewhere between 1700 and 1900 m a.s.l. This delimitation leaves us with a strip of land about 600 km in length and varying in width from less than five kilometers at some places to thirty or forty kilometers in others. The total area of the region is about 8,500 km^2. The location map (Fig. 3.1) shows the southwestern part of Saudi Arabia and the location of Assarah. The rectangular box which includes Assarah itself is enlarged in Fig. 3.2 representing the most detailed general map available.

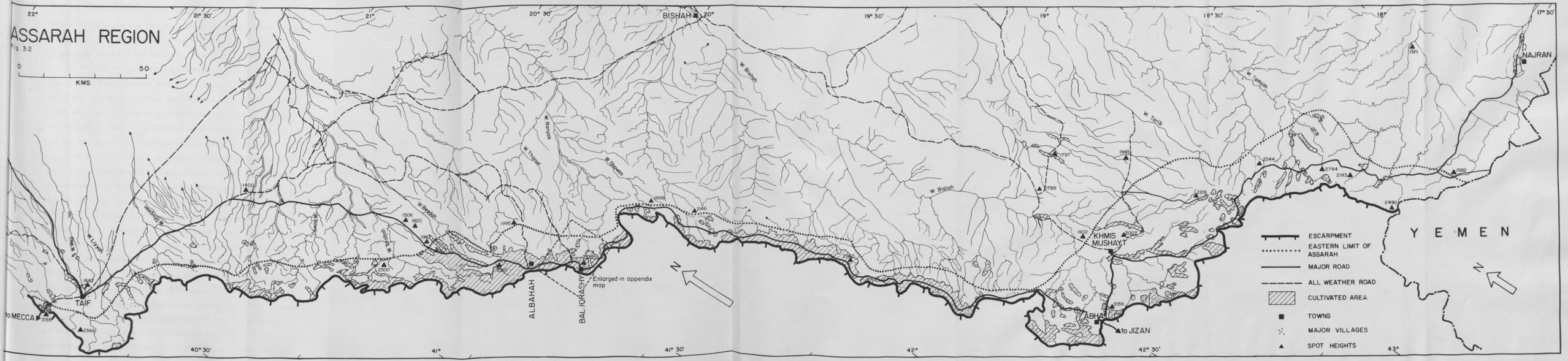
The western and northern limits of Assarah are clear-cut physiographic features, while the eastern limit, although physiographic

too, is not as clear, and is difficult to delineate on the map without detailed contours. The dotted line in Fig. 3.2 which indicates the eastern limit of Assarah is an approximation of a major physical change based on height points, field observation, and various other factors. Towards the south there is no such abrupt physical change, but the international boundary is taken as a convenient limit.

Assarah as defined above is a physiographic region which does not coincide either with the administrative districts or with the tribal territories. Administratively the northern part of it lies in Mecca Province while the southern part constitutes the bulk of Abha Provence (Asir). In the middle the small principality of Al-Baha extends over the territories of Ghamid and Zahran, while the further east Beshah principality administers a narrow tract immediately south of Ghamid. These administrative boundaries are not well-defined or demarcated. Thus a working subdivision of Assarah into smaller areas cannot follow them but must rather be based upon the tribal territory segments although even here there cannot be any strict adherences. Fig. 3.3 shows the more recognizable subdivisions which are of importance in this thesis because the agriculture census adopted similar divisions although they were not drawn on any map.

THE NAMING OF ASSARAH:

Assarah is an Arabic word, one of its meanings being "the top". It refers here to the region we have just delimited. Since this name "Assarah" is not commonly used nowadays specially in non-Arabic literature, it merits some explanation. The nearest term that is used to cover a major part of our region is Asir which appears on most new maps. However, I could not use Asir interchangeably with Assarah, because the former is mistakenly overextended far beyond its true limits and even at its present misleading use Asir does not coincide with Assarah.


ASSARAH REGION
Fig 3.2
0
50
KMS
22°
21° 30'
21°
20° 30'
20°
19° 30'
19°
18° 30'
18°
17° 30'
40° 30'
41°
41° 30'
42°
42° 30'
43°
BISHAH
NAJRAN
YEMEN
TAIF
to MECCA
ALBAHAH
BALJURASHY
Enlarged in appendix map
KHMIS MUSHAYT
ABHA
to JIZAN
W. Bishah
W. Tarib
W. Tathlith
W. Thirod
W. Shawas
W. Baydah
W. Layah
W. Qahmah
W. Qawrah
1400
1506
1820
1995
1896
2246
1797
1789
1945
1902
2002
2159
2344
2784
2193
2219
2490
1982
1315
1582
2159
2366
2500
2300
ESCARPMENT
EASTERN LIMIT OF ASSARAH
MAJOR ROAD
ALL WEATHER ROAD
CULTIVATED AREA
TOWNS
MAJOR VILLAGES
SPOT HEIGHTS

PULLOUT

Asir is originally the name of the tribes who lived and are still living in and around Abha town, not extending beyond a fifty kilometer radius in any direction, (see Fig. 3.3). Administratively, Asir or Abha provence goes beyond its tribal boundaries up to An-Nemas in the north, the Yemeni border in the south, Tehama in the west, and Tathleeth and beyond in the east. The usage of Asir as a geographic name was not more than a mistaken generalization of that administrative usage. Hamza draws attention to this mistake and indicates that the use of Asir as a geographic name came into being only at the beginning of the last century.[1] One of the reasons for the widespread use of the name Asir to refer to the mountain range rather than the tribe is that the word Asir means "difficult", hence associated with the ruggedness of the mountains.[2] The choice finally lies between two names, both of which are purely geographic and are not confused with any administrative or tribal territories. These are Al-Hejaz and Assarah. Although these two words mean the barrier and the top respectively, they have been used to refer to this mountain chain for so long that they acquired the status of proper names. They continued to be used more or less interchangeably for more than a thousand years. The slight difference between these two names is that Al-Hejaz refers to the whole mountain chain from South Yemen to Jordan while Assarah refers only to the uppermost part of the mountains and only from Taif area southward, and this is certainly one reason why I choose "Assarah". Additionally, Al-Hejaz in recent times and for no significant reason has become more associated with the northern part i.e. from Mecca northwards, and using it for the south would result in some confusion.

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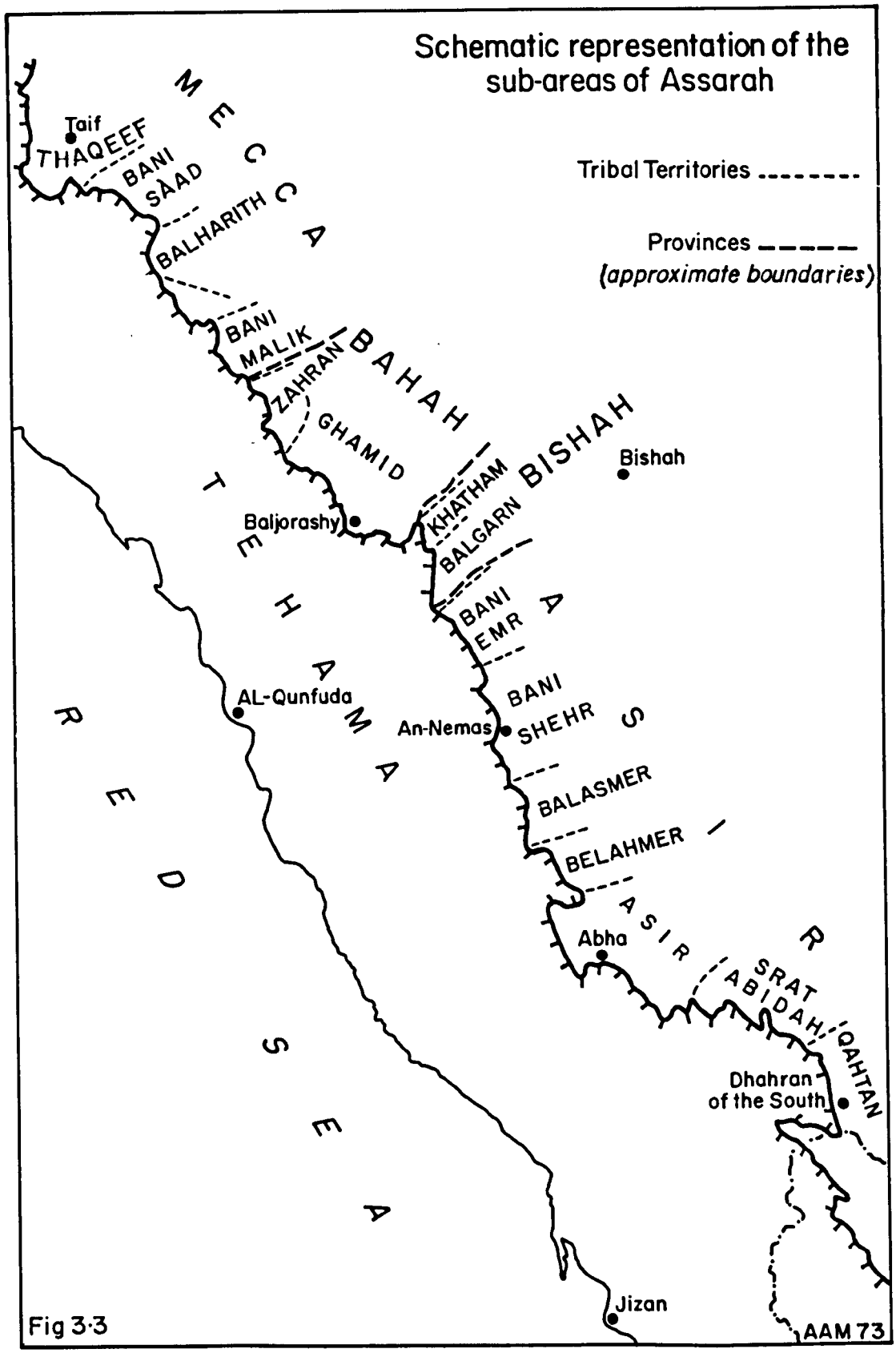
1. Hamza, F. 1968 (in Arabic) In Asir Country (Reyadh: An-Nasr) pp 85-88.

2. I could also speculate that the reason for the common use of Asir instead of Assarah in nearly all English written literature stems from the fact that Aramco in their handbooks which are widely quoted use the name Asir. Such usage must have had a feedback effect on the Arabic written books and government documents.


Schematic representation of the sub-areas of Assarah
Tribal Territories
Provinces
(approximate boundaries)
MECCA
Taif
THAQEEF
BANI SAAD
BALHARITH
BANI MALIK
ZAHRAN
GHAMID
BAHAH
BISHAH
Bishah
KHATHAM
BALGARN
Baljorashy
TEHAMA
BANI EMR
BANI SHEHR
AL-Qunfuda
An-Nemas
BALASMER
BELAHMER
ASIR
Abha
SRAT ABIDAH
QAHTAN
Dhahran of the South
RED SEA
Jizan
AAM 73
Fig 3·3

In using Assarah I have relied on historical and local usage. In the old geographical books "Assarah"was overwhelmingly used to indicate these mountains and no mention is given to Asir except in the narrow tribal context.[1] In the more recent literature the name did not die out altogether and is still used in many Arabic text books.[2] The tendency however, is to call the mountains from Taif southwards "Southern Hejaz and Asir".

As regards the local usage the people of the southwestern part of the country recognize three major types of landforms; Tehama: the land between the sea and mountain range, Assarah: the highland part of the mountains, and Najed or sometimes Al-Mashriq: the eastern plateaux. In nearly all local studies, past and present, a distinction is always made between these three geographical regions.

From what has been said above it becomes clear that Assarah is the best and most fitting name to give to the study area, for the whole of Assarah, taking the most reasonable definition, is included in the study area, and none of the study area, as defined here, is outside Assarah.

REGIONALITY:

To be able to recognize Assarah as a region, one does not have to be "industrious, patient and perceptive"the qualities which Grigg postulated for the geographer who is looking for the regional pattern,[3] because in Assarah the case is too obvious to need much of these qualities. Assarah is the prominence, the exception that is to be

1. This fact is well documented in all major traditional geographic works and gazeteers. See for example Al-Bakri, Ibn Khordathabah, Yaqoot Al-Hamawi, Aram ibn Al-Isbagh, Al-Hamadani, and many others in all their major works.
2. See for example, Abul-Ula, M.T. 1965 (in Arabic) The Geography of the Arabian Peninsula. Vol I The Kingdom of Saudi Arabia pp 34.
3. Grigg, D. 1965 "The Logic of Regional Systems"in Annals of the Association of American Geographers, Vol 55, pp 465-491. p. 465.

noticed easily rather than the incognito or the obscure.

The striking salience of the regionality of Assarah stems from the fact that it is basically a geographic anomaly and an azonal phenomenon in the Arabian Peninsula. Hence it is an ecological and physical exception. Here I must hasten to add, this does not necessarily mean that it is universally unique, for other parts of the world could be azonal in the same way. In almost all books and articles written on Saudi Arabia in particular or on the Arabian Peninsula in general one cannot fail to notice that when the physical conditions, be it geologic, topographic, or climatic, or the settlements and economic activities are mentioned, the south-west area is excepted from whatever general statement is made.

The basic factor that plays the major role in augmenting such regional distinctiveness is, without doubt, the elevation. Part of it is also derived from the landforms and the geographic orientation and alignment. As will be emphasised in the following section of this thesis, high elevation has created specific terrain and specific climate and these in turn have created a specific ecosystem which in its turn stimulated particular human responses in both exploitation and adaptation. The three landscape constituents which Minshull describes as the most visibly obvious "the relief, the vegetation, and the buildings"[1] are, in Assarah, different from anything in the surrounding country.

It is essential to understand the regionality of Assarah not merely for academic expediency, but also for the bearing that regionality or the lack of it has on development planning. This import is implicit in the premise that the successful spread of a developmental measure will depend on the homogeneity of the area over which it is applied, at least in respect to one or a few of the major factors which

1. Minshull, R. 1967 Regional Geography (Hutchinson) p. 20.

are considered conducive to that measure. The greater the extent and degree of homogeneity, with regard to as many variables as possible, the easier and more successful it will be to assess the validity of generalization and inferences from the particular to the general and from one locality to the other. The issue here is in what sense and to what degree is Assarah a region; or, to put it differently, what are the features which are displayed with reasonable uniformity. There are several levels of regionalization and a multitude of criteria and techniques necessary to achieve each of them.[1] We will not concern ourselves with them here. Instead an attempt will be made to summarize the most important characteristics which set Assarah apart.

If we take Minshull's definition of a formal region as being the region "through which one or more of the phenomena such as rock, rainfall, farming or population is sufficiently uniform to permit generalization, and sufficiently different from the phenomena in surrounding regions to justify the division; or more usually make division essential;"[2] or if we take Berry and Hawkins, more exact definition of a homogeneous region as being that "within which the variations and covariations of one or more selected characteristics fall within some specified range variability around a norm, in contrast with areas that fall outside the range;"[3] then one can easily find that Assarah more than satisfied these requirements. One of the objectives in this thesis, it is hoped, is to put this region in the

1. See for example: Minshull, R 1967 Ibid.; Grigg, D. 1965 op. cit.; Grigg, D. 1967 "Regions Models and Classes" in R.J. Chorley & P. Haggett Models in Geography pp 461-509; Berry, B.J.L. & T.D. Hawkins 1963 A Bibliographic Guide to the Economic Regions of the United States (Chicago University Press, Geog. Dept. Research Paper No. 87); Haggett, P. 1972 Geography: A Modern Systhesis (Harper) Chapters 10-13.

2. Minshull, R. 1967 op. cit., p. 18.

3. Berry, B.J.L. & Hawkins, T.D. 1963 op. cit., pp x.

right perspective. The argument that the region is "a kind of given the limits of which one forces oneself to justify at the threshold of the study"[1] does not hold for Assarah, because here the region poses itself at the start and one cannot help getting more and more convinced by it as the study progresses.

In anticipation of what will be evident at the discussion progresses in the following chapters, the regionality of Assarah is re-emphasized in many forms. It is a physical region, and to prove that one does not need more than to look at the maps of topography, climate and vegetation (see Section Two) which indicate very strongly the uniformity within and the dissimilarity without. It is also an economic region in which all economic activities at least up until recently, are based on subsistence-oriented type of sedentary mixed farming, in contrast to the country around. To a lesser extent Assarah is also a cultural region where the "state of the art" exhibits a recognizable degree of similarity and where people pursue their daily life and communal relationships in a similar rhythm and are abiding by the same traditional canons.

With regard to the question of whether Assarah is a functional region, the word functional must be defined. If we accept Berry and Hawkins definition of a functional region as being the "area in which one or more selected phenomena of movement connect the localities within it into a functionally organized whole",[2] which seems to be agreed on by most geographers, then Assarah is by no means a good example of a functional region. The narrow and elongated shape of

1. Juillard, E. 1962 "The Region: An Essay Definition" reprinted in P.W. English & R.C. Mayfield 1972 Man, Space and Environ (Oxford University Press) p 429.

2. Berry and Hawkins op. cit., p X.

Assarah is certainly one reason which affects the viability of such regionality. It is only when we include the adjacent parts of Tehama and the eastern plateaux that we get such a functional region, (Chapter XIV). The new highway which runs along Assarah from north to south is the nearest factor which contributes to making a functional region of Assarah.

Thus, far the discussion has been limited to Assarah's regional characteristics, but where does it rank in a global classification? There are many approaches to worldwide regionalization, but the oldest, most significant, and widely used are the climatic and agricultural regionalizations. As will be explained later in Chapter V, Assarah is definitely outside the desert climate, in terms of temperature, in terms of moisture it lies towards the more humid end of semi-arid climate.

To pigeonhole Assarah into any agricultural region classification depends on how closely the attributes of the agriculture of Assarah fit the criteria used in that particular classification. According to Whittlesey's agricultural regions, for example, the nearest class to Assarah is class (11) Subsistence crop and stock farming, yet one can easily find in Assarah other attributes akin to class (8) Mediterranean agriculture such as land tenure and settlements; and other attributes of class (6) Intensive subsistence tillage without paddy rice.[1] There are several other attempts to regionalize world agriculture. However, most of them are based on the same or similar principles used by Wittlesey.[2] It is perhaps important at this stage to mention briefly

1. Whittlesey, D. 1936 "Major Agricultural Regions of the Earth," Annals of the Association of American Geographers Vol 26, pp 199-240.

2. A survey of these attempts appears in: D. Grigg, 1969"The Agricultural Regions of the World: Review and Reflections." Economic Geography Vol. 45, No. 2 April 1969 pp 95-132.

the major attributes that ought to be taken into consideration when dealing with the question of ranking Assarah into a global classification.

a) Physical geography: Subtropical-semi-Mediterranean mountainous area.

b) Economy: Subsistence changing to commercial.

c) Social Organization: Village tribal changing to rural communities.

d) Land Utilization: Mixed farming.

e) Settlement Pattern: Permanent villages.

The following pages, it is hoped, will give a clearer idea about these attributes.

In addition to individuals who noted the regionality of Assarah, various other authorities have recognized it too. The Italian consultant firm, Italconsult, acknowledges a geographic, ecologic and agricultural region which coincide almost exactly with Assarah as defined in this thesis and they call it the mountain region.[1] ILACO, another Dutch firm, acknowledge this regionality and they refer to it as the dissected highland, or just the area represented by Abha and Baljurashy.[2]

The case of Assarah's regionality lends support to the idea fostered by some geographers who consider mountain ranges not merely as divides that separate one region from the other, but also as separate regions in their own right.[3] For Assarah, besides being a divide between the two regions of Tehama and Najd, is in itself a region different and distinct from either.

The geographic anomaly of Assarah, which stems from the elevation and extends to the resultant different ecosystem and different human responses is not peculiar to Assarah. Indeed most mountain ranges and

1. Italconsult, 1969 Water and Agricultural Surveys for Areas II & III, Final Report, pp 10-18.

2. ILACO, 1972 "Socio-Economic Development Plan for the Southwest Region" Discussion Paper on Crop Production.

3. Minshull, R. 1967 op. cit., p 22.

massifs are in this sense geographic anomalies. Mount Kilimanjaro in Tanzania and Mount Kenya in Kenya, which bring the arctic environment to the equator, are perhaps the most vivid analogies in this respect. Another impressive example is the Andes Mountains in South America. Of more general resemblance to Assarah, in its physical environment and human response, are the Oman mountains on a smaller scale and the Abyssinian highland on a larger scale. It appears also that Jabal Marra area in the westernmost part of the Sudan is, in many ways, similar to Assarah.[1]

A final point that must be stressed before leaving this section, and which must be kept in mind throughout, is that a great deal of the physical features that constitute the regionality of Assarah have their physical continuation inside the Yemen. In terms of Geology and land form the major features continue with little change. In terms of climate and ecology there is a very slow transitional change towards subtropical conditions. With regard to human impress there is no big contrast, but owing to the fact that the two countries have been through different historical events and had different economic outlooks especially in recent decades, it is only natural to expect some differences in social organization, customs and farming practices and in people's general outlook, but again not to any large extent.

1. FAO, 1968 Land and Water Resources Survey in the Jabal Marra Area, The Sudan. U.N. Development Programme.

CHAPTER FOUR

THE LAND

In the preceeding chapter the study area was delineated on a regional basis and the limitations of such delineation pointed out. This chapter attempts to describe the physical features which characterizes the land of Assarah, namely the geology, topography and soil, the understanding of which allows a clear picture of resources and limitations to emerge.

The major difficulty, in this respect, is the lack of usuable specialized study data. In some cases, e.g. geology and pedology, personal investigation to make up for such deficiencies in knowledge was difficult, and what existing data had to be used directly, and also indirectly, as indicators of probability. In other instances, as when dealing with the soil of Assarah, I had to lean heavily on my own observations in Assarah proper.[1] For the rest I tried to use the meager basic data in conjunction with the other literature, airphotos, various thematic maps and fieldwork observations, which sometimes means a certain amount of extrapolation and generalizations.

GEOLOGY:

The geology seems to be a logical starting point for this section because it is the most stable of all physical factors, and because of

1. For example, in the agricultural survey carried out by some consultant firms there are fifteen soil samples said to be taken from the "Mountain Zone", yet only four of these lie within Assarah proper. Three of these samples are not analysed and the analysis of one of them is incomplete. ITALCONSULT 1969 "Water and Agricultural Development surveys for Areas II & III, Final Report, Agricultural Development Surveys, Land Inventory.

its role in influencing the structure of the stage upon which other physical factors play their respective roles.

Geologically, Saudi Arabia consists of two major formations and a major tectonic feature, all of them easily noticeable because of their magnitude. The two major geological formations are the Arabian-Nubian Precambrian shield on both sides of the Red Sea and the sedimentary basins to the northeast, east and southeast of the Arabian shield. The major tectonic feature is the Red Sea graben which forms a shear rift dividing the Arabian-Nubian basement complex into two nearly symmetrical parts, and separating southwestern Asia from northeast Africa (Fig. 4.1). Hence, geological research in Saudi Arabia naturally falls under two major divisions with separate academic and administrative groups concerned with the sedimentary basins and the Precambrian shield.[1] Since Assarah, our area of study, is well in the center of the Precambrian complex and on the edge of the escarpment originally formed by the rift, the discussion here will be confined to these two latter aspects.

THE RED SEA GRABEN:

Although there seems to be no disagreement among geologists over the fact that the Arabian shield and its African counterpart were once one block of land, they disagree a great deal over the structural and tectonic details such as the reasons, factors and sequences that brought about the Red Sea.[2] The most substantiated opinion is that the Red Sea came about as a result of up-lifting or swelling movements which resulted in sub-crustal faults developing along parallel axes along

1. Directorate General of Mineral Resources, Bulletin No. 1, 1968, "Mineral Resources of Saudi Arabia, A Guide for Investigation and and Development." (Jeddah, Saudi Arabia) p. 14.

2. Whiteman, A.J. 1968 "Formation of the Red Sea Depression" Geological Magazine Vol 105 No. 3., pp 231-246.

TEXT BOUND INTO

THE SPINE

the two shores of the Red Sea. This culminated during the tertiary era in the formation of the rift which was gradually filled with water from the retreating Tethys Sea in the north. The final stages of its development were its separation from what is now the Mediterranean, its joining the Gulf of Aden, and the formation of the Gulf of Aqabah.[1] The effect of the Red Sea graben is significant to this study in two ways: a) meteorologically and climatologically as indicated in Chapter V; and,b), topographically, in that the process produced the steep escarpment which left Assarah abruptly hung 2000-3000 m above sea level and 1000-1500 m above the immediate hills at the foot of the escarpment (see Fig. 4.3 and Plate 4.1 and 4.2).

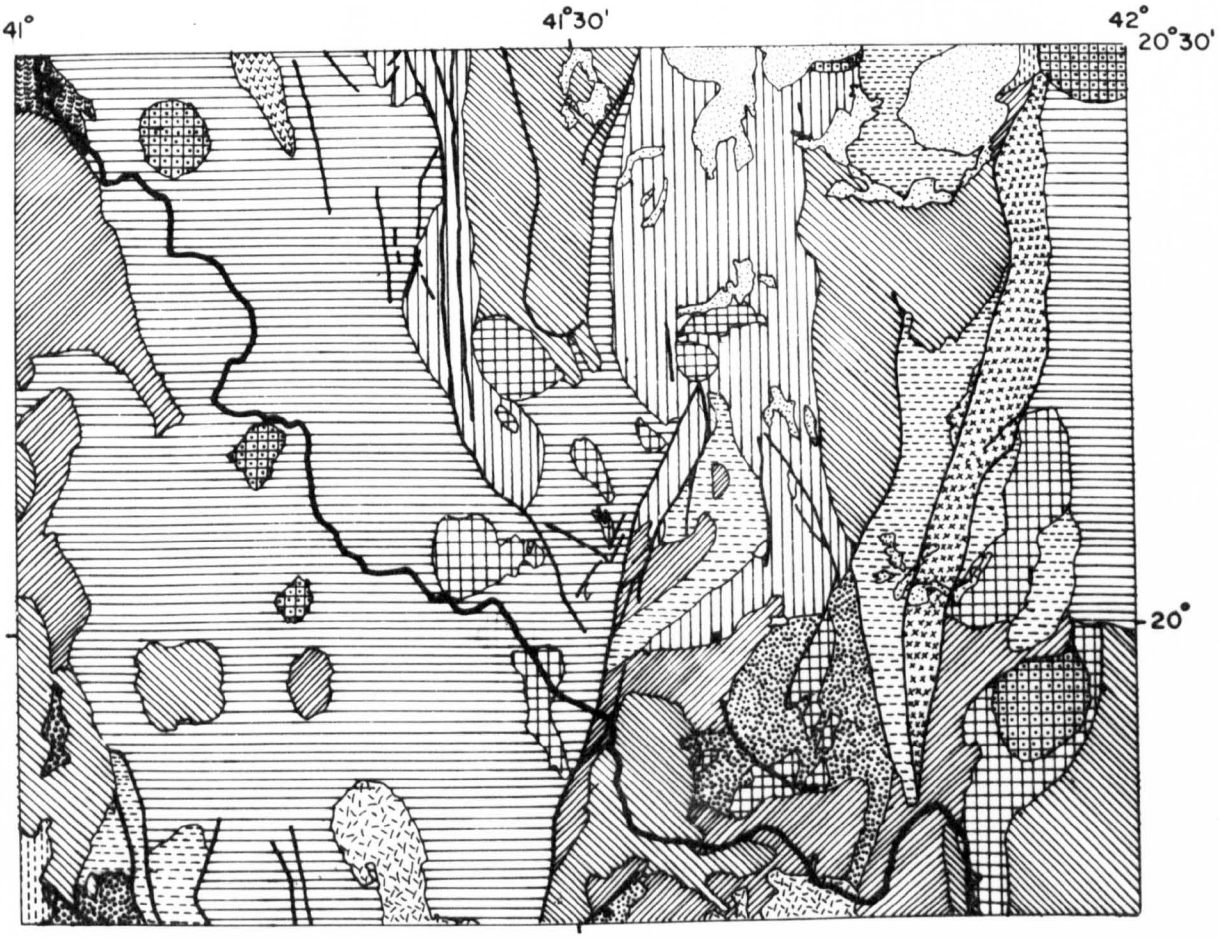
THE ARABIAN SHIELD:

The shield itself is a Precambrian complex extending over an area of between 610,000 and 770,000 square kilometers[2] (fig. 4.1). It consists of a wide range of igneous rocks, many of which have been metamorphosed to various degrees. This massive block has been subject to two major volcanic periods, with a very long interval between them. The first eruption took place during the Precambrian era covering most of the shield, but most extensively in the central and southern parts. The second eruption took place during the tertiary period covering an area about 75,000 square kilometers mainly over central and northernmost parts of the shield.[3]

Assarah, therefore, has a complex of crystalline rocks overlain in some parts by very old and more recent volcanic lava and ashes. Greenstones and schists are wide spread. Granitic rocks of various types are also common and dominate in some localities, such as around Baljorashy and in the area south of Abha. The age of the igneous rocks

1. Directorate General of Mineral Resources 1968 Bulletin 1, op. cit.,p 18; Whiteman, A.J. 1968 op. cit., ; Holmes A. 1965 Principles of Physical Geology (Nelson) pp 1078-81.
2. According to different estimates.
3. Directorate General of Mineral Resources, Bulletin 1, op. cit., p. 18.

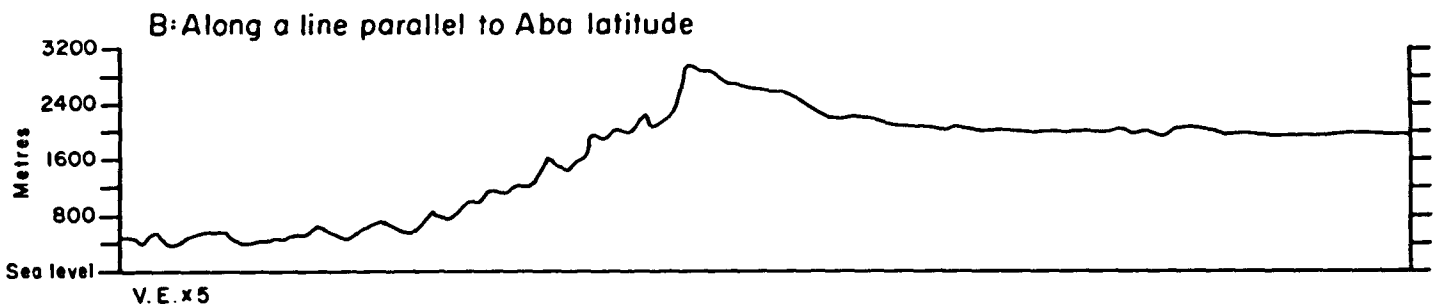
FIG 4·2 AN EXAMPLE OF THE GEOLOGICAL FORMATION IN ASSARAH (GHAMID & ZAHRAN AREA)



Baish greenschist
Hali schist
Granite gneiss and granite
Granodiorite and diorite
Baish greenstone
Abla formation
Calc-alkaline granite
Unmetamorphosed granite
Baish amphibolite schist
Basalt and andisite
Syenite
Wadi Lith series
Quartz diorite and adamilite
Altered basic igneous rocks
Alluvium deposits
Fault line
Crest of escarpment

Source: Compiled from various geological maps (U.S.G.S.)

Fig. 4·3 : EAST-WEST CROSS SECTION



SOURCE: (U.S.G.S)

Plate 4.1 The crest of the escarpment from the west.

Plate 4.2 A view of the foothills of the escarpment from the top looking westward to Tehama

of Assarah is probably around 1000 million years.[1] Assarah is also characterized by a high degree of faulting. Figure 4.2 which shows the main geological structure of the area of Ghamid and Zahran is an example typical of the rest of Assarah and an indication of the complexity of its geologic structure.

TOPOGRAPHY AND TERRAIN:

Assarah region is by definition a high mountainous terrain. The general topography as shown by the map in figure 4.4 indicates that most of the area lies at an altitude of around 2000 meters a.s.l. The lack of more detailed and accurate topographic mapping makes a detailed description all the more difficult, especially when dealing with local variations. However, the height points on Assarah Region Map (Fig. 3.2) indicate an elevation throughout Assarah of 1800 to 3200 meters a.s.l. This zone generally widens towards the south and narrows toward the north with three swells both in extent and height in Ghamid and Zahran; in Bani Shihr; and in Asir proper sub-areas. The highest peak is northwest of Abha at As-Sawdah and the widest extent is probably southeast of Abha. The most important topographic feature is the close succession of positive and negative relief zones with a great altitudinal range between them. This range sometimes reaches over 600 meters in a very striking juxtaposition; an example of this is evident in Aqabat Al-Gamah south of An-Nemas. Indeed, all the way from Al-Hada northwest of Taif to the Yeman border is an uninterrupted sequence of sharp peaked mountains and deep wadis and gorges.

The effect of the geology of the area on the development of such topography is evident in that the,

dissection (in the areas underlain by schists and

1. Brown, G.F. & R.O. Jackson 1960 21st International Geological Congress Part IX, pp 69,77, and p. 72.

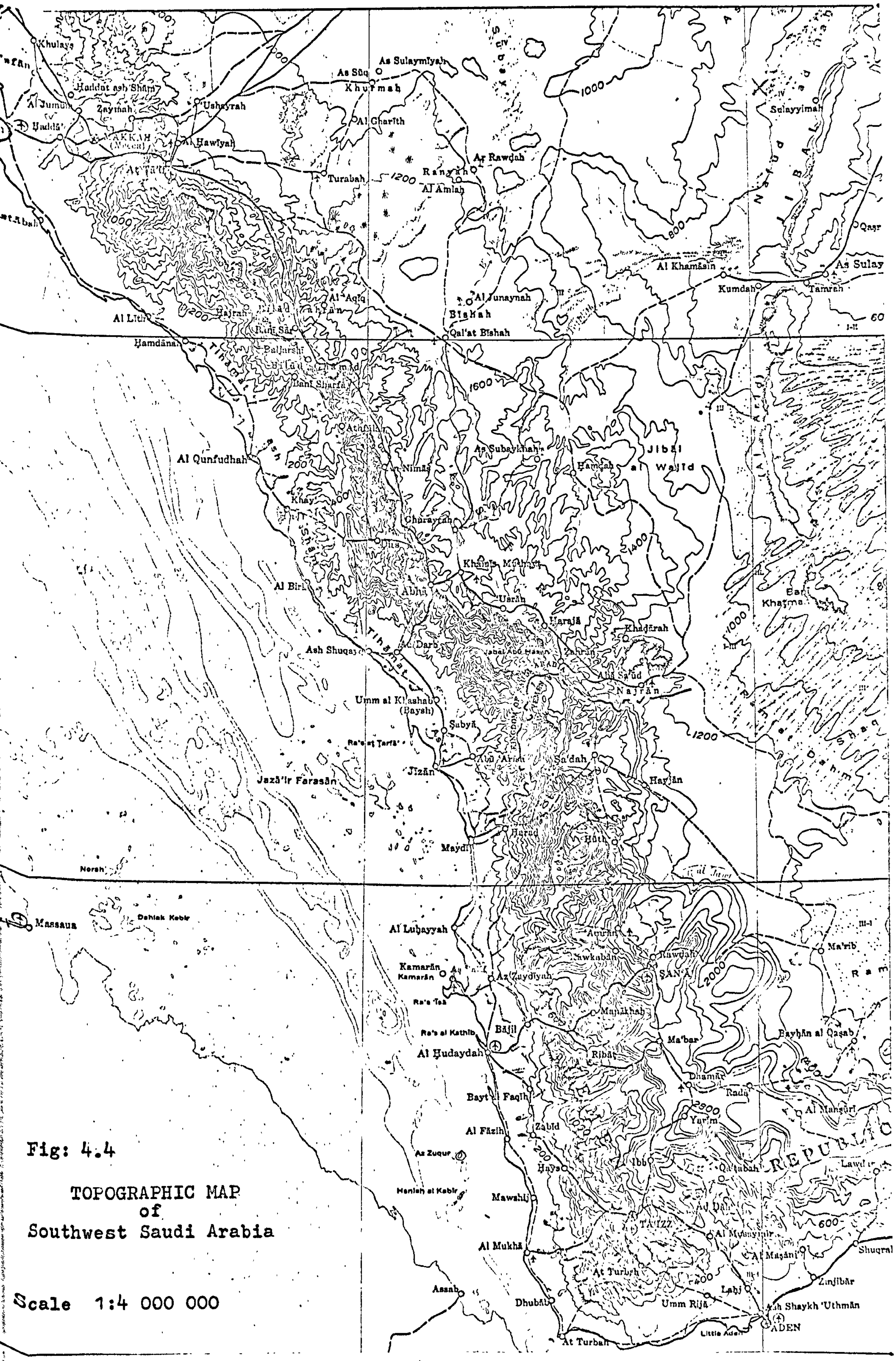


Fig: 4.4

TOPOGRAPHIC MAP
of
Southwest Saudi Arabia

Scale 1:4 000 000

> greenstones) is aided by the almost vertical schistocity planes which contribute to the development of deep V-shaped valleys. Hills in this area have steep slopes ranging from 20° to frequently over 45°, only near the valley bottoms, where pediments have formed, slopes are frequently more gentle. Areas underlain by granitic materials show more rounded hills with longer and more gently slopes. The colluvial pediments are more developed while the hill slopes are normally bare, consisting of hugh granite boulders. 1

To the west this type of topography is sharply limited by the escarpment line, whilst to the east the same pattern extends for long distances before relief becomes more subdued, and the wadis get wider and the mountains lower and farther apart.

Another feature in the topography of Assarah is the existence of a few elevated plateau-like blocks springing out of the prevailing rugged terrain; their surfaces are of relatively subdued relief. These features which are of considerable human importance will be referred to, henceforward, as perched platforms. The most conspicuous in contrast and the smallest in area is Al-Balas M. in Khathām Country, about 40 kilometers south of Baljorashy. In scale this particular perched platform appears no more than a mountain bluff, yet it supports seven small villages agriculturally. Another and bigger example of such a perched platform is Assawādah M., northwest of Abha. Equal in contrast and extent, there are also a few basin-like areas with more subdued relief than the surrounding hills, the best example of this being Baljorashy basin. Beside these there are some conspicuously elevated individual mountains with sharp pointed peaks and almost inpassable terrain, most of which still provide a natural reserve of fauna and flora. Examples of these mountains are Baidhan M. in Balharith, Ibrahim M. in Bani Malik, Batharah M. in Zahran and Hozna M. and

1. ILACO 1972 "Discussion paper on soil and land resources in S.W. region of Saudi Arabia", Reyadh Office, Saudi Arabia, p. 11.

Othrub M. in Ghamid. Indeed, this phenomenon is so wide spread in Arabia that it represents a separate theme in the old Arab geographers' literature.[1]

Both these positive and negative types of topography do not usually occupy more than a few square kilometers separated by rugged, dissected and steep gradient land. These features have a variety of lithological, tectonic and erosional origins. A simple verbal description such as this must suffice in the absence of suitable topographic maps.

The influence of the rugged topography is clearly manifested in the location of the airports serving Assarah. Taif airport serving the northern part of Assarah is situated 30 kilometers northeast of Taif. Al-Aqiq airstrip built to serve Ghamid and Zahran is situated 40 and 50 Km. from Al-Bahah and Baljorashy respectively connected by a most hazardous road. As a matter of fact it is easier for a passenger to travel the 200 odd kilometers from Taif to Al-Bahah than the 40 Km. from Al-Aqiq airstrip to Al-Bahah, and probably quicker. Abha district in the south is served by Al-Khamis airport 35 kilometers to the east.

SOIL:

It is strange and unfortunate that no soil survey or classification of any kind has been carried out in Assarah region; strange because Assarah is one of the biggest and most important agricultural areas in the country, and unfortunate because a great deal depends on such a survey.[2] This fact in itself presents the most difficult obstacle to

1. Since most of the classic Arabic geography is gazetteer in character it is only natural that mountains listing and description becomes a separate theme along with the listing and description of towns, villages, travel routes, springs, and other landscape phenomena. To cite only one example see Arram AsSolami Names of Tehama Mountains, their Inhabitants, Villages...etc. Edited by A. Haron (in Arabic) Cairo, 1955.

2. This lack of soil studies is clearly indicated in Stevens, J.H. & King, R. A Bibliography of Saudi Arabia (Durham University) p 14.

a scientifically based assessment of the agricultural potential and consequently of development priorities. It is true, however, that in recent years more attention is being given to development surveys, but the approach is usually so general and aloof that specific detailed study is often lacking.[1] For this reason the attempt in the following pages will be limited to a tentative outlining of the general characteristics of the soil of Assarah and the factors that affect its formation and development from a geographical standpoint rather than a pedological one.

In all soil groupings the tendency is to choose one or more of the soil properties or the factors governing their development and use these as criteria or points of reference against which the grouping or classification is made. The most important of these criteria are climate, parent materials, texture, and structure. Although all these have important roles to play, in Assarah the slope factor outweighs them all in importance. Thus, any future multidimensional soil survey of Assarah must acknowledge the slope factor as of critical significance, and a separate grouping based on it should be carried out. Similar situations exist in most semi-arid mountainous areas of the world. For instance, in the Central Highland of Jordan, which in many ways resembles Assarah, the dominance of slope influence on soil conservation has been emphatically stressed.[2] Indeed, the realization of this fact and the implementation of measures indicative of that realization go back into the history of the Middle East to times immemorial.

1. There are, however, a few general surveys of the soil of Assarah but because they were either concurrent to this research, or their final finding is not yet available, it was not possible to include them in this study. In both cases they are only of general reconnaissance type.

2. Willimott, S.A., et. al. 1964 Conservation Survey of the Southern Highlands of Jordan (Durham University); Fisher, W.B., et. al. Soil and Land Potential Survey of the Highlands of Northwest Jordan (Durham University); Fisher, W.B., et. al. 1966 Soil Survey of Wadi Ziglab, Jordan (Durham University) pp 29-39.

In considering the soil of Assarah two distinctive features must be born in mind. a) Due to the already mentioned topographic and altitudinal character the soils of Assarah are basically azonal, at least when viewed in natural conditions. b) The soil of Assarah is, to a large extent, a man-made phenomenon. The millions of terraces are in fact the containers which man himself built to trap and hold the soil, and without them Assarah would not be the important agricultural region that it is.

A distinction must also be made between evolved soil under natural conditions and the soil formed or deformed under human influence, be it positive or negative influence.

Along the steep slopes the existence of contiguous soil profiles depend on the existence of sufficient vegetational cover. Where such cover is evident the profile is usually composed of A/C horizons varying in depth from 20-60 cm and consisting of weathered plant material underlain by weathered and fractured rocks. As one goes down slope toward the more gently sloping wadi bottom a B horizon becomes evident and gets thicker down slope reaching its greatest development near the channel where continued irrigated farming has been practiced. In areas where farming has ceased for a long period in the wadi bottom one can see only B and C horizons. Great areas of natural soils have been severely degraded and represent skeletal remnants of soils formed under past richer vegetation conditions. Along the higher terraces soil profile is deepest and more matured at the toe of the terrace. In some terraces the profile thins out at one or all of its other three sides into the exposed bed rock. Stoniness and rockness are more pronounced toward the upper terraces, but they are also encountered in the low-lying terraces. The soil texture of Assarah is generally clayey in the upper reaches of the watershed and silty towards the

lower parts and mainly sandy east of Assarah. Five sample profiles are described in Appendix 2.

Since it is impossible to attempt any standard soil grouping, because of the total absence of any completed pedological work, an attempt will be made to discuss other soil characteristics in as far as they relate to soil formation processes. The discussion will, however, be limited to the geographical aspects of such processes.

a) The Parent Materials:

Although the parent material of the soil all over Assarah is basically derived from igneous and metamorphic rocks, the varying degree of metamorphisation coupled with the presence in many places of Precambrian volcanic remains, produce significant variations in the soil on a local scale. At one end of the scale we find the very slow-weathering granites with extensive outcrops of igneous rocks; the best example of this is found at Baljorashy and its vicinity, and on a lesser extent at the northern parts of Assarah west of Taif. At the other end there is the amphibolite greenstone, derived from basic fine grained igneous or volcanic rocks, containing slates and shales which are highly laminated; the best example of this is a narrow formation in Shora, a few kilometers in width extending for some tens of kilometers in a northeast direction. This type of parent materials is so quick-weathering that it disintegrates on rubbing by the fingers. The second most significant quality is its high water retention capacity. Between these two extremes there are large expanses of different kinds of granite, diorite and schist with varying degrees of resistence. The important contrast between the two extremes in relation to soil formation is that in the schistose friable formation the parent materials tend to decompose quickly with manipulation. The ploughing, applying of water, and cropping for five to ten years in an area not cultivated before will

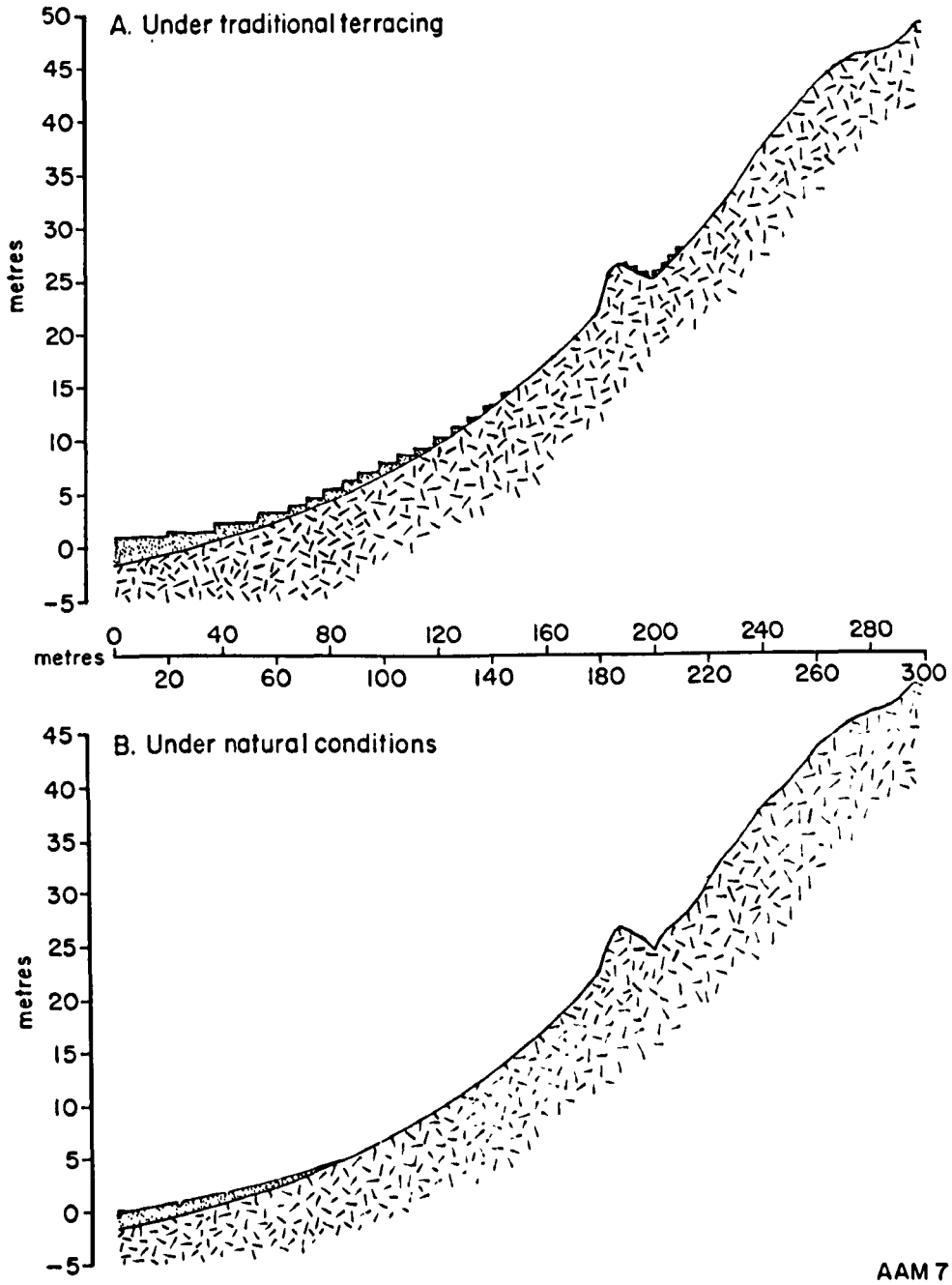
hasten the decomposition in situ which will result in a mature soil. Soils in these areas tend also to be more fertile.

b) Slope:

If we were to take away the human factor and envisage the situation in which the soil existed without Man acting, either building or abolishing, we would see a very thin soil with very stony structure and relatively moderate humus content on the moderate slopes and on the bluffs of the mountains. This soil would also show a developed but very shallow horizons with a C horizon generally at a depth of about 50 Cm. Down slope, and before the wadi bottom, the soil would be scarcer and almost totally eroded due to the increased volume of run-off. The gorges and narrow upstream tributaries would be completely eroded with no soil at all and the bed rocks exposed. At the wadi bottoms the greater the contrast in relief the barer they become and the more boulders and exposed bed rocks occur along the wadi course. In the wider wadis or with a low relief the dry water courses would, in their natural state, appear two or three times wider than if they were under human utilization flanked on both sides or just on one by highly dissected and deeply gullied alluvial terraces (Fig. 4.5B).

Different from this is the picture under human utilisation, where the dry water course at the bottom of the wadi is minimised by the building up of strong field walls along the wadi to avoid gullying. In many instances farmers are seen to increase the size of their fields at the expense of the wadi courses. This walling and a good management help keep a good and thick alluvium varying in depth from 1 - 3 meters. Beyond that and towards the slopes the man-made terraces keep a deep layer of soil thinning as you go upslope with a continuity often broken by shear slope and by outcrop of bed rocks (Fig. 4.5A). Under utilisation

Fig 4·5 SOIL CATENA IN A TYPICAL WADI IN ASSARAH



the degree of slope is very critical. Owing to the strong erosive action in such mountainous terrain, cultivation proved to be viable only on near-flat surfaces and this is indeed what the terracing is all about, (Plates 4.3 & 4.4). A number of measurements taken at various localities show that the bulk of the fields under cultivation maintain a slope of 0.5^{o} - 2°. On the irrigated fields the slope is hardly steeper than one degree. Upslope 10° appeared to be the critical angle at which soil could form under natural conditions; but if it is to be ploughed and cropped it needs further levelling. This soil where it occurs is very marginal. On higher and unterraced slopes there exist patchy pockets of soil trapped between stones, boulders and bed rock outcrops. This soil is highly varied in depth, consistency and maturity and maintains some natural vegetation. Another effect of slope on soil is that the unterraced upslope provide a very good catchment area washing down a considerable amount of loose particles and organic remains which undoubtedly enhance the soil in quantity and quality.

c) Rainfall:

Rainfall affects the soil formation mainly in the form of run-off which has a positive correlation with both the intensity of the rainfall and the degree of slope and which plays two contrasting roles; negatively as an erosive agent reverting soil to waste; and positively as a weathering agent breaking the parent material into fine grains and as a transporting agent carrying the loose particles and depositing them. Furthermore, after the rain water has been absorbed by the soil it provides as soil moisture the medium through which the various bacterial and chemical processes takes place. The magnitude of the danger of erosion will be discussed later in Chapter VI. The rainfall also helps keep

Plate 4.3

Terraces are typical landscape features in Assarah

Plate 4.4

the soil compact, especially as it is mainly clay. Although this compaction has many drawbacks it does at least make the soil more resistant to strong winds and gales and so wind erosion is reduced. Due to the fact that land gradient is steep and the soil is often underlain by a porous wadi alluvium, soil and sub-soil drainage is unimpeded and a salinity problem does not exist. Waterlogging may occur but only in a few localities and in very small patches, lasting only for a few days after heavy rain.

d) Fauna and Flora:

It is universally accepted that the vegetation cover affects the soil favourably by insulating soil from erosive agents and by enhancing the biotic contents and processes.[1] This statement is very true in Assarah as it is of most tropical areas. In the rainfed fields and upper terraces there are sporadic trees, mainly Talh (Acacia Sp.) and Arar (Juniperus Procera) which are scattered along the terraces with some shrubs along their edges. In the surrounding rough-land a patchy type of woodland exists. Although these two kinds of trees are evergreen, they shed a considerable amount of leaves all the year round. The fallen leaves of all these plants enrich the soil and add considerably to its fertility. On the rough hills the quality of the thin soil depends almost entirely on the degree of both the thickness of the trees cover and the degree of grazing. Grasses and various other perennial and ephemeral natural plants affect the soil in that if they grow in the fields themselves they will most definitely exhaust the soil by drawing upon nutrients, especially if they are of no use to the farmer.

1. Vegetation cover insulating the soil from erosional forces. Gourou, P. 1966 The Tropical World (Longmans) pp 27-28; Kirkby, M.J. 1969 "Erosion by Water on Hillslopes" in R.J. Chorley, Water, Earth and Man (Methuen) pp 229-237; Fisher, W.B., et. al. 1966 op. cit., pp 29-34.

In this way they represent an extra burden on the farmer. He will have to clear them by hand or plough them in the soil before they seed, or, failing that, he will have to put up with the loss in the following season.

If this non-tree vegetation exists on the surrounding hills it will have a beneficial effect in that it will stabilize the soil, enhance infiltration, and increase humus content in situ and in the run-off water which will end up in the terraces. Here we see a sharp contrast between, on the one hand, the areas where the woods have been cleared due to excessive cutting and where the pasture has been destroyed as a result of overgrazing, where there is almost no soil and, on the other hand, a few protected areas which have been kept under the al-Hima system where the soil, though shallow and stony , is matured and rich in organic matter (see Chapter VI).

The effect of the fauna on the soil is two-sided. On the one hand the animals play as a destructive element uncovering the soil and exposing it to erosion agents; and more peculiar to this region all animals from camels to the tiny rats, including man himself, contribute to the destruction of the terraces. On the other hand their dung and refuse help add to the precious organic matter, and they disturb the upper loose particles which help quicken the mixing of soil. However, a particular problem worth mentioning here is that rodents, especially rats, constitute one of the main causes of terrace collapse. The structure of the terraces having a deep layer of soil just behind the terrace wall provides the ideal habitat for such animals where they burrow extensively. When the rainfall comes, the water seeps through these burrows pulling down the soil and the terrace wall, if it is not quickly repaired a few seasons of rainfall will wash all the soil away.

e) Wind:

Due to the relative compactness of the soil the wind poses no major danger as an erosion agent, in spite of the recurrent but infrequent strong winds, and some localized wind whirls. However, the most important effect of wind on soil development in our area originates outside the region. During the strong dust storms which are commonplace in central Arabia, especially in the summer, very fine particles are carried high in the air. Air movement carries this dust westward and south-westwards. On reaching Assarah and or as a result of a considerable decline in wind velocity, this is deposited and settles down adding, on the long term, to the soil. The amount of such fine particles varies through times and place; sometimes they are hardly noticeable and sometimes they reduce the visibility markedly, but usually the amount is so small as to only cause a halo around the moon and the sun. This dust is more noticeable on the leaves of trees and grasses than on the ground. When one shakes the plant it would be possible to see the dust falling. The thickness of the deposited layer can not be more than a small fraction of a millimeter. The local name for this phenomenon is al-Ghobri which means the hazy dust.[1]

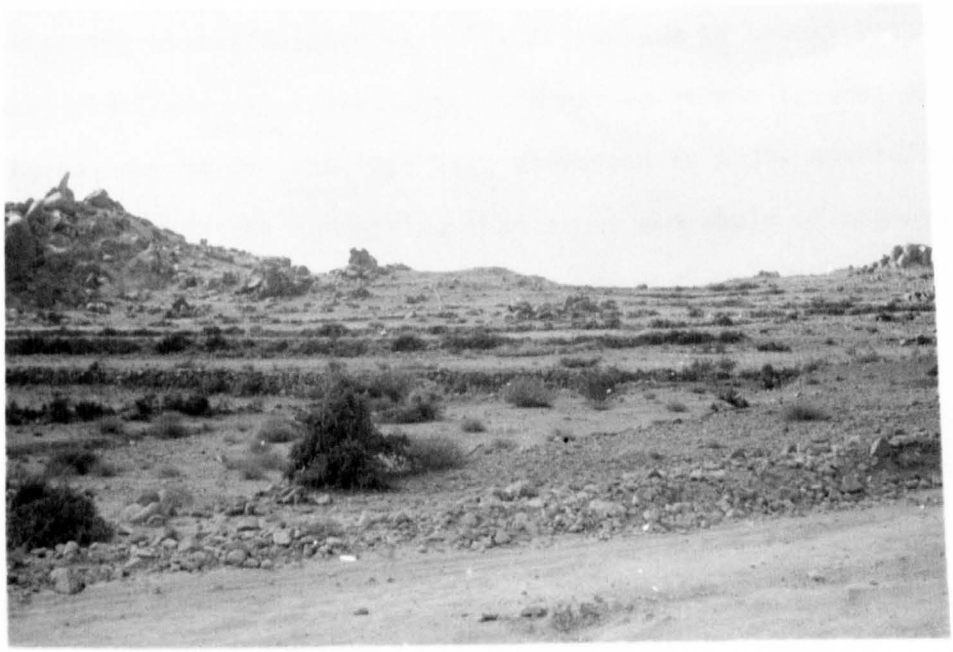
The main point that stands out from what has been said above is that the soil of Assarah is not natural but rather man-made. A continuous utilization of the soil is necessary for its existence. In river delta and major plains the soil will not suffer if left idle for decades or centuries. In areas like Assarah if the terraces are not maintained the soil will disappear after prolonged neglect. (Plates 4.5 & 4.6).

1. As far as the author can assertain no one has ever mentioned this phenomenon, at least in the context of its effect on soil formation. As for the above mentioned origin of this dust and its effect on the soil formation, this is the author's own speculation.

Plate 4.5

When man-made terraces are abandoned serious soil erosion follows, endangering the whole hydrological and ecological balance.

Plate 4.6



CHAPTER FIVE

CLIMATE

Saudi Arabia, as a whole, is generally classified in climatological literature as belonging to the arid zone hot desert type of climate. Given further details the general tendency is to subdivide this basically arid class into two sub-classes: arid and extremely arid, or desert and extreme desert. However true this may be, such generalization does often obscure the fact that the Assarah Mountains in the southwest enjoy a better climate than the rest of the country. There are three reasons behind this discrepancy. First, although the area affected covers about 50,000 sq. Km. it still represents only 3 per cent of the total area of the country which makes it easily overlooked in a generalized account. Secondly, the relatively better climate in this area is mainly due to the high elevation of the mountain range, whilst the classification of climatic regions is mainly based on a zonal (latitudinal) classification which sometimes ignores altitudinal effects, except for the very high elevation in major mountain ranges. This has led to the assumption that since the whole of the Arabian peninsula is in desert latitudes, and since there is no major elevation like the Himalayas or Alps to warrant any exception, then the whole country is classified as desert. Thirdly, when the elevation and the monsoonal effects are mentioned they are usually associated with the Yemen where they are most felt rather than with Saudi Arabia. This may, partly at least, justify the emphasis I am putting on the uniqueness of the climate of this region in the general context of the whole country.

Before proceeding to the discussion of the climatological conditions

which prevail in this region, a brief account should be given of the previous climatological research in this area. Owing to the fact that academic interest in all behavioral sciences including geography, in any form resembling modern scientific thinking is a recent pheonomenon, the inadequacy of its findings becomes an inherent and inevitable problem.

In Saudi Arabia meteorological data can be obtained through three agencies. Each one is set up for different purposes, none of them provides adequate cover, and there is a considerable over-lapping and duplication in the job they do. First, there is the General Meteorological Department whose main concern is providing meteorological data useful to Civil Aviation Service and whose 17 stations are restricted to the airports. There are only two in, or rather near Assarah, one at Taif airport at the northernmost part of Assarah and one at Khamis Moshait, east of Abha in the south. Secondly, Aramco's meteorological stations which are confined to the eastern and northern provinces where most of Aramco's activities are. Lastly, the Ministry of Agriculture and Water, Department of Water Resources Development, Hydrology Division (henceforward referred to as MAHD) has a good network of different climatological stations with comparatively good coverage and denser instrumentation. MAHD gives Assarah a particular attention in this respect because of its agricultural importance. There are six general climatological stations within Assarah run by MAHD at Taif, al-Mandak, Baljorashy, Nemas, Belesmer and Abha. There is also another station at Bishah, but this lies well to the east of our region and is more influenced by a true desert type of climate. Nevertheless it can be useful in this investigation for comparison purposes. Table 5.1 shows the locations, instrumentation and dates of installation

of these stations.[1] One fact stands out clearly and that is all these stations have been installed very recently, one of them as late as August 1968. This has prevented any detailed climatological analysis because records cover too short a period for valid analysis. We must also take into account that the date of installation does not necessarily coincide with the beginning of reliable records. Added to this is the fact that the existing gaps in the available records affect the validity of the results. However, in spite of these shortcomings one must use this data and be as cautious as possible.

TABLE 5.1

INSTALLATIONS IN THE MAIN METEOROLOGICAL STATIONS IN ASSARAH

Name of Station	Latitude	Longitude	Altitude	Date of Installation	Instrumentation
Taif	21.14	40.21	1634	1964	A,E,GB,H,P,NR,RR,MT,TA
Al-Mandak	20.06	41.17	2400	Aug 1968	E,GB,H,P,NR,RR,MT
Baljorashy	19.52	41.33	2400	Dec 1960	E,GB,H,P,NR,RR,MT
An-Nemas	19.06	42.09	2600	May 1968	E,GB,H,P,NR,RR,MT
Belasmer	18.47	42.15	2250		
Abha	18.12	42.29	2200	Feb 1965	A,E,GB,H,P,NR,RR,MT,TA

A - Actinograph
B - Barograph
E - Evaporation Pan
GB- Gunn Bellani
H - Hydrothermograph
P - Psychrometer
NR- Nonrecording Rain Gauge
RR- Recording Rain Gauge
MT- Maximum and minimum Thermometer
TA- Totalizing animometer

Source: Ministry of Agriculture and Water, Department of Hydrology, Hydrological Information No. 1A.

1. Several rain gauges were installed some years before the opening of full meteorological stations. Also a number of additional stations and instruments have been installed since this research started.

As far as the climatological literature is concerned no one, as yet, has approached such a vital subject from an analytical point of view either in the context of Saudi Arabia as a whole or in this region in particular.[1] Although the General Meteorological Department publishes an annual report, and MAHD publishes monthly or bimonthly bulletins entitled "Hydrological Information", both agencies publish only the data with no discussion or analysis. MAHD only occasionally provides some hydrological analysis in the form of rainfall maps or run-off analysis. The only meteorological analyses which have some bearing on Assarah region which can be cited are in an article in "Weather"in relation to the Red Sea Convergence Zone by D.E. Pedgley; and in two reports by FAO in relation to the Yemen.[2]

The climate of Assarah is complex because of the altitudinal variant which the mountains add to a climatically little understood part of the world. The region itself is not distinctively under the influence of any one of the major global climatic regimes and it is only marginally influenced by such regimes, i.e. the Mediterranean winter depressions, the southwesterly summer monsoon, the Inter-tropical Convergence Zone and also by the central Asian high and low pressure cells.[3]

In a typical general climatological textbook Assarah (or Asir) is too small to warrant particular mention as having a particular climate. It is often lost between the desertic dry climate in the north and the semi-Arid monsoonal climate in the Yemen.

Several methods have been developed for measuring aridity, but none of them is wholly satisfactory.[4] If we apply some of the mathematical

1. Currently a compatriot is carrying out a post graduate research at Durham University into some aspects of the climate of this region. It is hoped that this work, when finished,will fill a serious gap.
2. Pedgley, D.E. 1966 "The Red Sea Convergence Zone"Weather Vol XXI Nos. 10 & 11; Toffolon,C. 1956 "Meteorological Observations in the Yemen" in FAO 1966 Report of the FAO Mission to Yemen.
3. Trewartha, G.T. 1962 The Earth's Problem Climates (University of Wisconsin Press) pp 244-247.
4. Wallén, C.C. 1967 "Aridity Definitions and their Applicability" Geog. Ann. Vol 49A pp 367-384.

indexes of aridity developed by geographers or climatologists we find that Assarah with a mean annual temperature of 17-20°C and an annual rainfall of 12-16 inches has a semi-arid climate.[1] If we apply Koppen's formula for winter maximum rainfall: $r = \frac{0.44t-14}{2}$ to Baljorashy with a total annual rainfall of 14 inches, it would give us a result of 6.86 which, according to Köppen, puts Baljorashy just outside the arid and semi-arid climate. If we use Koppen's formula for the evenly distributed rainfall: $r = \frac{0.44t-8.5}{2}$ for Abha it would have a value of 8.89 which would put Abha with a total annual rainfall of 15.4 inches within the semi-arid climate. t in both formuli equals the mean annual temperature in degrees F[2].

The best articulation of Assarah climate in a global context appears in Meigs' distribution of arid homoclimate,[3] Fig. 5.1.

On a regional scale, the bioclimatic map of the Mediterranean Zone which was prepared by UNESCO and FAO is the most detailed map of the bio-climate of the Arabian Peninsula. The part of this map which covers Assarah is given in a slightly modified form in Fig 5.2.[4] Fisher's treatment of the climate of the Middle East indicates both the complexity of the climate and the frustrating lack of adequate data.[5]

PRESSURE AND FRONTAL SYSTEMS:

Summer Conditions:

During the summer months from June to September Assarah falls

1. Miller, A.A. 1965 Climatology (Methuen) pp 85-6; Haggett, P. 1972 op. cit., p. 236.
2. Simons, M. 1967 Deserts: The Problems of Water in Arid Lands (Oxford) p. 86.
3. Meigs, P. 1951 Eastern Hemisphere, Distribution of Arid Homoclimates (UNESCO/NS/AZ/37)
4. U.N. UNESCO-FAO Bioclimatic Map of the Mediterranean Zone, Arid Zone Research XXI.
5. Fisher, W.B. 1971 The Middle East (Methuen) pp 44-75.

Fig: 5.1 P. Meigs' distribution of arid homoclimates

MOISTURE

E= Extremely arid A = Arid S = Semi-arid

SEASON OF PRECIPITATION

a = No distinct season b = Summer precipitation

c = Winter precipitation

TEMPERATURE

24,33,34, = Hot 22,23 = Mild 12, 13,14 = Cool winter

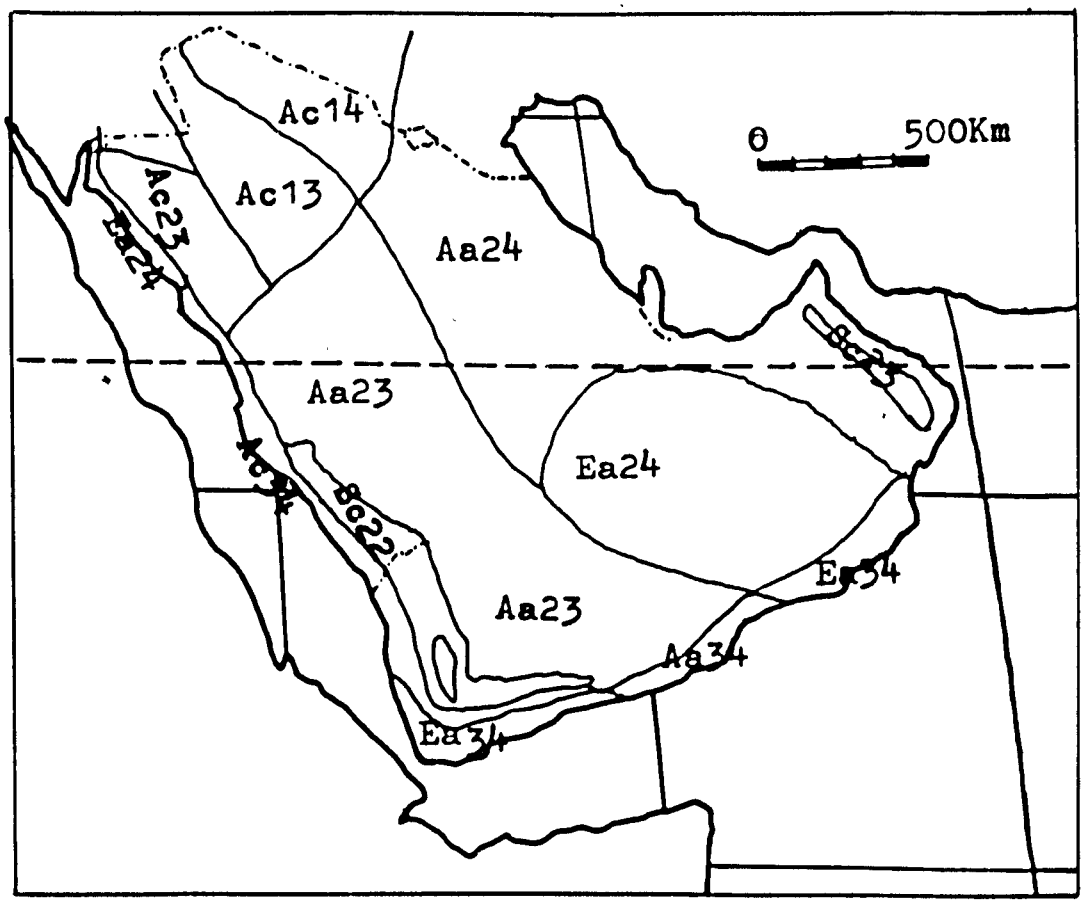
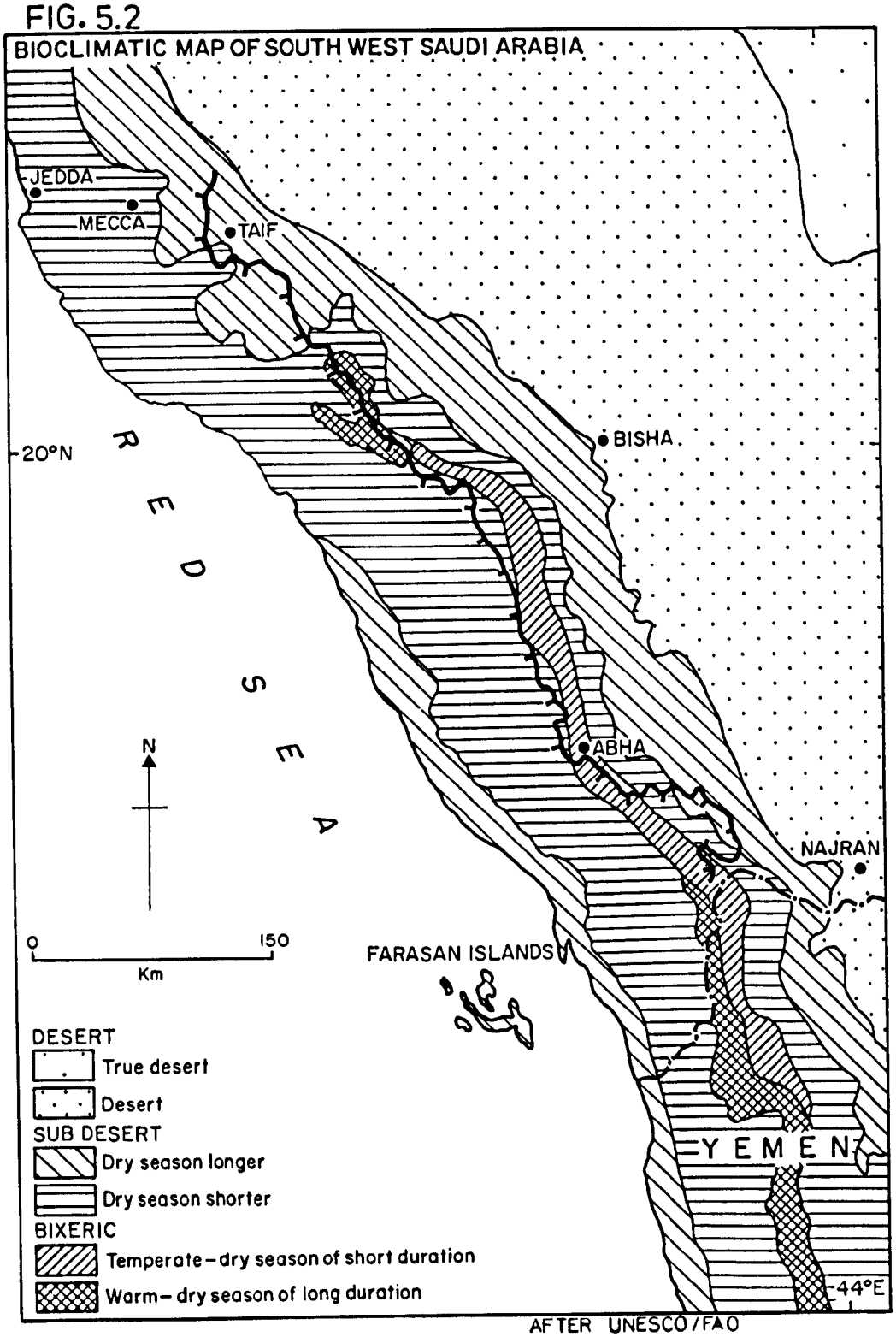


FIG. 5.2



AFTER UNESCO/FAO

between the influence of two low pressure systems, one in the far southwest over Yemen, Gulf of Aden and the Ethiopian highland, the other over the northeast of the Arabian Peninsula. These are minor fringes of the main monsoonal system to the south. In addition there is the Azores high pressure system which is comparatively stable and persistent extending eastward over the Sahara.[1] Since the northeastern low and the Azores high are too far to have a significant direct effect on Assarah, the southwestern monsoon low remains as the prevailing pressure system. Being centered over the southwesternmost part of the peninsula and the adjacent part of Africa its effects are most felt in the Yemen and southern part of Assarah. Largely modified by the mountains, this system results in summer weather conditions peculiar to these parts, namely clear mornings followed by the formation of clouds around noon. By mid-afternoon the sky becomes dark and light showers occur. Occasional heavy showers or just a trace of rain falls before the clouds disperse again giving way to clear skies in the evenings. A completely clear summer day is rare especially in the south. (see below) The precipitation following such cloud formations depends on the amount of moisture in the air, the thickness of the clouds and the mechanism of the rain formation process. This type of climate may extend as far north as Taif and Al-Hada. The flux of such a regime is experienced during July and August. The irregularity and failure of this system increases as you travel north until it becomes only marginal north of Zahran. When and where this type of weather fails it gives way to the contrasting climate prevailing over the rest of Arabia - namely the desiccating north and northeast and east trade winds which are highly modified by the above mentioned low pressure

1. Fisher, W.B. 1971 op. cit., pp 48-50.

cells. This air stream is strong and dry after it has released any moisture it might have had over Zagros, and accentuated by blowing across vast expanses of hot deserts. In Assarah these summer conditions are further modified by a rather localized factor, namely the Red Sea Convergence Zone which is a part of the ITCZ trapped in the Red Sea depression.[1]

Winter Conditions:

From October to May Assarah does not usually become a centre of major cyclone or anti-cyclone. The tropical regime has travelled too far to the south to affect this region and the cool temperate regime has moved to the lower mid-latitude with its axis extending along the Mediterranean to Iran, but not close enough to play a dominant role over Assarah. The winter climate of the Middle East is characteristically varied and unsettled, and especially so in Assarah. This makes any attempt to formulate a recurring regular pattern all the more difficult. However, from the available information it seems that the Middle East from October to May is influenced by a high pressure zone centered over south central Asia and Eurasia on the one hand, and by a low pressure system over the Mediterranean on the other. This produces cold and dry continental polar air from the east and north, and maritime polar air from the north with maritime tropical air coming from the west. Added to this is an occasional flow of warm dry tropical air from the south.[2]

Inasmuch as Assarah is affected at any particular time, three main considerations need to be borne in mind: a) the origin and nature of the pressure systems and climatic regimes further north; b) the time-

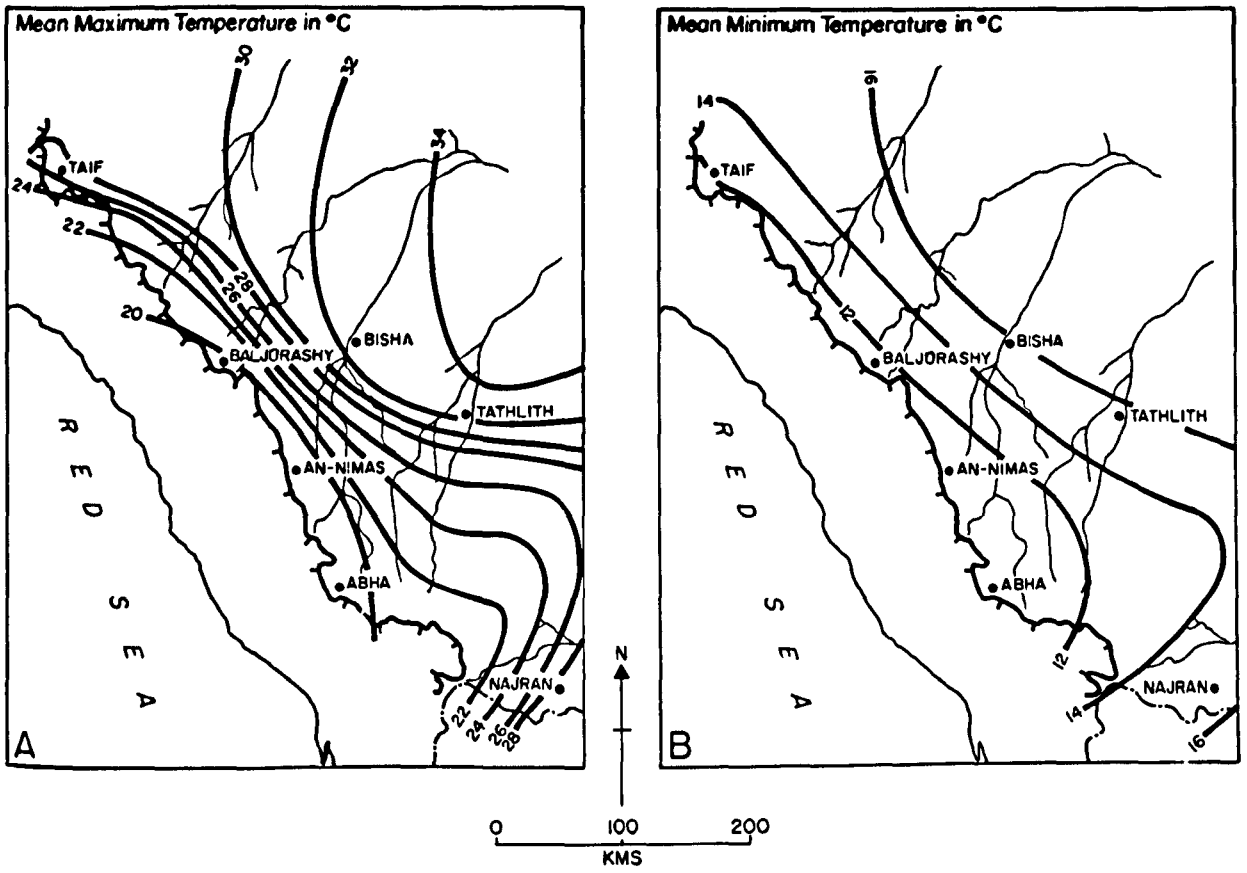
1. Pedgley, D.E. 1966 op. cit.
2. Fisher, W.B. 1971 op. cit., pp 55-57.

lapse which is needed for such regimes to travel such a distance; c) the changes which are likely to occur as a result of the added variables: such as the gain or loss of temperature, moisture and velocity. Unfortunately the meteorological data in the Arabian Peninsula is very scanty on this account. It seems that during September the semi-monsoonal effect retreats from the area altogether. Although the on-set of the Mediterranean winter depressions start to be felt in the Mediterranean from October, it does not reach Assarah effectively until November. During the early winter, November and December a northwest wind prevails, coming as a fringe of air escaping from between the sometimes-formed Saharan high and the Mediterranean belt of lows. This air is relatively moist but not warm. In rising up the mountains it experiences further cooling and condenses producing the first and most important rainfall. This pattern sometimes extends till January. From mid-January til mid-March the region sometimes experiences a north to northwesterly flow of air, cold but often dry, escaping from the eastern fringes of the high pressure cell centered over Europe. Sometimes it gains moisture on its way over discontinuous expanses of water and sometimes it arrives very dry after the moisture has been precipitated further north. From mid-March til mid-May prevails a kind of unsettled weather condition characterised by changes in wind speed and directions producing some rainstorms.

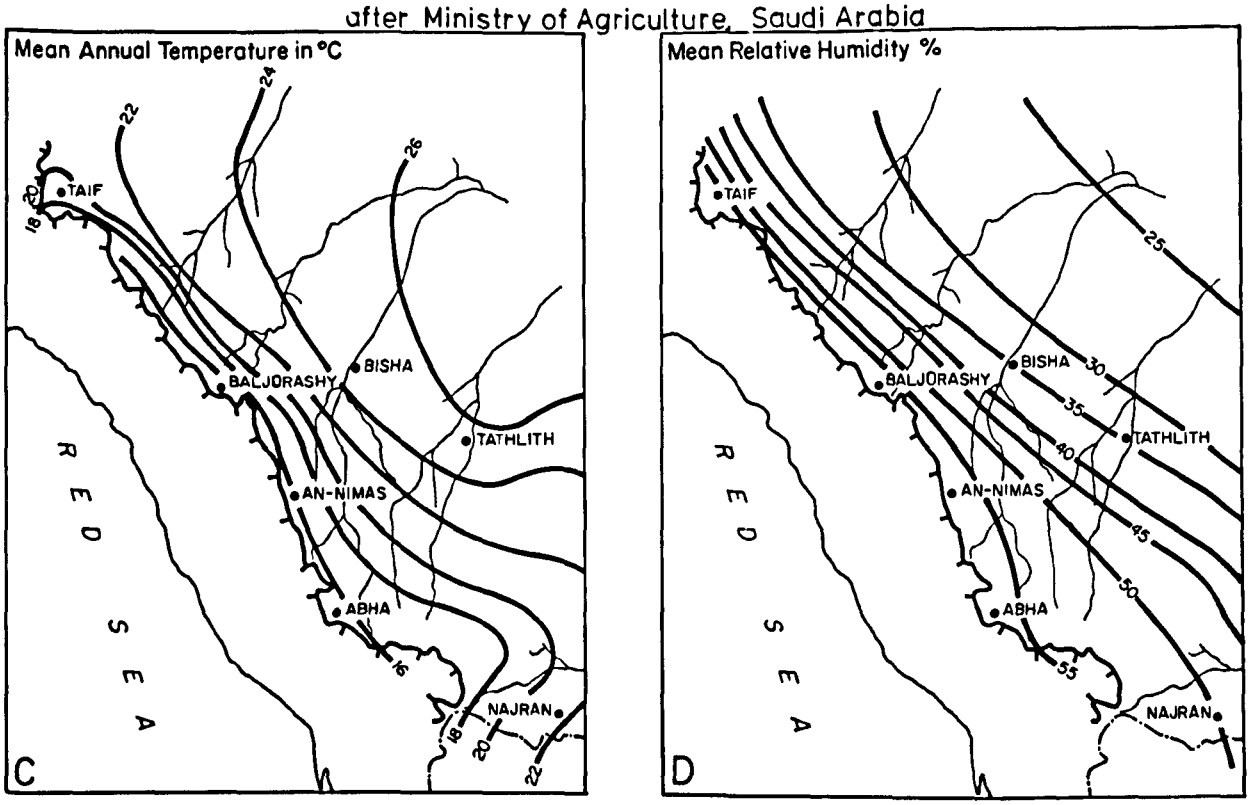
TEMPERATURE:

In Assarah there is a positive relationship between altitude and isotherm anomalies, the importance of which is signified by the effect it has on the bio-ecology of this area. This is shown on the maps of vegetation (Fig. 6.4), rainfall (Fig. 5.6) and isotherms (Fig. 5.3 A,B & C). The altitudinal factor here works favourably in reducing summer

FIG.5.3 TEMPERATURE



after Ministry of Agriculture, Saudi Arabia



heat. The absolute maxima of temperature figures in summer are lower in Assarah than anywhere else in the country. Table 5.2 shows the main temperature characteristics in four stations in Assarah and in two other stations, Bishah and Sabia, representing the interior plateau and the coastal plain respectively.

TABLE 5.2

TEMPERATURE CHARACTERISTICS 1969

	Station	Ab. Max.	Mean Max.	Ab. Min.	Mean Min.	Max. Av.	Mean Av.
Assarah	Taif	35	27.1	-2	12.9		20.0
	Baljorashy	30.5	22.9	1.0	12.0	25	17.4
	Nemas	28.8	20.8	1.0	10.8	24.6	15.8
	Abha	30.0	21.4	0.6	10.5	23.4	15.9
Interior Plateau	Bishah	42.6	34.1	2.2	18.5	35.7	26.3
Coastal Plain	Sabia	46.6	36.8	18.6	25.7	40.0	31.2

Temperature decreases slightly as the altitude increases and as the high altitude becomes maintained over a wide area. In Assarah both features increase southwards (Fig. 5.3 A, B, & C). As far as the reporting stations are concerned, Nemas is the highest in the country, (Table 5.1).

January and February have very low temperatures for the latitude, reaching near freezing point at night and occasionally even lower, but not by more than one to two degrees C. During the daytime if the sky is cloudy the restricted outflow of ground radiation raises the temperature high enough to allow growth of most plants, or if the sky is clear the direct heat from the sun will raise the temperature above the minimum threshold for growth. Critical are the clear dry nights when temperatures drop to freezing point, when frost is not uncommon at

this time of year. The absolute minimum temperature can occur at any time from about the second half of December til the first half of March, but most frequently during February. January and February have similar mean monthly averages with February sometimes slightly lower (table 5.3). In March temperatures start rising steadily, reaching a peak in June and staying at that level till September. In some years June is the hottest month. This situation is best seen in Baljorashy over an average of four years (Table 5.3). The mean monthly averages stay almost constant over the period from June til September, the reason being the daily cloud formation mentioned above which shelters the ground against further direct heating by the sun. The accompanying rainfall also has a cooling effect.

At the beginning of October there is a definite decline in temperature which is maintained through November. Finally in December the temperature is back to its low winter values. On this basis one can distinguish four seasons; cold winter and mild summer of nearly four months each, associated with cloudiness and varying precipitation, and spring and autumn seasons of just over two months each associated with clear skies and transitional temperature. These features are most apparent in the south and less evident in the far north, i.e. strongest in the Yemen and weakest north of Taif.

The range in the mean monthly values along Assarah is more similar to that of the coast rather than that of the interior. (see Table 5.4) Yet the daily range is smallest in the coast, increasing at the foothills of the scarp and being moderate at the highlands and greatest further east in the interior plateau. Although there is not enough data available on the daily range it seems that the moderate range at Assarah is attributed to the relatively high relative humidity and the cloudiness which invariably damps down the afternoon temperature and sometimes causes warm nights.

TABLE 5.3

TEMPERATURE: MEAN MONTHLY AVERAGE

	J	F	M	A	M	J	J	A	S	O	N	D	
Taif 3-5 years	14	14.8	17.1	18.4	21.5	24.4	25.1	25.1	22.6	19.4	16.4	14.7	19.4
Baljorashy 3-4 years	12.4	11.5	14.2	16.9	19.4	22.7	21.1	21.4	21.1	18.2	15.1	13.2	17.2
Nemas 1 year	10.6	10.3	13.4	15.5	17.5	20.4	21.7	20.9	19	15.7	13.5	11.5	15.8
Abha 3-4 years	12	12.2	14.8	15.1	17.6	20.1	19.8	21	20.4	17.1	14.3	12.8	16.4
Bishah 4-5 years	18.6	19.3	22.9	25.5	28.4	30.4	30.6	30.8	28.4	24.3	21.4	18	24.8

TABLE 5.4

TEMPERATURE: ABSOLUTE MONTHLY RANGE AND MEAN MONTHLY RANGE

	J	F	M	A	M	J	J	A	S	O	N	D
Baljorashy												
ab. m. r.	14	19.8	18.6	17.1	20.2	17.5	17.5	18.2	19	19.6	15.4	19.2
m.m.r.	4.6	10.5	10.8	10.3	11.1	11.8	11.1	12.1	12.9	12.4	10.5	13
Sabia												
ab.m.r.	15.4	15.8	18.6	16.2	21.6	16.8	15.5	15.2	17.8	17.8	17.2	15.4
m.m.r.	8.8	10.6	12.7	11.2	12.1	11.7	11.9	10.8	11.3	11.8	10.4	12
Bishah												
ab.m.r.	23.7	29	21	22	21.8	20.6	20.4	20.2	23.8	23	23.4	26
m.m.r.	12.5	15.7	15.2	13.7	14.5	16.7	15	14.7	17.5	17.3	16.4	18.1

key: ab.m.r. - absolute monthly range
m.m.r. - mean monthly range

The above mentioned annual course of temperature is the general pattern, yet it sometimes exhibits extraordinary extremes or out of season anomalies which often bias the mean values for the longer period. It is perhaps worthwhile here to mention two of such cases which took place during the recent years of record.

During the winter of 1966-67 a severe cold wave swept over the Arabian Peninsula, presumably an expansion of a fringe of the Eurasian high pressure cell. It reached Assarah in February 1967 and persisted all through March. At the time the temperature dropped below zero in most central and northern parts of the country. At Taif the absolute minimum temperatures for February and March were -2.8 and -0.6°C respectively. At Baljorashy although the temperature figures for January and February are not available, owing to a gap in the record, the absolute minimum for March was -1.6°C and at Unaizah in the north central part of Arabia the corresponding figure for February was -2.5°C. This cold wave was in itself void of moisture by the time it reached Arabia. Its effect was further accentuated by low relative humidity at some localities especially over the area extending from Taif to around latitude 19°N. These conditions resulted in a very severe frost not experienced in the area for many years. Water was frozen in pipes and shallow exposed surfaces, deaths of livestock occured and a few people were reported to have died from exposure.

However,the effect of this cold wave was most felt on one night of March when this area experienced the worst frost in a lifetime. Before sunset the sky was clear and the air was very dry and calm. During the night temperatures dropped to below the freezing point. A severe frost resulted which damaged most of the crops and affected even the hardy wild plants. Because this frost coincided with the time when most fruit trees set new succulent leaves, shoots and flowers, the effect was devastating and retarded trees' growth for two and three years. In

the morning the vines and fruit trees not only looked, but also smelled, as if they had been boiled (see Plate 5.1).

The other case occured in Abha during the summer of 1968, though it was not as striking and not at all harmful. The temperature returns for that summer showed abnormally low values through the period from May till July. The mean monthly temperature for July was only 1.1°C higher than that of January (Table 5.5). The likely explanation of this is that the southwestern monsoon was unusually pronounced bringing along cloudy and rainy weather which kept the ground from the direct heat of the sun. This assumption is supported by the high rainfall figures for the summer of 1968. The total precipitation for the period from April to August was 388 mm., slightly above the annual average, and about 62 % of that year's total rainfall (Table 5.10). This is even more evident in the sky conditions (Table 5.6). Although there is no sky condition or cloudiness recording in Abha itself, the record for the neighbouring town of Khamis Moshait (30 km. east of Abha) indicates high cloudiness with no single completely clear day all the year round; 75 cloudy days occured during the period from April to September against 48 for the other half of the year. The remaining days are recorded as partly clouded (Table 5.6). If this is the case for Khamis Moshait, it must have been even more cloudy at Abha.

TABLE 5.5

RANGE BETWEEN MEAN MONTHLY AVERAGE OF JAN. AND JULY

Station	1966	1967	1968	1969	1970
Taif		10.8	9.2	12.4	
Baljorashy			10.6	9.6	
Nemas				11.1	
Abha		7.8	1.1	11.4	
Bishah	11.8	12.2	10.9	13.0	
Sabia				8.2	

Plate 5.1 Grape vine in Baljorashy affected by severe frost

TABLE 5.6

SKY CONDITIONS AT TAIF AND KHAMIS MOSHAYT 1968

	Number of clear days		Number of partly cloudy days		Number of cloudy days	
	Taif	Khamis Moshayt	Taif	Khamis Moshayt	Taif	Khamis Moshayt
J	2	-	25	17	4	14
F	3	-	23	16	3	13
M	4	-	27	27	-	4
A	5	-	15	19	10	11
M	-	-	12	12	19	19
J	1	-	25	22	4	8
J	-	-	26	13	5	18
A	-	-	30	19	-	11
S	-	-	26	23	4	8
O	3	-	28	31	-	-
N	-	-	20	21	10	9
D	-	-	28	23	3	8
Total	18	-	285	243	62	123

Source: Statistical Yearbook 1969, Saudi Arabia

TABLE 5.7

WIND DIRECTIONS IN KHAMIS MOSHAYT AND TAIF 1968

	Khamis Moshayt		Taif	
	Prevailing	Maximum	Prevailing	Maximum
J	SW	SSW	S	SSW
F	S	S	S	$NW
M	SSW	W	S	W
A	SW	W	W	W
M	SW	NNE	S	W
J	SW	NE	S	W
J	WSW	SSE	S	E
A	W	NE	S	S
S	NNW	NE	S	SSW
O	W	NE	S	NW
N	SW	NW	S	W
D	WSW	W	W	W

Source: Statistical Yearbook

RELATIVE HUMIDITY:

One of the determining factors in the presence or absence of moisture in the air is the prevailing wind which in Assarah is originally maritime and from southwest (see Table 5.7). Although the water expanses of the Red Sea do not contribute very much to the amount of rainfall, they play a major role in increasing the water vapour load in the air layer near the ground along the coastal plain. When this layer rises up the escarpment it experiences a substantial drop in temperature of 8-10°C on average causing a rise in relative humidity. In other words the relative humidity is very high along the coast owing to high absolute humidity, then it declines considerably along the foothills of the escarpment because of a decline in the amount of water vapour without corresponding decline in temperature. At the top of the escarpment the relative humidity increases again, as a result of a drop in the temperature without significant drop in the absolute humidity. Further towards the interior the relative humidity once again drops (see Fig. 5.4 & 5.3D).

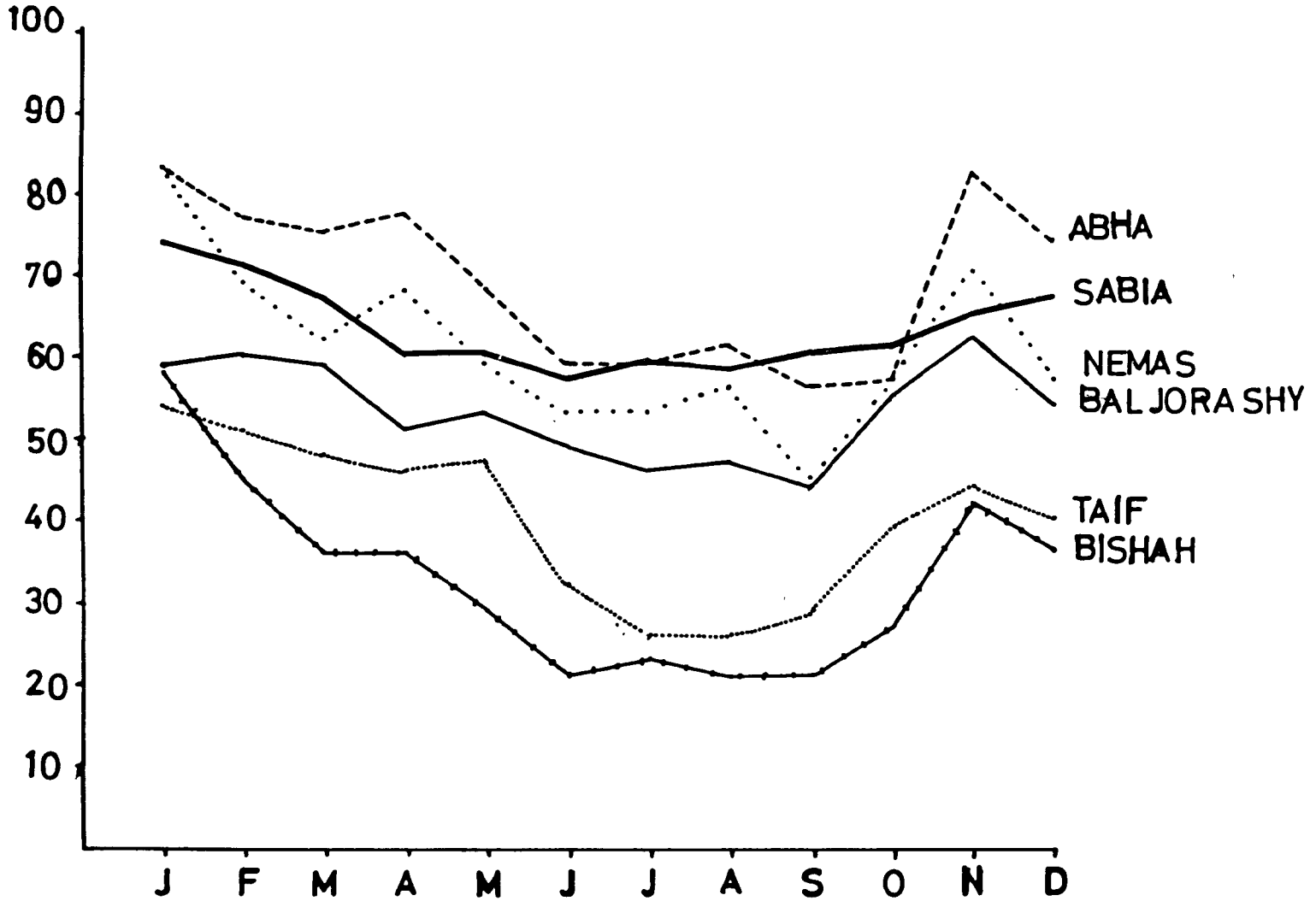
This type of relative humidity which is neither too high nor too low tends to mitigate the worst effect of both summer heat and winter cold, thus giving Assarah the most bracing weather conditions in Arabia in the summer, especially when contrasted with the enervating hot and humid coastal areas or the scorching heat of the interior.[1]

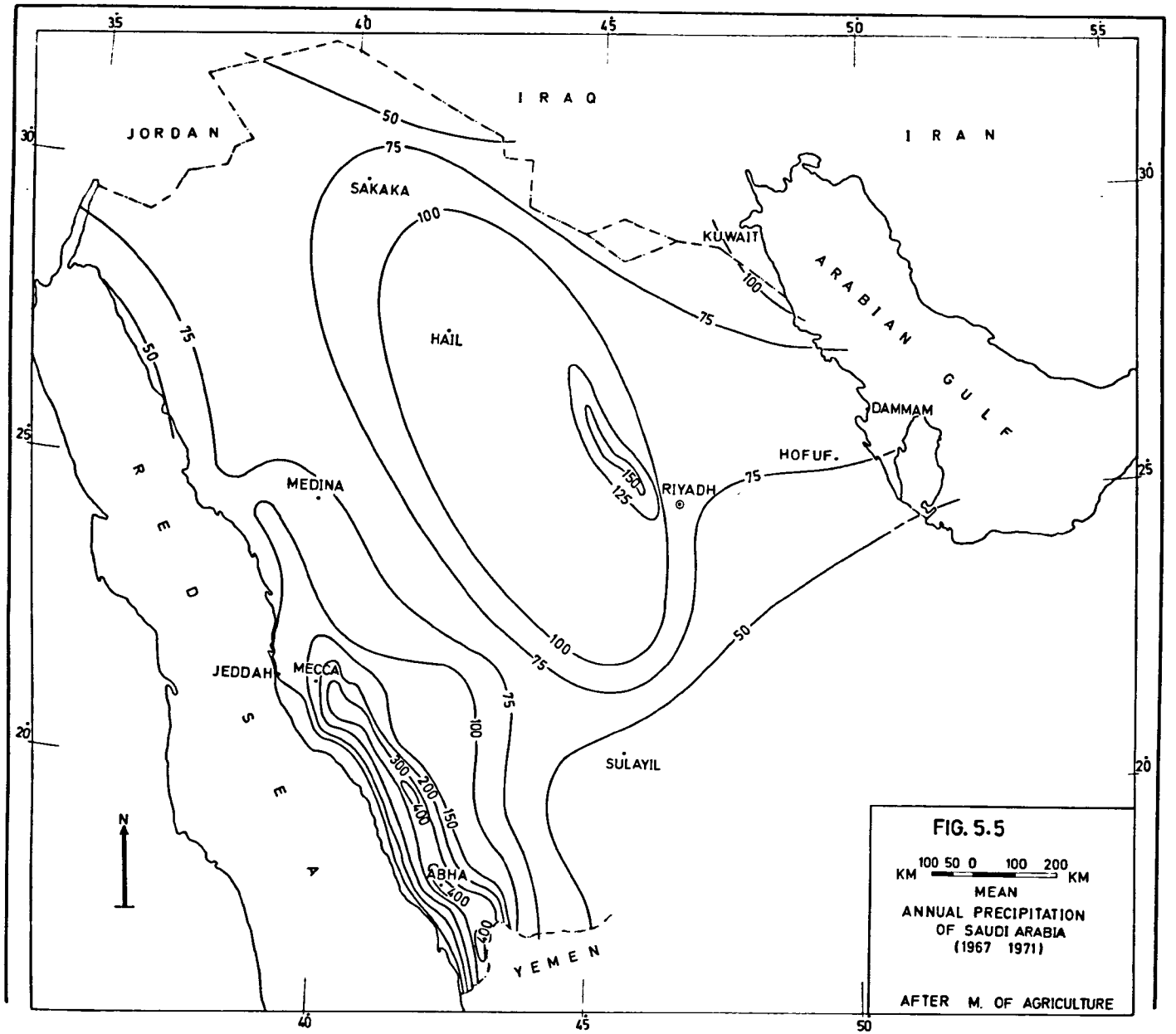
PRECIPITATION:

Favoured by its elevation and geographical alignment, Assarah, with its continuation in the Yemen, enjoys the highest amount of rainfall in the whole of the Arabian Peninsula as clearly shown in the general map of isohyets (Fig. 5.5). When comparing this map with the general map

1. Naval Intelligence Division (British Admiralty) 1946 Western Arabia and the Red Sea p 153.

FIG. 5.4 RELATIVE HUMIDITY




IRAQ
JORDAN
IRAN
SAKAKA
KUWAIT
ARABIAN GULF
HAIL
DAMMAM
HOFUF.
MEDINA
RIYADH
RED SEA
JEDDAH
MECCA
SULAYIL
ABHA
YEMEN
N
FIG. 5.5
KM 100 50 0 100 200 KM
MEAN
ANNUAL PRECIPITATION
OF SAUDI ARABIA
(1967 1971)
AFTER M. OF AGRICULTURE

of topography (Fig. 4.4), the similarity between the contours and isohyets becomes so striking that they almost coincide, demonstrating the consequential role played by the elevation. The rainfall genetics are of varied nature; cyclonic from the north and monsoonal from the south but nearly always orographically modified.

The total amount of the mean annual rainfall between parallels 20°30" N and 15°30" N, i.e. between Bani Malik territory in Saudi Arabia and Sana'a in the Yemen shows little variations (Table 5.8). The rather high value for Azzafir is unreliable, probably exaggerated, and the value for Nemas is only for two rather wet years. Yet the variability within one single year over the whole area differs between north and south. The area north of lat. 19°N seems to relate to the winter maximum area in the Mediterranean region rather than with the neighbouring southern areas. Equally the area within the Yemen seems to relate to the monsoonal region in Ethiopia rather than with the northern parts of Assarah. This leaves the area between parallels 17° and 19°N as a transitional area. The effect of this on the discrepancy between the variations of anyone year and the mean annual variations is that when, for example, the monsoon fails it will be reflected very markedly in that year's total in the southern area. Likewise, when the winter rain fails it will affect markedly that year's total only in the northern parts (Table 5.11). Having equal changes of success or failure,these variations may not affect the mean annual in any considerable degree. This phenomenon is best exampled by Abha town in the middle of the transitional area. For some years it experienced totally dry summers (June to September) and for some years totally dry winters (November to February) without any pronounced difference in the annual totals. It also explains the seasonal variability from near nothing in some years to well above the mean annual in other years. In Abha for instance in the winter of 65-66 the months of November to February were virtually rainless (only 16mm which

TABLE 5.8

ANNUAL RAINFALL IN ASSARAH (in mm)

	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	Average
Taif											395	247.4	418.5	269.6	162.5	298.6
Taif Airport						132	103.3	496	119	188	138.2	114	453.2	208.3		216.8
Azzafir		188.7	495.3	850	521	880	551	438	368	557	281	360	420			492
Baljorashy						275.1	241.9	261	384.8	311.8		443.1	471.9	435.6	414.6	359.9
Nemas															427.7	484.6
Abha	252.6	396.1	348.1	155.9	181.4		834	738.2	315	166.6	183.3	437.6	625.5	370	336.2	384
Khamis Moshayt												246.6	262.9	307.9		272.4
Bishah		59	47.7	45.1	67	484.8	326.2	203.7	120.2	32.2	81	119	237.7	68.8	84.3	149.9
Sanāa								434.6	385.7	347.9		397	233.3			359.7

Source: Compiled from various sources including Ministry of Agriculture, Ministry of Defense and FAO

TABLE 5.9

RAINFALL IN ABHA FROM 1956 - 1969

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1956	54.5	0	4.7	35.0	7.0	7.0	82.1	62.3	0	0	0	0	252.6
1957	0	30.8	78.5	146.4	38.8	0	12.5	89.0	0	0.1	0	0	396.1
1958	177.9	21.0	25.2	18.2	0	15.0	28.0	15.0	0	0	37.0	9.0	348.1
1959	24.0	0	17.0	0	6.0	0	16.5	67.0	0	0	18.0	7.4	155.3
1960	0	0	48.5	20.0	90.4	0	8.0	14.5	0	0	0	0	181.4
1961	data not available												
1962	23.0	52.0	179.0	103.0	72.0	25.0	23.0	57.0	0	0	290.0	10.0	834.0
1963	130.0	60.0	0	293.1	11.0	0	20.0	144.1	0	0	68.0	12.0	738.2
1964	90.0	10.0	0	125.0	0	0	0	0	0	0	0	90.0	315.0
1965	0	22.0	0	42.0	5.0	22.0	19.0	38.5	0	18.0	0	0	166.5
1966	0	16.0	5.0	23.0	0	32.0	48.0	12.0	0	17.0	30.0	1.3	188.3
1967	0	0	18.0	110.0	31.0	6.0	59.0	45.4	14.0	0	152.2	0	437.6
1968	7.0	7.0	2.5	95.0	128.0	79.0	73.0	18.0	0	0	24.0	0	625.5
1969	57.0	57.0	33.0	59	39.0	0	53.0	63.0	0	0	0	0	370.0
Mean	43.3	37.2	31.6	84.3	32	13.9	32.9	48.2	1.0	2.7	47.6	9.9	585

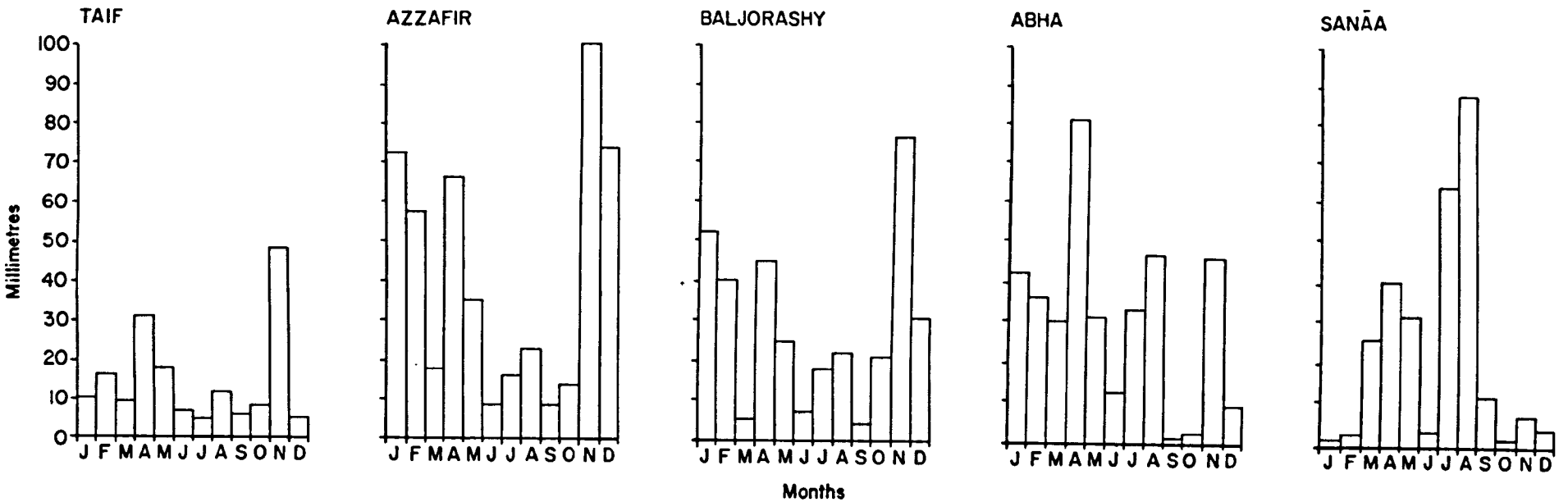
Source: Ministry of Agriculture, Hydrological Division

fell in February) contrasting with the winter of 62-63 where the same four months experienced 490 mm. On the other hand the seven months from May to November 1964 were virtually rainless while the total annual for that year was about average 315 mm. In contrast, the four months from May to August 1968 were responsible for 293 mm (Table 5.9). This peculiarity is not to be found anywhere else in the region. In fact the stations in the northern half of Assarah never in the period of records have experienced total winter rain failure, although it can be little or slightly off season. Likewise in the Yemen the summer rainfall has never totally failed during the period of available record. However unscientific it may be to draw such a generalization from such a short record - 12 years at Azzafir and 16 years at Sana'a - it is a good indication nevertheless. So the mean monthly averages for Abha are more illusive than that of Baljorashy, Azzafir or Sana'a. The mean monthly average for November in Abha is about 47mm which may well disguise the fact that in six years out of thirteen rain failed to take place in November and the fact that in 1962, November alone produced 290 mm of rainfall.

The Annual March of Rainfall:

Figure 5.6 shows a distinct and recognizable pattern with three peaks; one in the winter, from November to February with November having the highest amount, followed by a decline in March. The second peak is in April and May followed by a pronounced decline in June. The third peak occurs in July and August followed by two almost dry months - September and October - before the winter rains start again. The important regional variations in this regime are the inverse correlation between summer and winter rains. Whilest the former is proportionately highest in the south, decreasing as you go northwards, the latter is proportionately highest in the north decreasing as you go southwards

Fig 5·6. RAINFALL- Monthly average at various stations in Assarah



(Fig 5.6). This pattern is clearly related to the southwestern monsoon in summer and the Mediterranean disturbances in the winter.

The spring rainfall, March to May, is the most difficult to explain; for one thing it does not show any correspondence with either the winter or the summer rainfall, for the percentage of spring to annual rainfall is exactly the same in Taif and Sana'a - namely 34% (Table 5.10). Furthermore, it does not have a pronounced relationship with elevation; April is the highest monthly average in Bishah at an altitude of only 1040 m. for instances.

TABLE 5.10

SEASONAL RAINFALL PERCENTAGE OF THE MEAN ANNUAL

	Oct-March	Oct-May	Nov-Feb	Mar-May	July-Aug
Taif	55.3	84	45	34	9
Azzafir	68.3	89	62	24	7.6
Baljorashy	65	85.1	57	21	11
Abha	44	74	35	38	21
Bishah	44.2	89.5	35	52	9
Sana'a	16	41.5	6	34	52

However, since no explanation is available to account for this spring peak one can only speculate until more detailed information becomes available allowing more accurate assessment. To my mind this April peak could be related to the Mediterranean cyclogenetic disturbances which reach their highest frequency during March and April according to Gleeson.[1] Yet if we are to accept this theory we must also accept that the high elevation in Assarah provides both physical and thermal variants which trap and reactivate the out-flow fringes from the Mediterranean

1. Trewartha, A.T. 1962 op. cit., pp 229-32.

disturbances. This could well be the case, at least as far south as latitude 18°N. Since these outflows often come from north and north-westerly direction i.e. parallel to the mountain range axis, they could easily penetrate over the mountains into the interior because the mountains here do not pose a real barrier. The rather local low which develops over central Arabia may also trap some of these out-fringes from the late Mediterranean cyclones and the early monsoon winds accounting for the more regular April rainfall all over the country. In the area south of latitude 18°N this spring peak could be related to the southeast monsoon which bring the Little Rain to Ethiopia.[1]

Beside these three maxima there are two minima or low rainfall periods; one persisting during September and October, prolonged or shortened according to the weakness or strength of the two adjoining rainy periods. When the summer rains fail - most likely in the north-, or when the winter rains fail - most likely in the south -, this dry period may expand to five or six months of severe drought. The second dry period is June which separates the spring rainfall from the summer rainfall.

Precipitation Forms and Behavior:

By and large, the rainfall in Assarah is orographic mainly because the prevailing winds are northwesterly, westerly and southwesterly where their trajectory with the high escarpment favours convective rain formation. Yet the cyclonic influences are evident in the thunder storms associated with heavy showers of short duration and sometimes with strong winds all over the peninsula.

Hail can occur at any time of the year and has been observed in all seasons. It appears to be associated with the local cyclonic disturbances

1. FAO 1960 Report of the FAO Mission to Yemen ;Naval Intelligence Division 1946 op. cit., pp 178-9.

whenever they develop rather than with one particular season in the year. A single storm may sometimes produce hail without any rain; sometimes it is followed or proceded by rain. The size of the hailstones varies considerably from a few millimeters to ~~over an inch~~ two cm. in diameter. Hail is always unwelcome among the peasants because it nearly always has some damaging effect which can hardly be balanced by the moisture it brings. It hurts people and animals, it damages crops, but most of all it ruins fruits and vegetables. Worse still is that the resultant damage is not proportional to the amount of hail falling, because the first minute or so does nearly all the damage. The amount of hail varies from light showers barely covering the ground to heavy showers reaching a foot thick. One of these heavy showers which took place fairly recently is that of the early months of 1971 which was reported to have reached about one foot at Al-Bahah north of Baljorashy.

Unlike the hail, dew is beneficial and highly appreciated by the local peasants especially in summer and autumn when it is most needed. In this respect the Naval Intelligence Geographical Handbook states that "dew in Arabia is often copious enough to take the place of rain in the economy of vegetation."[1] In the summer of 1970 I was able to observe more than twenty occurances of heavy dew at Baljorashy over the period from August to November. By heavy dew is meant condensated water droplets on alfafa which were so copious that they gave a silverish colour after the sun-rise making the ground below the grass wet, and persisting until midmorning before completely evaporating.

Its effect on the moisture balance, however minor or marginal its amount may be, is of real significance. The amount of dew moisture utilised by the plant during one or two nights may be the only moisture available to sustain plant life until rainfall takes place. This is specially so with the rain fed crops. In the case of irrigated crops it

1. Naval Intelligence Division 1946 op. cit., p. 132.

is practically proven that the dew does help prolong the intervals between waterings and consequently saves irrigation water. Although measurements are lacking, the vigourous appearance of the plants even at mid-day after dew has fallen compared with the near wilt of plants when or where no dew has taken place, leaves one in no doubt as to the significance of the dew contribution to the plant moisture balance. Fisher indicates that in some areas of the Middle East "dew falls provides as much as 25% of effective moisture usable by plants."[1]

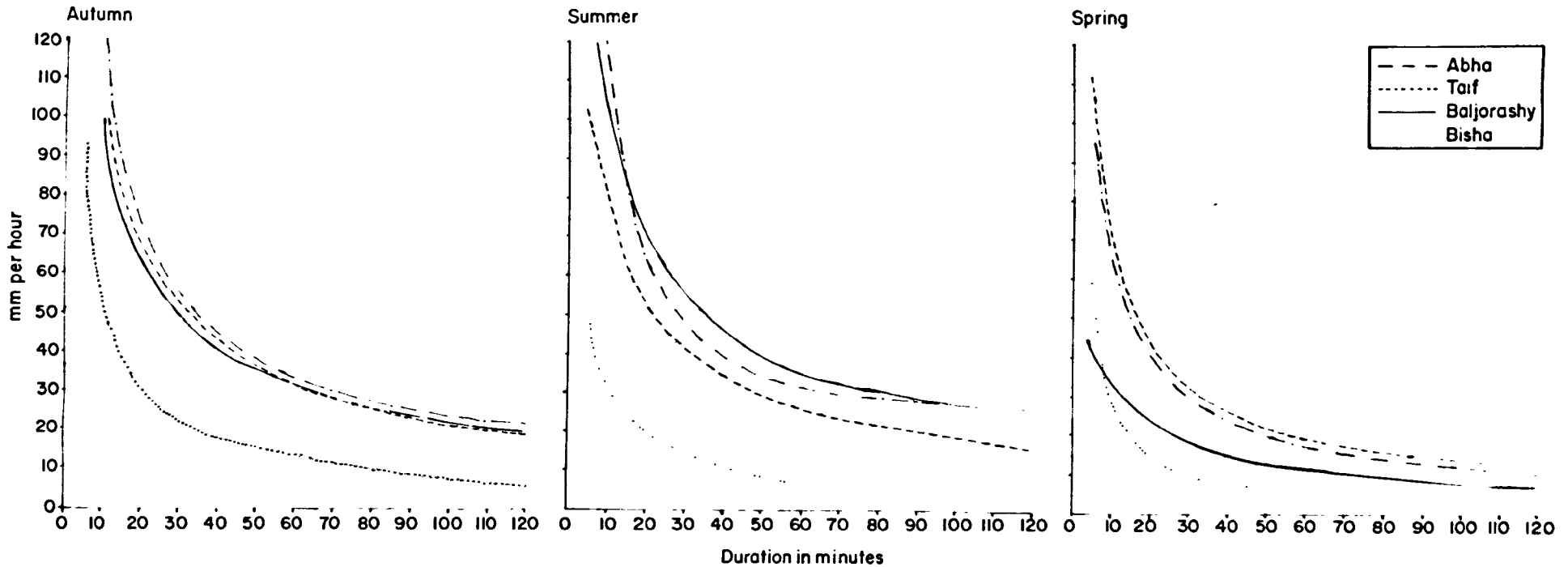
Fog drip and fog are also frequent phenomena recurring at the highest season of the rainfall both in winter and summer. Although they reduce visibility considerably, they do provide an appreciable amount of moisture to the plants. When fog drip is associated with some light drizzle which is usually the case, the moisture becomes more plentiful and most effective especially when it persists for a few days. Under such conditions the evaporation and transpiration are reduced to a minimum and the gentleness of the rain droplets does not provoke erosion. Consequently run-off is reduced to a minimum and perculation takes place slowly but effectively. However, this form of precipitation has some bad effects specially when it persists more than one day. It restricts the activities on the fields and can cause some damage to crops at harvest time. Owing to the fact that most houses are beams-and-mud roofed the percolation tends to take place in the roofs causing dripping inside.

Intensity:

In addition to what has already been said concerning the low intensity forms of precipitation as fog-drip, dew and mist, the actual rainfall occurs in a wide range of intensities. The only intensity record available for Assarah is given in intensity curves in Figure 5.7. Also

1. Fisher, W.B. 1971 op. cit., p. 64.

Fig 5·7 Rainfall Intensity Curves



as an indirect indication of rainfall intensities is the number of rainfall occurrences and amount as shown in Table 5.11. Table 5.12 records the occurrences of rainfall of 100mm or more, which is indicative of the intensity. From rainfall duration records at An-Nemas for Jan., Feb., and March 1969 which can be considered as reasonably typical of the region, we see that the intensity ranges from 0.096 mm/min. extending over ten hours to 2.2 mm/min. lasting only for a minute. These two extremes should not be considered the absolute extremes either for An-Nemas or for the region beyond. On the 9th of January 1969 an intensity of 11.5 mm/5 mins were recorded, but when compared with other observed, but not recorded cases, it did not seem exceptionally high.

Another aspect of the intensity is the great variability both within the time duration of the occurrence and the areal extent of the rain shower. Although the latter can be said to be represented, if only partly in the rain gauge readings, the former is not, so sometimes the range of intensity within the same rainfall occurrence is just as wide as between various occurrences. This is especially so if the occurrence is of long duration, in which case the rain usually comes in short spells of heavy showers within the continuity of less intense rainfall rather than in a homogeneous intensity.

Areal Extent of Precipitation:

The areal extent of any particular rainfall exhibits a pattern not unusual for the arid and semi-arid areas the world over; namely the sporadic nature and clear cut boundaries of the rain shower areal extent. While a locality may get a heavy shower resulting in flood, an adjacent area a few hundred meters away may stay not only dry and rainless, but even sunny. Sometimes particular weather associated with

TABLE 5.11

RAINFALL OCCURRANCES

	Baljurashy				Abha			
	1969		1970		1969		1970	
	Rainfall in mm.	No. of Occur-rances	Rainfall in mm.	No. of Occur-rances	Rainfall in mm.	No. of Occur-rances	Rainfall in mm.	No. of Occur-rances
J			147.8	5			49.4	4
F			-	-			4.5	1
M			91.5	4			131.7	5
A			1.5	1			9.3	3
M			4.1	2			13	4
J			-	-			11	5
J			59.5	4			50	11
A			-	-			43.7	6
S			5	1			13.4	4
O			2.5	1			0.5	1
N	12.4	3	64.6	7	0.5	1		
D	1.0	1	38.1	5	-	-	1.6	2
Total			414.6	30			328.1	46

TABLE 5.12

ONE DAY RAINFALL MAXIMA IN ASSARAH

Station	Date	One Day Rainfall	Same Month Total
Abha	12-2-1968	131.8	230.7
Bani Malik	18-4-1968	158.7	230.5
Taif	19-4-1968	120.3	226
Shafa	18-4-1968	115	176
Lyyah	18-4-1968	100.2	126.2
Ackraman Dam	18-4-1968	117	216.4
Wadi Wajj	18-4-1968	112.4	199.7
Biqran	18-4-1968	100.5	196.1
Alaya	19-1-1970	102	163
Sarat Abidah	3-3-1970	150	252.2

rain formation conditions may have a wide and complete influence over the whole region or at least a considerable part of it. An example of such conditions happened on the three days of April 1968, 17th, 18th and the 19th where the majority of rainfall gauges stations all over the country recorded well over half their annual averages in April alone, most of which fell in these three days. Indeed most of the extreme one-day precipitations coincide with this period particularly in the Taif area (Table 5.12.).

All signs indicate that the rainfall which fell during April 1968 belonged to the same climatological origin and, at least during these three days overwhelmed the whole of Assarah. In contrast the annual rainfall values for some stations in close proximity exhibit a pronounced range which can only be attributed to the great areal variability mentioned above. For example the two stations of Baljorashy and Ajaeda recorded total annual in 1970 of 414.6 and 226 mm. respectively despite the fact that they are both at the same altitude and only a few kilometers apart.

Seasonality:

It is absolutely essential to appreciate the significance of and the role played by the seasonality of rainfall or the lack of it in order to understand the behavior and temperament of such erratic and unpredictable climatic phenomena. It is often stated in climatological literature that the rainfall in arid and semi-arid areas of the world is highly variable and characteristically fluctuating. Little has been done in the way of developing a technique which would help predict the precipitation within the season. In fact the farmer's need is immediate. He would very much like to know what kind of season he is going to undergo so that he can prepare for it rather than to be merely told that rainfall variability in his area is 30 or 40%. Nor is it of much

relevance to his practical needs to be told that the frequency of the occurrance of more than 100 mm of rain in November, for example, is one in ten. To him this is merely a sophisticated statement of the obvious; he knows only too well how unreliable the rainfall is, but he does not know what to expect at one particular season.

In Assarah the winter rainfall - November to February is the most reliable. Not only does it start the agricultural calander but also it represents the surplus period in the hydrological balance sheet. The reliability of winter rain is nearly the same from Taif to Belasmer, because the distance to the south is compensated for by the higher elevation and the wider areal extend of highland. South of Belesmer this reliability begins to weaken but it does not dwindle to an uneffective degree until well inside the Yemen. The area from Abha to Sada represents the area of seasonal regressional overlapping (Fig 5.8) where the reliability of seasonal rainfall is very much reduced although this is not reflected in the annual figures (Table 5.8).

Another relevant and equally important aspect of winter rainfall is its timing. When it takes place too early or too late in the season it might have as little effect as if it did not take place at all, at least from the agricultural point of view. Indeed the timing of winter rain is more elusive because it originally stems from characteristically irregular cyclonic and occasional frontal disturbances. In other words it could take place any time from October to February with November and January having higher probabilities. This, of course, results in great expectations on the part of the farmers as to when they are to get this all important rain and consequently what decisions they ought to make.

The summer rainfall has less a decisive effect on cropping, because it is rather limited in amount, contributing only marginally to the moisture balance sheet, and the farmers do not depend on it too a great

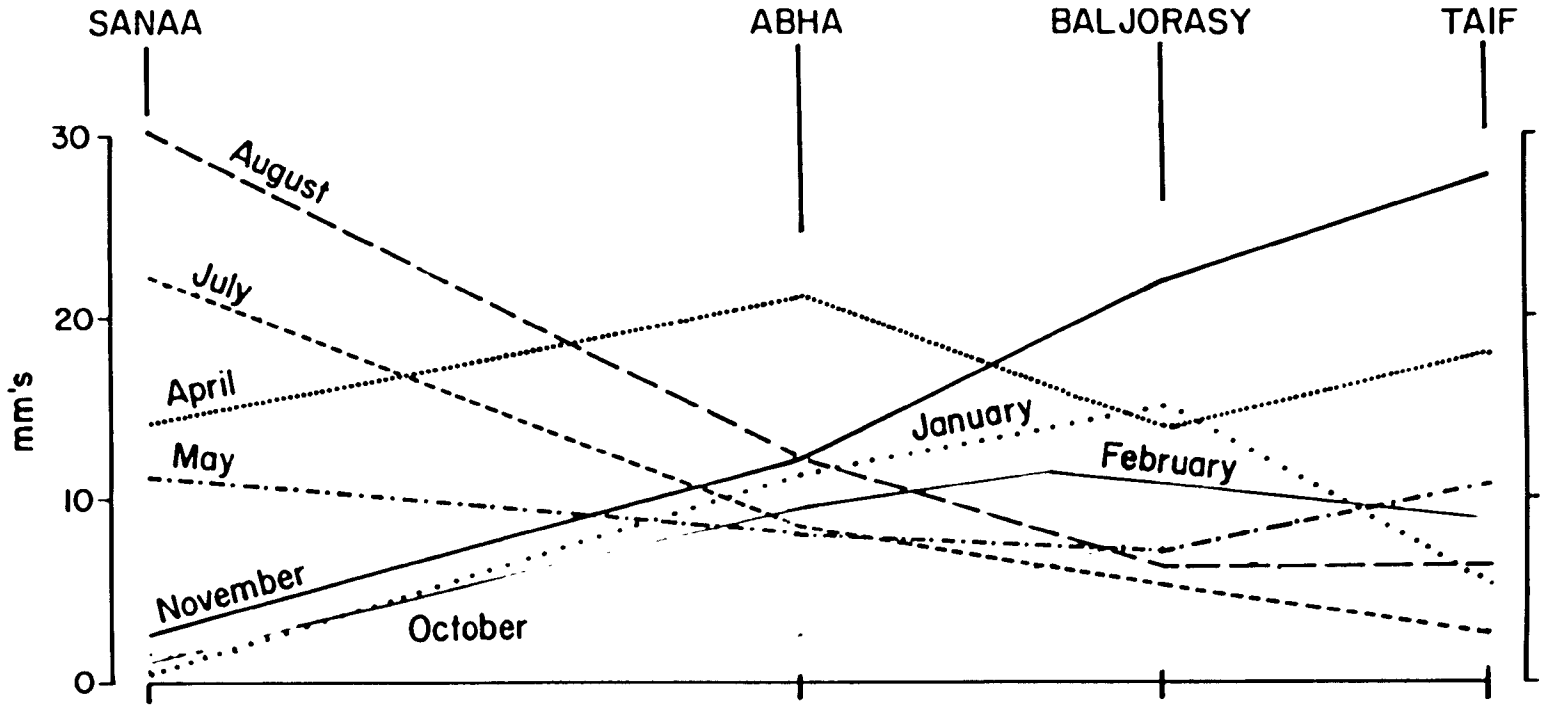


Fig 5·8 Rainfall — seasonal regressional overlapping

extent, certainly not as much as they depend on the winter rain. This applies more specifically to the Saudi part of Assarah. Yet the occurrence of several showery afternoons in July and August is almost certain. The above mentioned criticality of rainfall timing and its relevance to cultivation and cropping times is illustrated by the daily rainfall of 1970 (Fig. 5.11).

Annual Fluctuations:

There is an ample amount of evidence that the rainfall fluctuates from year to year. This is definite and tangible and requires our attention because of the direct influence it has on the present day farmer. Figure 5.9 presents the percentage deviation from the mean annual rainfall. Whether this year-to-year fluctuation is only a minor pulse in a wider and long-intervalled remittent tidal rhythm is still debatable though probable.[1] In this respect the available record does not lend itself to investigation simply because it is not long enough. Nevertheless it seems from the experience of the local population and from various historical sources[2] that there are two vaguely recognizable cycles in rainfall fluctuations.

The first is a short one making a full circle every eight years, consisting on average of two or three consecutive years of below average rainfall and two or three consecutive years above average. An anatomic analysis of a trunk of a 100 year old Arar tree (Juniperus procera) from Assarah has indicated the reality of this cycle,[3] whilst a study of some history books has led to a similar conclusion. The other cycle is more

1. Miller, A.A. 1965 Climatology (Methuen) pp 283-291; Crowe, P.R. 1971 Concepts in Climatology (Longman) pp 483-500.
2. Nass, I. 1970 "The Physical Disposition of Najd Region" (in Arabic) Bulletin of the Faculty of Arts Vol 1, pp 9-37.
3. Ibid.

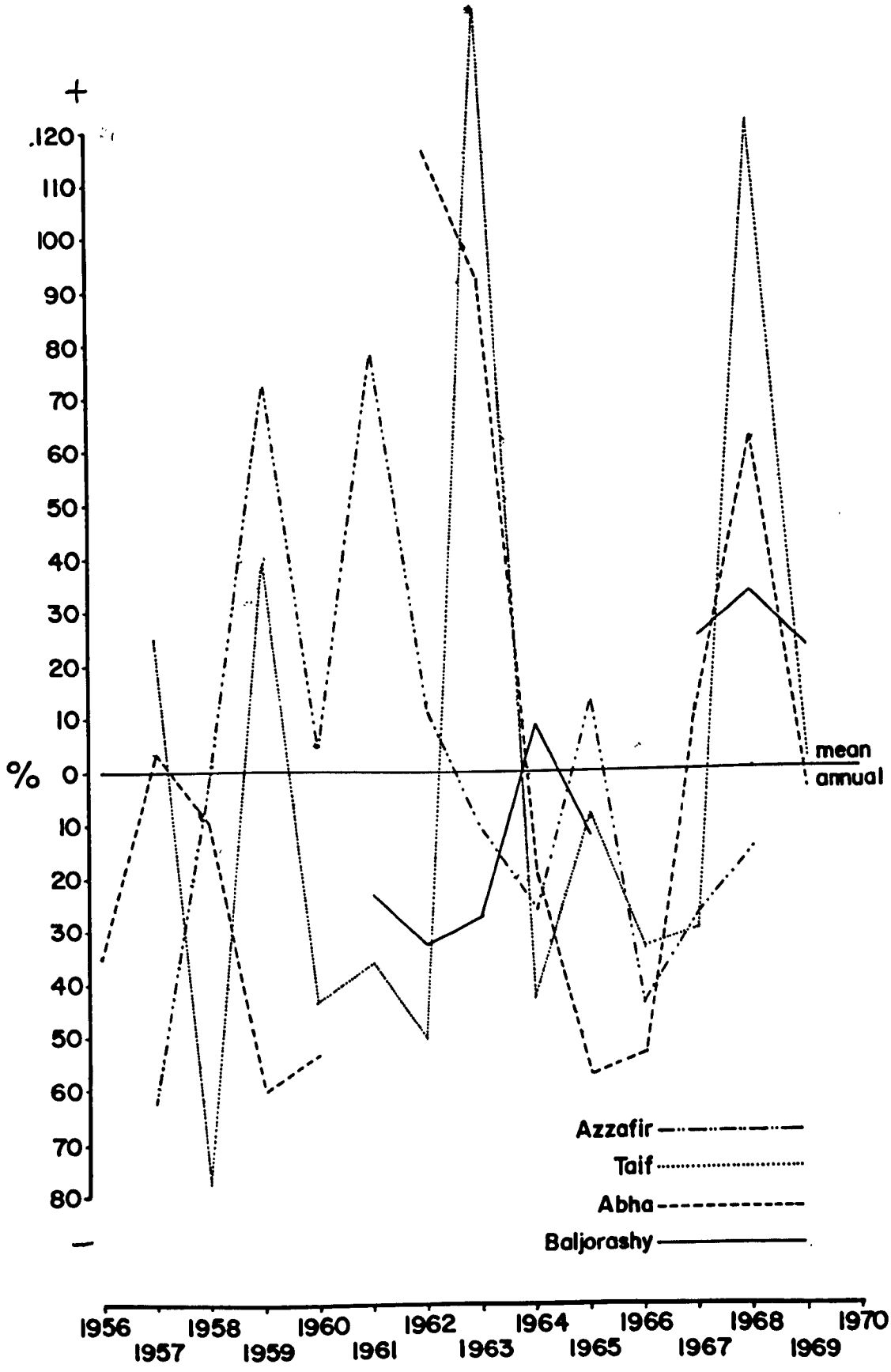


Fig 5·9 Rainfall—percentage deviation from the mean annual

deceptive in its rotation because of the other circumstances which it coincides with, such as the dry or the wet peak of the smaller cycles. It is believed to take place every forty to fifty years and may be longer. This cycle is historically important because during these periodic severe droughts starvation takes place and many people die or suffer as a result. If such droughts also coincided with epidemic diseases or other natural hazards the death rate rose rapidly and population increase was checked severely. Such bad years remain so vivid in the memory for several generations that the people consider it as a point of reference in their history to which they date and relate things and events (see Chapter X). Any attempt to infer a pattern of these two cycles by extrapolation from the nearest localities which keep a longer record, such as Jerusalem, should be approached with great caution, because Assarah as stated above does not fall under one particular climatic domain so as to permit such extrapolation.

As shown in Table (5.8) the annual variations exhibit great extremes. Azzafir, for example, has recorded annual rainfall as low as 188.1 mm. and as high as 880 mm.; the two extremes for Baljorashy are 234.1 mm. and 471.9 mm. with a probable error in both recorded values suggesting that the figures are something like 200 mm. for the lowest and 600 for the highest. In Taif the extremes are 162.5 and 418.5 mm., while in Abha they are 155.9 and 834 mm. Considering that all these extremes were experienced within the span of five to ten years, a greater range cannot be ruled out in longer periods.

Also, it appears that the further outside the core of the region, the greater the range. Bishah, for example, which is in a transitional location towards the extremely arid region, recorded 484.8 mm. in one year, and only 32.2 mm. four years later. A relevant point here is to emphasis that in order to develop anything close to a prediction tool,

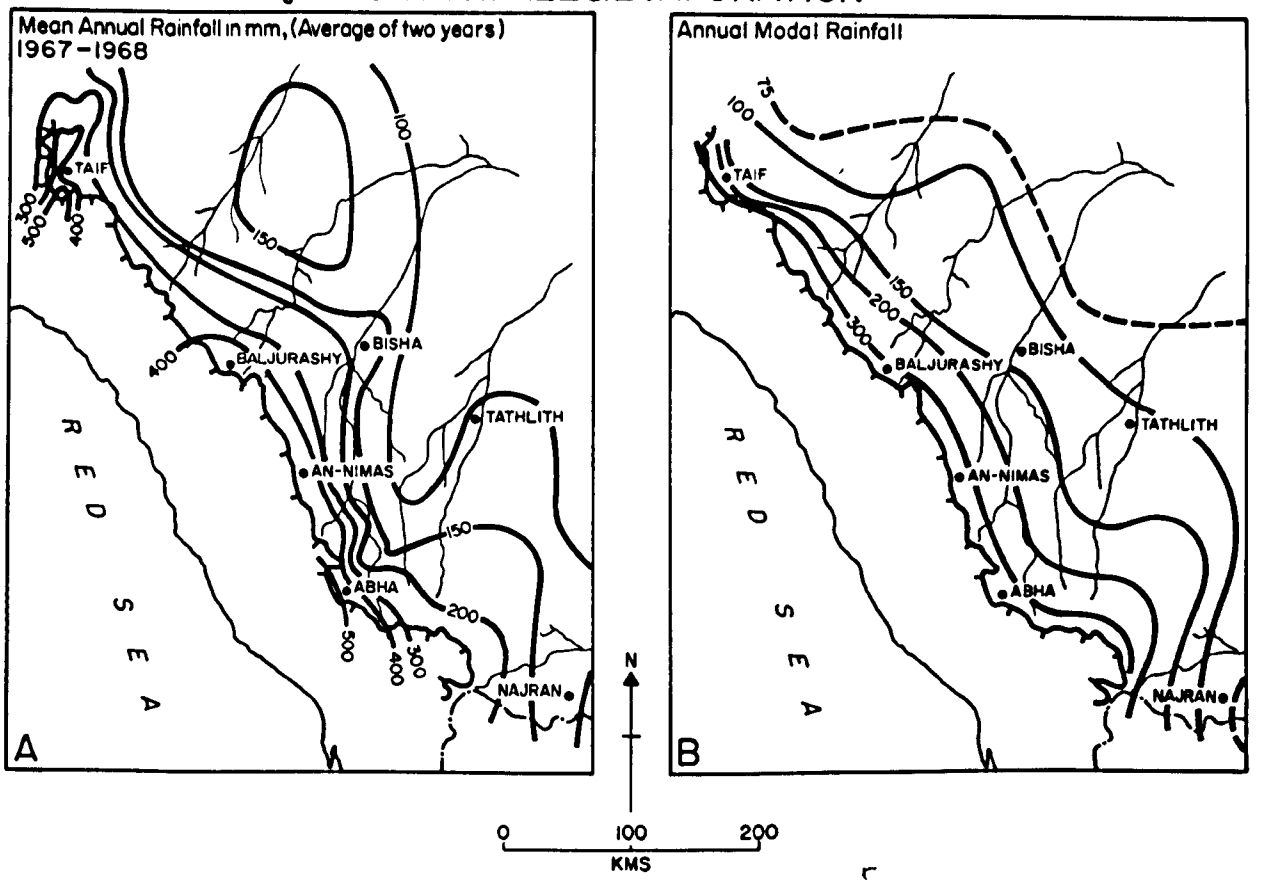
several important factors have to be born in mind; the universal fluctuating factors such as sun spots, the regional fluctuating factors such as the Mediterranean depressions and the monsoon, and finally the local factors. The significance of these inter-related factors would be more readily appreciated when noting that both positive and negative extremities of both regional regimes can come about as a result of universal causes or evolve independently. In both cases they can coincide or alternate, and the greater the coincidence the greater the extremity.

Precipitation Effectiveness:

Generally the effectiveness is measured by the amount of moisture available to the plant. In systematic terms there are factors which increase the positive effect of precipitation and others which reduce it. Climatically, high intensity of rainfall and high temperatures reduce the moisture reaching the plant by increasing rates of run-off and evaporation. In Assarah this means that the winter rainfall is more effective than the summer rain and the rain at a high altitude - over 2000 m. - is more effective than on the low plains and foothills. Also the nocturnal rain is more effective than the durnal rain and the long duration drizzle is more effective than the intense thundershower. As far as the loss of moisture through evaporation is concerned Assarah has the lowest evaporation rate in the country although the basic potential evaportranspiration still exceeds the annual rainfall (Fig 5.10).

An important factor which determines the effectiveness of precipitation from the agricultural point of view is its timing. As shown in Figure 5.11 the bulk of the rains fall in less than ten days of the year. There is a certain threshold that rainfall must exceed before fields can be ploughed. Although this threshold depends on soil characteristics it

Fig.5.10 RAINFALL & EVAPORATION



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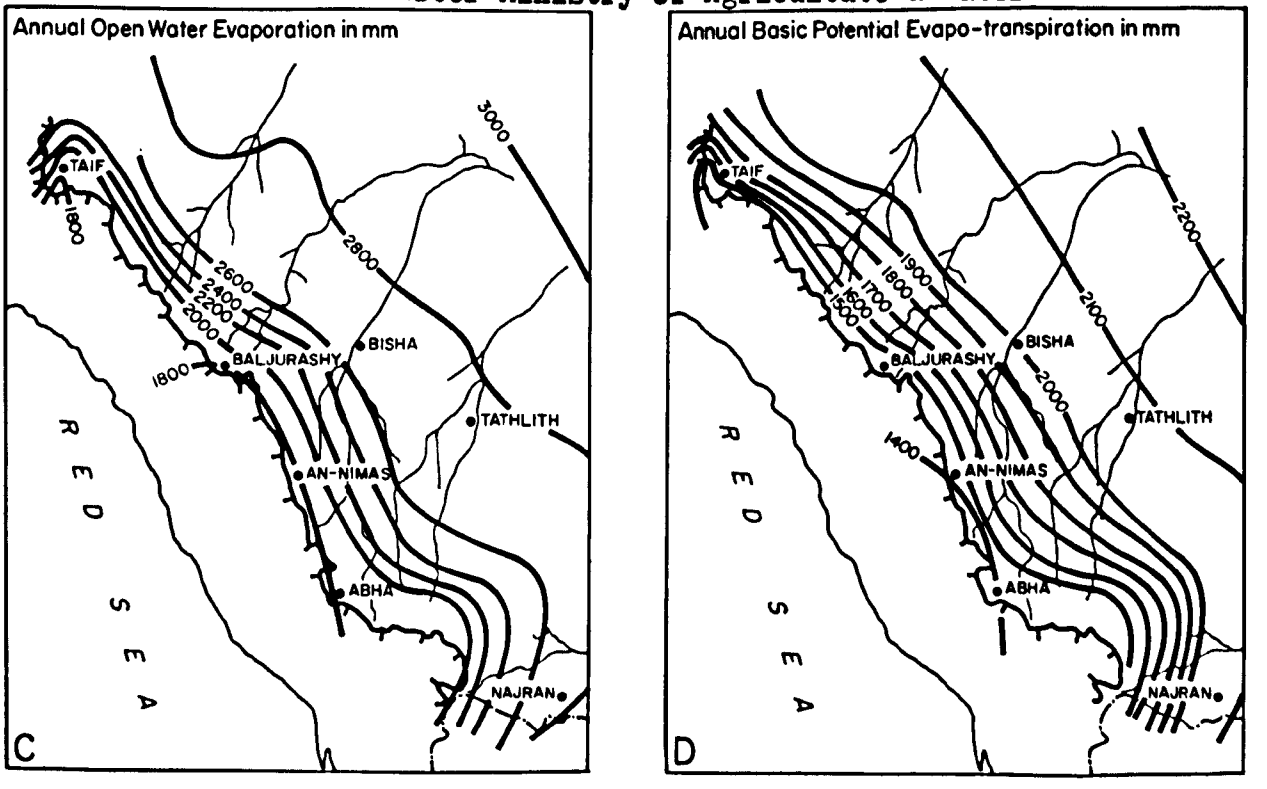

DAILY RAINFALL AT TAIF, BALJORASHY AND ABHA 1970

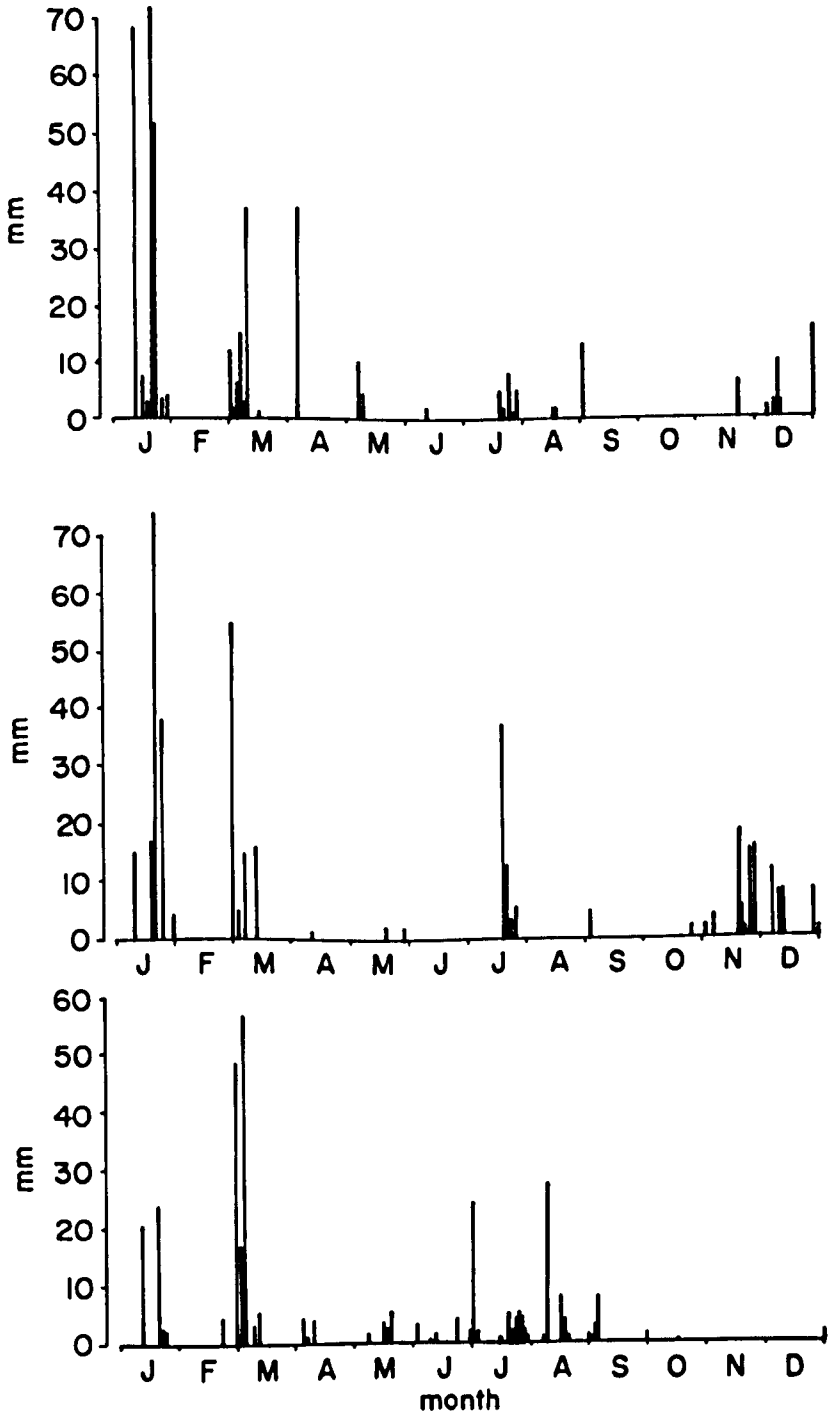

Fig 5·11

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is certainly higher in summer than in winter. Sometimes the farmer has to rely entirely on anticipation. If the rain does not come in sufficient amount in November and December, he will sow and plough his fields in the hope that rain will come in January. If it has not come by late February or March, it is too late and he has wasted all his efforts. If, on the other hand, he delayed cultivation until January, he might stand a better chance. When a sufficient amount of rain came in November or December it would be unwise not to start cultivation, because if more rain does come later in January or February it will help make a good harvest. If no more rain comes he cannot be worse off.

To sum up, the climate of Assarah represents a positive tendency compared with the climate of the surrounding areas. The high elevation results in lower temperature, more rainfall, less evaporation, hence more effective rainfall utility. A 300 mm. of rain falling mainly in winter and spring is perhaps equivalent to 500 mm falling in the summer.

CHAPTER SIX

HYDROLOGY AND VEGETATION

From the preceding chapters one can infer the type of vegetational cover that prevails in the region, as it is also possible to see the general water regime and hydrological pattern. However, in this chapter the intention is not to describe in detail the types or extent of vegetation cover, or the mode or volume of hydrological regime, because of the lack of data. Instead, the discussion will be limited to some specific points which have more relevance to the ecosystem and to development problems such as watershed management and deforestation.

HYDROLOGY

Precipitation in the forms and modes already mentioned is the only source of water for all uses; human, animal, and vegetation. Other sources are not available at the present, nor likely to be developed in the future. Fossil water does not exist, nor is it likely to be discovered because of the geological structure. Water from outside the region is out of the question because of the high elevation. Thus the total volume of water and moisture of any use to the above mentioned three consumers can be expressed very simply: $W = P-(E+R)$. When "P" is all forms of precipitation, "E" is evaporation and "R" is the run-off. Consequently water development in this region will have to be based on the utilization of precipitation. This involves two separate approaches: First, the minimization of evaporation and run-off by increasing water retention capacity in the area where rain falls; secondly, the upgrading of present utilization of water by affecting shifts from low value uses to high value ones. Prior to any embarkation on such plans we need to know the main features of the hydrological behavior in the region.

When the rain falls, part of it infiltrates the soil and another part runs downslope. In the meantime evaporation is taking place. The part that infiltrates the soil or the subsoil should not be considered lost because it is, to a large extent, practically retrievable. The run-off is determined by the intensity of the rain and the slope gradient; however, it should never be forgotten that terrain in Assarah is largely man-made. The millions of terraces are the most effective way of reducing the effect of the gradient, and when well maintained, they work as water storage agents and infilteration maximizers. "In general storms rainfall must exceed a total of between 25-30 mm before any substantial run-off from these areas occurs."[1] In other areas run-off threshold is substantially lower.

The permeability of the sub-soil in Assarah is very important to the hydrological regime. To understand the sub-soil water regime one must recognize the fact that the surface and subsurface rock formation consists of uncontiguous bodies of permeable and impermeable rocks varying in thickness and extent in both horizontal and vertical planes. When water infiltrates the soil it seeps into veins, fissures, fault lines and pocket-like water-bearing rocks. However, if any regular pattern of rock formation could be detected in Assarah it might be summarized as follows: At the bottom of the valley (wadi) there is usually a thick clay soil, one to three meters deep, followed by compact, but porous, sandstone formations varying in depth from a few meters to fifteen meters or even more, depending on the width of the wadi; below that is a highly fractured and jointed basement complex. Upslope along the flanks of the wadi or along the main channel all these formations thin out until they disappear toward the peaks, giving way to the base-

1. Italconsult, 1969 Water and Agricultural Development Surveys for Areas II and III, Climate and Surface Hydrology, pp 62-63.

ment outcrops. Figure (6.1) is a simplified illustration of this sequence, but it must be remembered that such a sequence is by no means regular and is often broken by an abundance of bedrock and fractured formations which are highly intermingled with both top soil and subsoil sandstone.

The horizontal movement of ground water in these conditions is not the same as would be found in sedimentary basins, because of the absence of continuous non-lithified strata. Since the water-bearing strata are more likely to be thicker towards the bottom of the wadi and towards the main channel, one can visualize subsurface water flow similar in orientation to that of surface run-off. However, the subsurface flow is very often hampered by many impermeable rocks and basement rock out-crops. When such damming effects reach the surface of the main channel it produces a running spring (Ain) which soon re-enters the subsoil after passing that natural dam (Plate 6.1). When the damming effect remains underground, it tends to hold the water in the water-bearing formation upstream, resulting in two different water tables - high water table upstream and lower water table downstream. This subsoil dike is known locally as Habs. Table (6.1) shows the variations in wells depth and in the water available and is a good illustration of the irregularity of the subsoil formation and water regime.

It is difficult to determine the productivity of these wells because it varies depending on whether the site strikes a favorable aquifer or taps a good water vein, and depending on whether it is a wet season or a dry season, following wet years or dry years. The rate at which the water table lowers depends, beside the above, on whether the water is lifted by AsSania (the traditional lifting apparatus) or by pumps; it is faster in the latter and slower in the former. The table also gives a general indication of the variations in water quality as

SIMPLIFIED SUBSOIL PROFILE IN SOME LOCALITIES IN ASSARAH

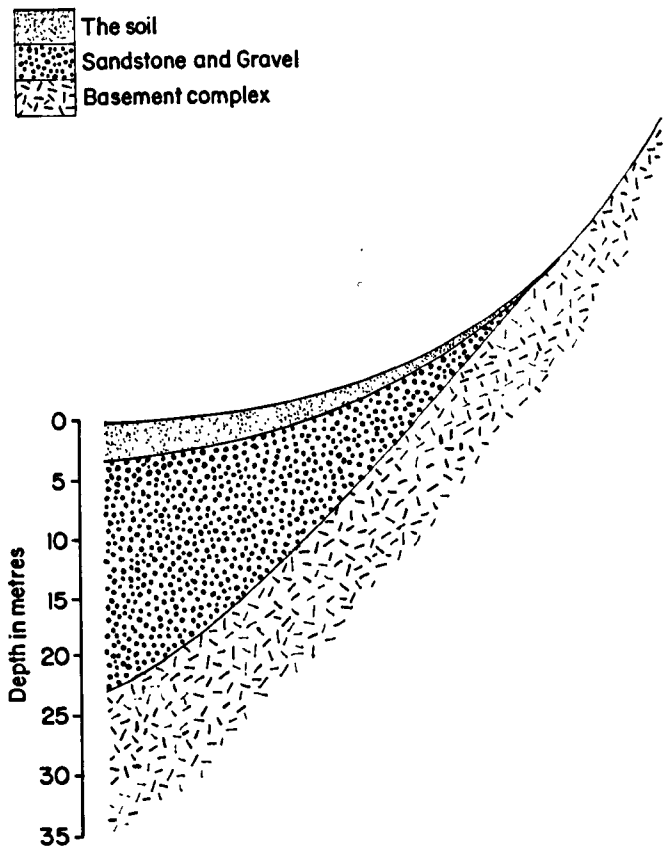

Fig 6·1

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indicated by electric conductivity revealing a range from 200 mmhas to 1200 mmhas, but the vast majority of wells are between 600 and 800 mmhas. As regards temperature, it varies from 11°C to 22°C with the majority lying between 17 and 18°C (See Table 6.1).

Most of these variations are local with no discernable trend of change in Assarah itself. However, outside Assarah and towards the eastern plateaus the soluble minerals increase in the water reaching an electric conductivity of 2000 - 3000 mmhas in Bishah, and in extreme cases 10,000 mmhas has been recorded.[2] Well pits are rectangular in shape varying in width from 1.5 X 2m to 3 X 4m or even wider.

In Assarah wells are dug near the bottom of the wadi where the aquifer is more likely to be found, but wells can also be found higher up the slope. In some areas I came across wells located at short distance from the escarpment edge. Wells in Assarah, in contrast to other areas, are strikingly numerous and dense. (Table (6.2) gives an idea about the distribution of wells in Assarah. When considering the irrigated area it appears that the distribution is nearly even. Figure (6.2) is an illustration of the density of wells in one square kilometer in Baljurashy basin. In this square kilometer, of which less than three quarters is irrigated fields, there are nearly seventy wells. From this example and from the above mentioned table, one can see that there is one well for every acre of irrigated land.

The reason behind such high density of wells is partly physical and partly human and operational. Among the physical factors the irregularity of the aquifer already mentioned is certainly the most important one. To tap as much ground water as possible the peasants had to dig many wells in order to strike the more copious veins of underground water. Also the low water yield, especially in dry years, makes it necessary to dig more wells to maximize the use of underground

1. Wells Inventory Reports, Ministry of Agriculture and Water, Water Resources Development Department, 1969.

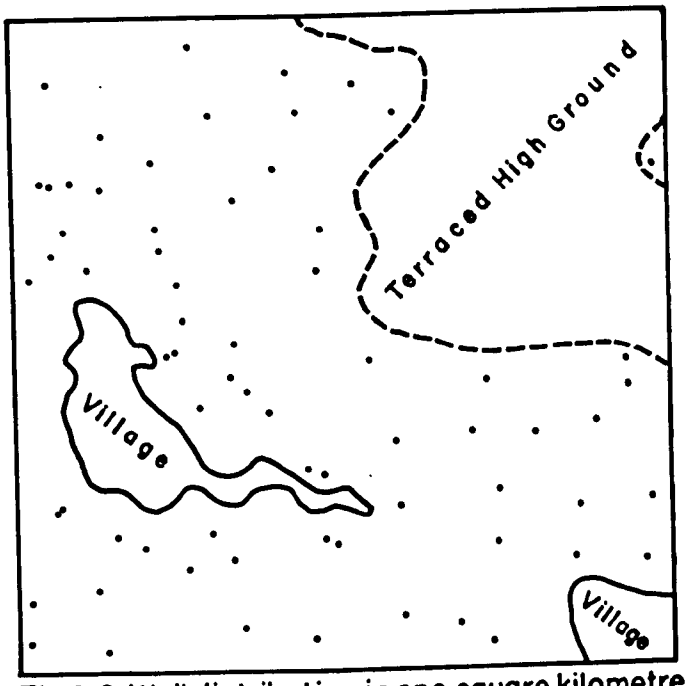


Fig 6·2 Well distribution in one square kilometre near Baljorashy

water. Among the human factors, which will be dealt with in more detail in the following chapters, the private ownership of wells and water rights coupled with the absence of large contiguous holdings make it necessary for every peasant to have his own irrigation water. Accentuated by fragmentation of the holdings, this led to a situation in which the average farmer had many varying shares in several wells. Among the operational factors, the need to shorten the distance between the well head and the fields serviced by it, in order to minimize the seepage loss caused by long channels, is important. The water yield from the wells is restricted by the slow traditional lifting devices and by the slow rate of recharge in the well. This has to be overcome by digging more wells. At sites where copious recharge is proved, several wells are dug in the same area to allow for more than one team of draft animals to draw more water. In Figure (6.2) one can find at least three such cases. All these subsoil discontinuities in the underground water flow are of crucial importance, not only because they shed light on the present and past water utilization and management, but also because they have significant bearing on the future development of water resources.

The relationship between rainfall, terrain, and subsoil formation which determines the hydrological regime had been understood by Assarah people to the extent that all water management and utilization are based on it. This fact is well reflected in the highly efficient watershed management practiced by Assarawi farmers. Since settlement and farming are located at the upper reaches of the watershed, the watershed units are sufficently small to be manageable within the family holdings, i.e. one family will be able to look after a part of, or a whole small watershed. In such steep gradient terrain it is only natural that watershed management is wholly directed to retarding run-off as far as possible.

TABLE 6.1

EXAMPLE OF THE RANGE OF VARIATION

IN WELL CHARACTERISTICS ALONG THE ASSARAH REGION

Sub-Area of Assarah	Report Reference Number	Total Depth in Meters	Static Water Level in Meters	Electric Conductivity mmhos	C° Water Temperature
Asir	2/9	7.5	4.6	600	
Qahtan	2/10	10.7	7.6	700	
Asir	2/13	7	2.9	600	
Ahamid	1/41	2	1.8	580	18
Bashoot	1/51	25	10	300	
Bashoot	1/52	51	23		18
Bani Shihr	2/22	11	3.7	700	
Bani Shihr	2/26	19	7.5	750	
Bani Emr	2/29	12.2	9.8	700	
Bani Emr	2/30	39.6	28.1	650	
Tanuma	2/34	6.5	2.7	700	
Tanuma	2/39	12	6.7		
Bal Asmer	2/41	12	6	600	
Bal Ahmer	2/42	17.7	14	700	
Bani Shihr	2/56	12.2	4.6	650	
Taif (west)	3/17	14.9	5.1	800	
Ghamid	3/21	9.5	7.6	1200	
Thaqeef	3/25	11.6	3.5	1200	
Thaqeef	3/26	4.6	3.7	1200	
Thaqeef	3/27	13.4	1.5	1200	
Bal Harith	3/42	20	18	850	
Bani Saad	3/43	15	12	1050	
Bani Saad	3/45	7	1.8	1100	
Zahran	1/9	20	4	950	
Zahran	1/20	20	12	400	17
Zahran	1/23	24	2.4	1050	15
Zahran	1/27	17	7	450	11
Ghamid	1/31	27	13	200	19
Ghamid	1/39	20	5.5	500	22

Source: Compiled from various wells inventory reports. Ministry of Agriculture and Water

TABLE 6.2

NUMBER OF WELLS AND THEIR UTILIZATION IN ASSARAH REGION

District	Hand Dug Wells	Sania Irrigated Area dunum	Pump Irrigated Area dunum	Rainfed	Total
Dhabran o.s.	1507	7363	480	542	8385
S. Abide	1911	11831	1891	3733	17455
Abha	4595	20133	6403	14190	40726
Khamis M.	1647	2425	5826	114	8365
An Nemas	5531	42285	638	56412	99335
Balgarn	1118	7151	1337	2875	11363
Bashoot	1092	11070	64	7061	18195
Ghamid	3571	7486	2626	10596	20708
Zahran	2797	5406	1568	9141	16115
Bani Malik	1367	10224	590	45425	56239
Bal Harith	0987	6098	2180	17961	26239
Bani Saad	1075	7017	2967	9194	19178
Thaqeef	0323	2937		30789	33726
Total	30939	141426	26570	208033	376029

Source: Agricultural Census. Ministry of Agriculture and Water

Water is used as direct precipitation, but the amount of water that the crops can effectively utilize from direct precipitation is limited by the erratic nature of rainfall. Much of the annual rainfall comes too early or too late to benefit the crops. Such inadequacy in precipitation is treated in two manners. First, the low lying fields are supplemented by irrigation from the numerous open wells. Second, the upslope terraces receive additional water collected as run-off from the immediate watershed areas.

As regards the surface run-off, the escarpment line presents an obvious dividing line. Since gradients abruptly decline to the west of it and gradually to the east, it can be easily stated that all run-off that generates in Assarah, itself, flow northeasterly toward the eastern plateau. Figure (3.2) shows the general pattern of this drainage system.

The volume and velocity of the run-off is dependent on the intensity and duration of the rainfall and on the size of catchment that it covers. The above-mentioned rainfall threshold of 25-30 mm applies only to the moderate rainstorm. High intensity rainstorms generate considerable run-off, while low intensity rainfall may reach two or three times that amount without generating much run-off. Although there is an association between the high monthly rainfall values and the run-off, it is the single rainstorm which is more important in determining the run-off volume.[1] It is understood that beyond a certain threshold of intensity and duration the run-off begins to generate. To my knowledge there has been no study of the single storm characteristics and its relationship with run-off in this part of the country. Table (6.3) shows some of the variations in the relationships between rainfall and run-off in five catchment areas in Assarah in two consecutive but contrasting years. (see also Plate 6.2).

1. Linsley, R.K. Et. al., 1949 Applied Hydrology (McGraw-Hill) pp 412-427; Wisler, C.O. and Brater, E.F. 1959 Hydrology (Wiley) pp 257-259.

Plate 6.1 Where bedrock blocks the ground water flow the water appears in a spring or "ain".

Plate 6.2 A major flood in Wadi Turabah; the width of the water course is more than one kilometer.

TABLE 6.3

RAINFALL AND RUN-OFF IN SOME CATCHMENT AREAS OF ASSARAH AND IT'S EASTERN PLATEAU

Catchment	Area (sq.Km)	Aug 66 - July 67			Aug 67 - July 68		
		Rain-fall (cu.m x 10^6)	Run-off (cu.m x 10^6)	%	Rain-fall (cu.m x 10^6)	Run-off (cu.m x 10^6)	%
Liyyah	153	65.6	1.0	1.5	99.5	7.5	7.5
Wejj	224	77.2	0.2	0.3	123.7	2.3	1.7
Abha	59	19.6	0.2	1.0	53.5	8.0	15.0
Bishah	14,877	2349	16	0.68	5107	180	3.70
Turabah	3640	475	15	2.1	1747	177	10.1

Source: Ministry of Agriculture, Hydrology Division

Although a part of these catchment areas is outside Assarah proper, it is safe to assume that the bulk of the run-off is generated within Assarah itself. Note also that Wadi Abha catchment is a part of Wadi Bishah catchment.

The upper reach catchments are exemplified by Wadi Abha near Abha town with a catchment area of 59 km^2 and Wadi Al-Ajaeda near Baljurashy town with a catchment area of about 20 km^2. [1] The recorded run-off from these two upper catchments is given in Tables (6.4) and (6.5).

The variations in the volume of flow over the years is of particular significance in that it magnifies the irregularity of the rainfall and makes the need for flood control a prerequisite for sound water resources development. The equation of such control is, theoretically, at least,

1. As the area of the catchment of Wadi Al-Ajaeda does not appear in Hydrology Division data, the estimate of 20 km^2 was made from air-photographs.

TABLE 6.4

WADI ABHA - MONTHLY FLOW VOLUMES

1962 - 1968
(cu.m x 10^6)

Year	J	F	M	A	M	J	J	A	S	O	N	D	Annual
1962	0.70	0	0	0	0	0	0	0	0	0	0	0	0.70
1963	0.80	0	0	2.50	0.50	0.10	0	0.80	0.20	0	0	0	4.90
1964	0	0	0	1.00	0.20	0	0	0	0	0	0	0	1.20
1965	0	0	0	0	0	0	0	0	0	0	0	0	Nil
1966	0	0	0	0	0	0	0	0	0	0	0	0	Nil
1967	0	0	0	0.23	0	0	0	0.09	0.05	0	0.90	0.20	1.29
1968	0	2.43	0.60	0.40	1.55	0.71	1.25	0.14	0.08	0.04			

Source: Ministry of Agriculture, Hydrology Division

TABLE 6.5

WADI AL-AJAEDA MONTHLY FLOW VOLUMES

1959 - 1970
(cu.m x 10^6)

Year	J	F	M	A	M	J	J	A	S	O	N	D	Annual
1959	0	0	.054	.077	.330	0	0	0	0	0	.021	.058	.450
1960	No Data												
1961	.002	.127	0	.053	0	0	T	.018	0	0	.125	.117	.442
1962	T	0	0	.013	.029	0	T	.051	0	0	0	.023	.116
1963	0	.172	.054	.123	.241	0	0	0	0	0	0	.022	.612
1964	0	0	0	.007	0	0	0	0	0	0	0	.467	.474
1965	0	0	0	.017	0	0	0	0	0	.015	.125	.003	.160
1966	0	.162	0	.135	0	0	0	0	0	0	0	0	.297
1967	0	.077	0	.129	0	0	0	.150	0	0	.416	0	.772
1968	0	.660	0	.385	.043	0	.079	0	0	0	0	0	1.167
1969	.083	.052	0	0	0	0	0	0	0	0	.032	0	.167
1970	.059	0	.001	0	0	0	0	0	0	0	0	0	.060
1971	0	0	.007	.035	0	0	0						

Source: Ministry of Agriculture, Hydrology Division

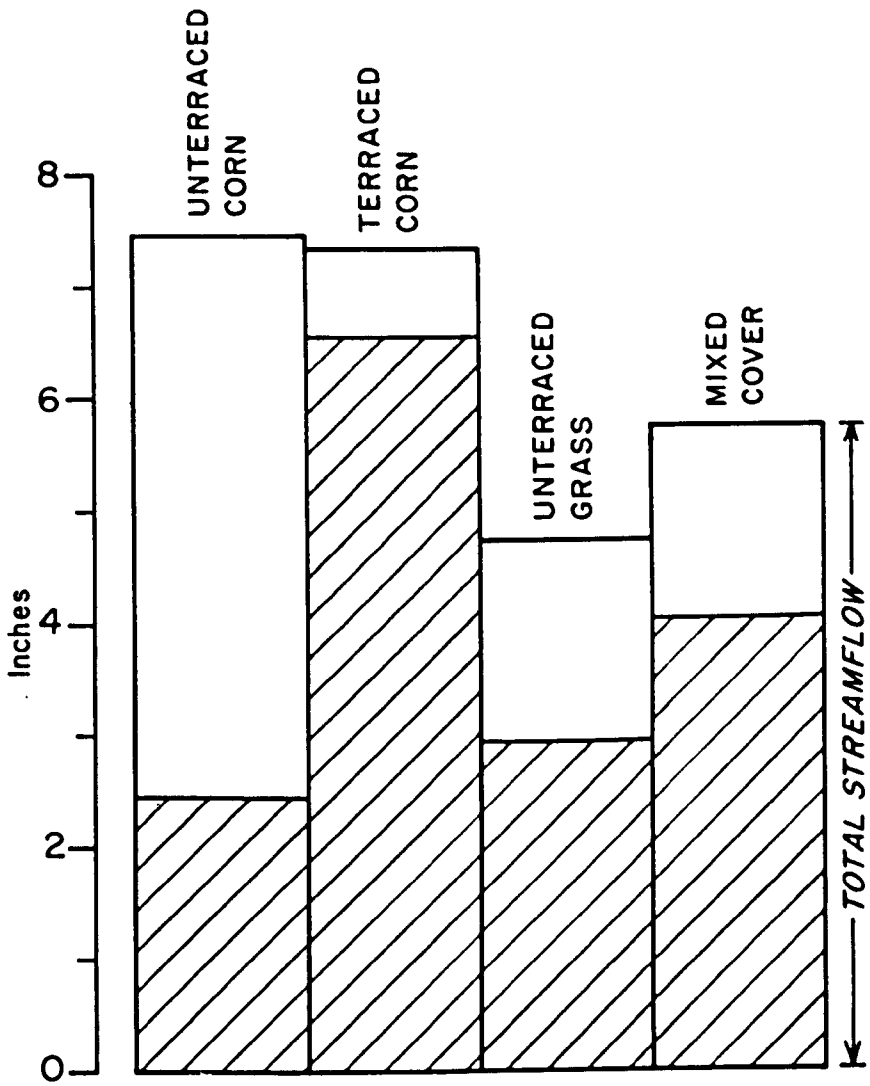
simple. It is based on the maximization of infiltration during the wet season so that the soil moisture can sustain the crops through the dry season. Also, the maximization of infiltration during the wet years will, most certainly, top up the subsoil aquifers so that irrigation water would be available for two or three dry years before the next two or three wet years come again and replenish the aquifers.

The amount of water that remains after evaporation and run-off is partly consumed by the vegetation cover and partly precipitated to the subsoil irregular aquifers. Once the water is there it functions as a storage which percolates to the numerous wells which are everywhere functioning as collection points. The significance of this is that the ground water ameliorates the effect of irregularity in rainfall by providing fairly reliable water in dry years or when rainfall does not come at the expected time. In a prolonged drought the water table falls considerably and this storage dwindles. At this time people clear their wells of any debris and sediment that might have accumulated during the wet years and they deepen their wells in the hope of trapping more water. When the rain comes, after a long absence, everything is prepared in the best possible way to minimize run-off and maximize percolation. Terraces are all ridged and water sheds are properly channeled and diked.

Although all the water that does not run-off, does not necessarily go to underground and subsoil storage, a significant proportion of it certainly does. A recent study of the influence of watershed management in Iowa, U.S.A. has proved beyond doubt the role that terraces play in reducing run-off, increasing infiltration and thus raising the subsoil flow which, in the case of Assarah, is eventually tapped in the wells (see Fig. 6.3).[1]

1. England, C.B. "Watershed Models: Tools in Planning Land Management for Water and Pollution Control" Journal of Soil and Water Conservation (Jan-Feb 1973) pp 36-38.

Fig: 6.3



Pathways of flow under four management systems in Treynor, Iowa U.S.A.
(6 years average) (After C.B. England)

Sub-surface flow Run-off flow

The point that I am trying to make bears repeating. In Assarah we are faced with a highly interdependent, hydrological system in which subsoil should be considered as a reservoir. The well-being and future of Assarah, not only as an agricultural area, but also as a suitable place to live in, depends on how much water there is in that reservoir. The critical point lies in the fact that many of the factors that determine the replenishing of that reservoir, such as soil, its thickness, retention capacity; slope, its low gradient; and watershed management, are all man-made and require continuous maintenance. Once this maintenance deteriorates, the loss in the reservoir and the damage in the system is more than proportional and more difficult to correct.

Water resources development in Assarah must be based on the concept of watershed management, surface and subsoil, and such development will only succeed if integrated into a general community development. However simple this concept may seem, it has not as yet been incorporated into water development policies at a national level. The current water development thinking is still based on the idea of water mining with little attention to practices that increase water recharge so that more mineable water would be available. This situation may be best illustrated by an example I came across in the region of Assarah. A group of villages complained to the Ministry of Agriculture and Water about a lack of water in their numerous wells, especially in the summer dry season. The Ministry sent a highly qualified expert to investigate the complaint and to make recommendations. Upon arrival, the expert acknowledged the problem and after estimating the affected population at 5000 inhabitants he could not find a suitable site for an adequate new well in the vicinity. Consequently he chose a site 30 to 40 kilometers downstream and recommended that a well be dug in that site and water be conveyed in tank trucks to the villages. This expert

could not suggest anything that would trap the water upstream where it is needed, because the idea is not as yet a part of his professional thinking. It is perhaps not surprising to know that this particular expert is a geologist.[1]

The approach and scale of the development of watershed management is predetermined by the size of catchment area and size of distribution of settlement. Both these factors require small scale projects dispersed all over the region. There is no need for a mammoth sensational project. What is needed is a very small dam here, some afforestation there, and a couple of terraces reclaimed. I am sure that the effect of the sum of many tiny works such as these will equal many gigantic individual projects.[2]

Water resource development, as well as agricultural and other socio-economic development, should start at the upper catchment areas where people are, where it is needed, and where it is more likely to benefit the downstream development.

The mismanagement of catchment areas, as Pereira put it,

> increases overland run-off and leads to spate flows in streams. The decreased infiltration fails to maintain springs and to supply dry-weather stream flow. For the same reason water levels fall so that boreholes and the shallower wells dry up.[3]

In Assarah we have two examples of run-off control projects: Wadi Wejj at Taif area with a catchment area of 224 square kilometers and Wadi Abha with a catchment area of 59 square kilometers. Yet in both examples attention is limited to the dam site and care stops at

1. Complaints Investigation Trip Report, September 1969, Ministry of Agriculture and Water, Water Resources Development Department.
2. Italconsult in its final report excluded the possibility of any large scale utilization and re-emphasized the need for small run-off control works and the maintenance of terraces. See Italconsult, 1969 Water and Agricultural Development Surveys for Areas II and III, Final Report, pp 12-13.
3. Pereira, H.C. 1973 Land Use and Water Resources (Cambridge University Press) p. 79.

PAGE NUMBERING AS ORIGINAL

the construction of the dam and its maintenance. These works are, of course, good and essential, but it must be supplemented by similar efforts at the upper tributaries where the catchment area is not more than a few square kilometers.

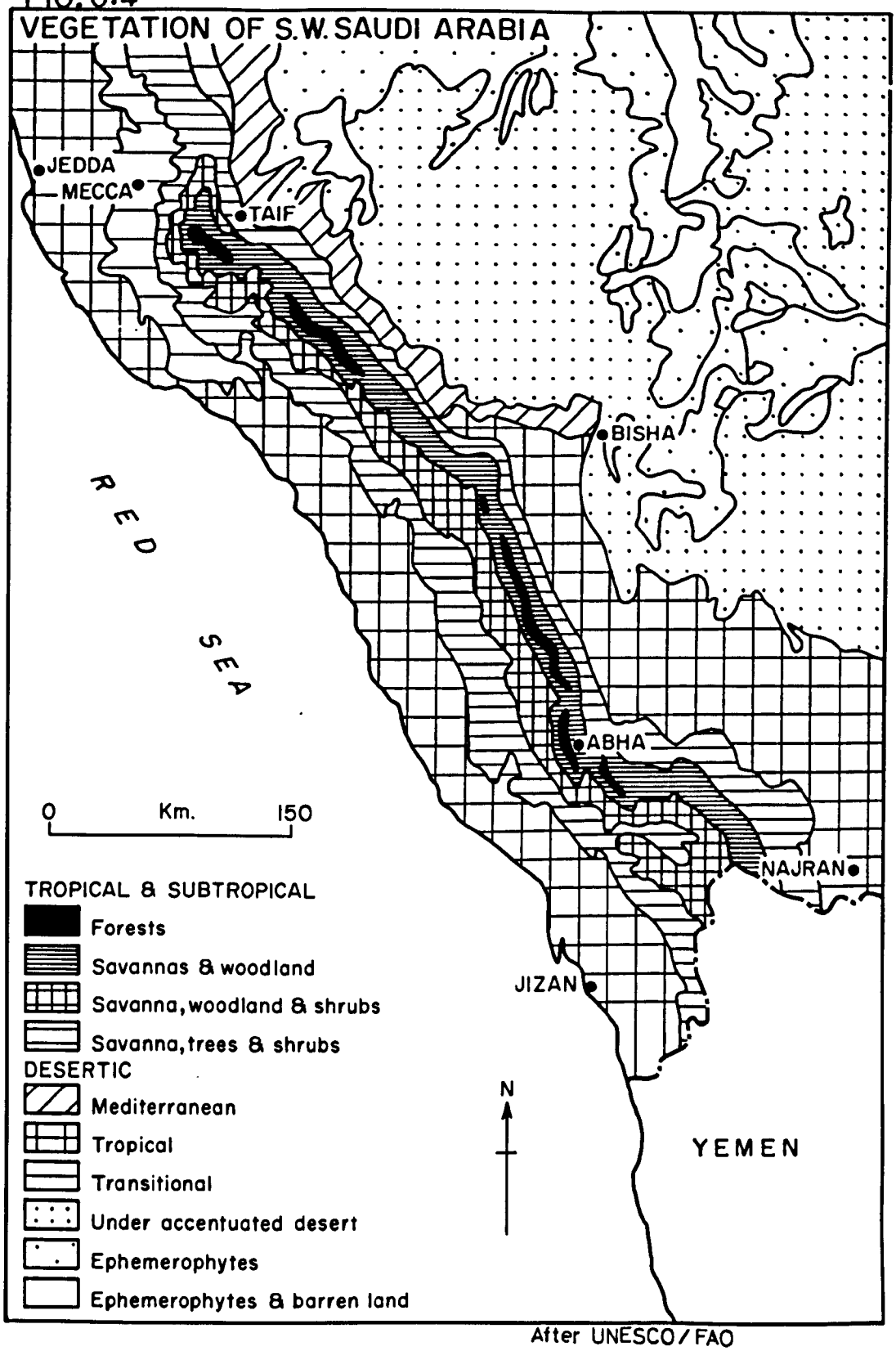
VEGETATION

The main factors that determine the vegetation cover in Assarah are the two main monsoonal and Mediterranean climatic influences that overlap each other in this region (Chapter V), and the combined effect which results from their interaction with the altitudinal factor. A comparison between vegetation map figure (6.4) and the bio-climatic map figure (5.2) reveals the complexity of such interaction. However, the most distinct feature in this respect is that Assarah is a recognizable vegetational region, exhibiting features that differ from all surrounding country. The first visible contrast is that the vegetational cover in Assarah is denser, higher, and greener than that of its neighbours.

Along the plateaux east of the mountain range, a xerophitic steppe type of vegetation dominates. The tree formation in this area consists of dwarf species dominated by acacia. Toward the bottom of the wadis and along the main channels large trees of Acacia, tamarix and zizyphus are in abundance, such as in Wadi Turababh and Wadi Showas. As one approaches the mountains, at an altitude of about 1800 m., trees, bushes and thickets get taller and denser. Within the mountain range, at 1800 m. contour and above, new vegetational species appear representing both the Mediterranean influence and the sub-tropical influence, such as the olea chrysophilla and juniperus procera, which are often quoted as indicators of the ecological limits of Assarah.[1]

1. Dranz, O.A. Rangeland and its Improvement in Saudi Arabia (Saudi Arabia: Riyadh University,) 1965, pp 37-39.

FIG. 6.4



After UNESCO / FAO

It is only in Assarah, itself, that a genuine forest formation becomes evident. However, owing to excessive deforestation, the extent of such forests is limited to small areas where protective methods have been practiced. (Plates 6.3 & 6.6). The forest areas in Assarah were estimated at two million hectares[1] in 1966, but four years later the estimation was put at 1,600,000 hectares, the deforested areas were estimated at another 1,600,000 hectares. In another source woodlands are estimated at 25,000,000 acres or about 10 million hectares.[2] The wide difference between these estimates may be due to the differences in the criteria used and definitions of woodlands. Outside forest reserves trees cover is either thin (Plate 6.4) or bare.

Beside overgrazing, which retards the regrowth of trees, the use of wood for various human needs has hastened the degeneration of forest cover. These needs can be summed up as follows: a) For construction purposes, such as house roofing, which requires both long and strong beams, and smaller branches and bushes for the overlying thatches. (Under this category falls, also, the use of wood for various implements). b) The burning of trees for distilling tar and products - wild olive in particular, has suffered most from this practice, although juniper and other trees known locally as Gharab are also used. c) The biggest use and by far the most damaging is for firewood and charcoal. The former two uses consume healthy green trees, while the latter, which originally used dry and dead trees, soon also encroached on the green trees.

Judging by the ecological capabilities of Assarah and by the remaining small patches of forest it seems probable that Assarah has had, in the past, a continuous woodland formation similar to these

1. Bulletin on the Forest in Saudi Arabia 1966 (in Arabia) Ministry of Agriculture and Water, Forests Department (Riyadh, Saudi Arabia)
2. Allred, B.W. 1968 Range Management in Saudi Arabia (FAO Report Pl: PFC/4) p 39.

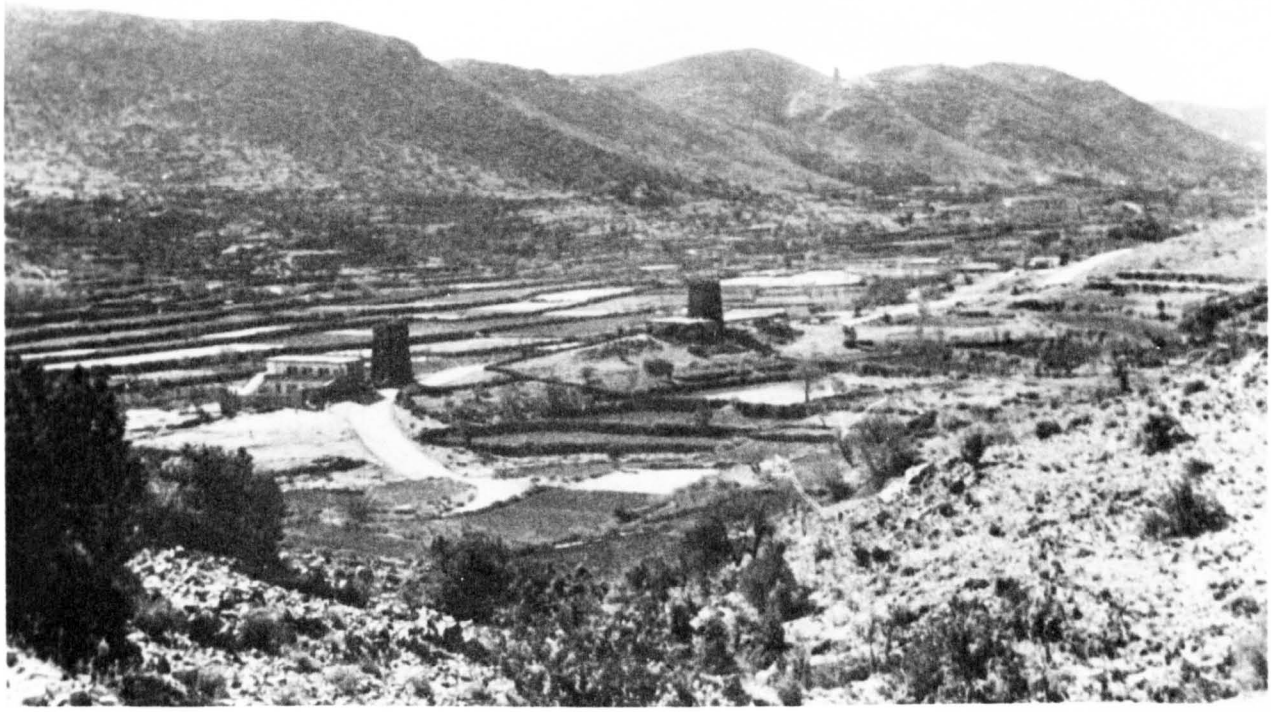


Plate 6.3

Typical landscapes around the villages of Assarah. Vegetation cover varies considerably in density associated with differences in soil and water and land use. (MOA)

Plate 6.4

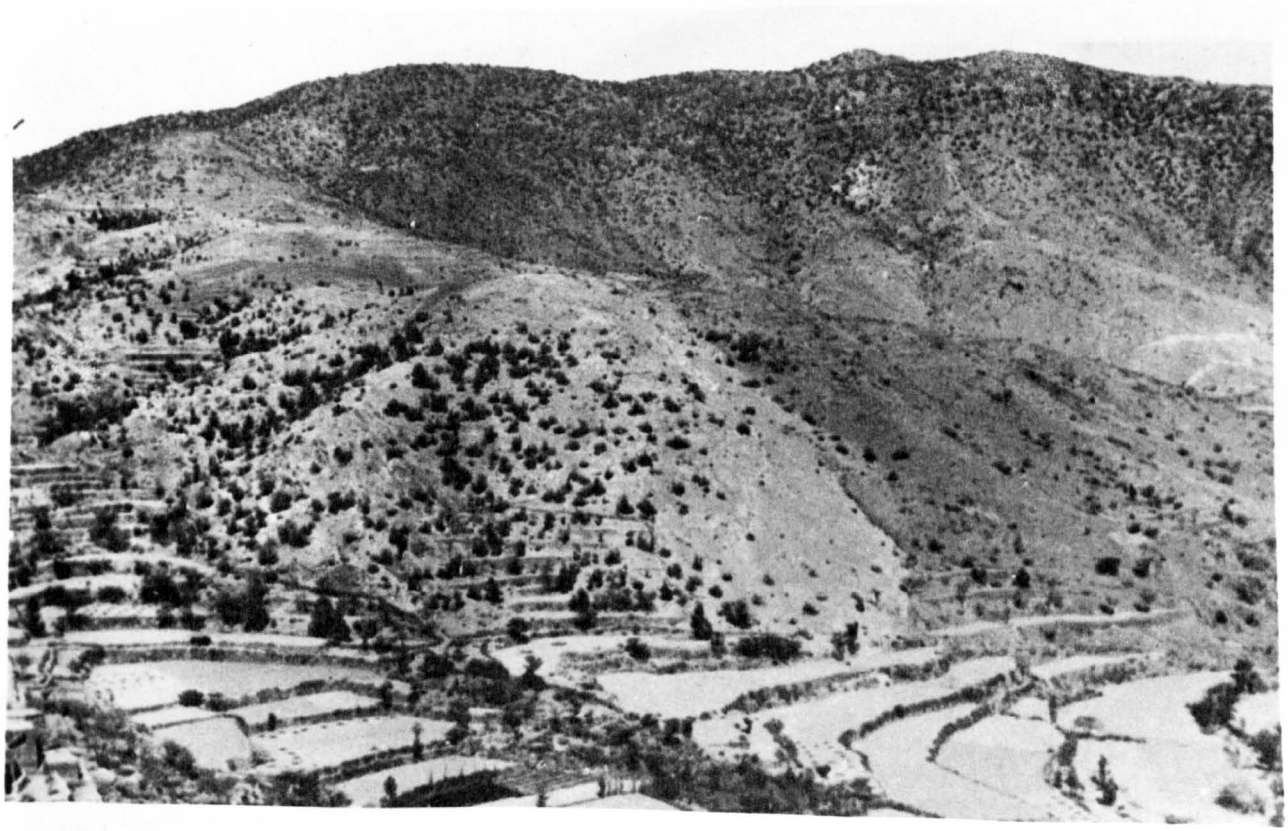


Plate 6.5

Two types of woodland landscape in Assarah: above, Acacia scattered on terraced rough land, below, Juniper forest.

Plate 6.6

remaining patches. In Ghamid and Zahran subareas, for example, Assulloke listed 39 such patches of woodlands varying in development from real forest canopy formation to mere dense bushes, and varying in extent from about 10 km^2 to less than one square kilometer.[1]

Forest fire, though not frequent, is not uncommon. Assulloke records that in 1970 a fire broke out in one forest in the Zahran area lasting for twenty days and extending to a neighbouring forest. It was estimated that 12,400 large trees were lost in that fire.[2]

Many of these forests are interspersed with cropped terraces, where wheat and barley are grown on rainfall. The acacia (Plate 6.5) and juniper (Plate 6.8) which are scattered on and around these terraces are of the best quality and biggest of all other timber trees, because of the depth of the soil and of the occasional care they get from the farmers (see also Plate 6.7). A distinction must be made here between the communally owned woodlands or pasture reserve, whether they are owned by a tribe, a village, or a clan, and the timber trees which are privately owned. The latter are significant in that, beside being an integral part of the subsistence system, they are in a better shape than the former, because of the extra care and protection they get from the individual owners. In the agricultural census an attempt was made to survey this type of timber tree (see Table 6.6). However, on my own observation and on few ad-hoc checkings, I believe that these figures highly underestimate the actual number of this type of trees. The reason being that most villagers do not even know how many such trees they have, and they consider them too unimportant to bother to count them.

1. Assulloke, A.S. 1971 Gazateer of Ghamid and Zahran (Yamamah, Riyadh, Saudi Arabia) pp 177-182 (in Arabia)
2. Ibid., p 179 and p 181.

Plate 6.7

Timber trees in and around privately owned terraces are always found in better condition than natural forest trees.

Plate 6.8

TABLE 6.6

NUMBER OF PRIVATELY OWNED TIMBER TREES IN ASSARAH

Sub-Area	Tamarix	Acacia	Juniper	Wild Olive	Others	
Dhahran O.S.	1162	28327	98	95	6	29,688
Sr. A Beeda	2063	39449	-	11	19	41,542
Abha	28381	41163	4675	104	380	74,703
Khamis M.	32113	1392	-	12	436	33,953
Nemas	2231	85705	67158	15269	25	170,388
Balgarn	-	8878	10997	1	20	19,896
Bashoot	-	19292	59589	7224	873	86,978
Ghamid	5491	53546	71375	1445	451	132,308
Zahran	40	7111	25947	10687	262	44,047
Banimalik Balharith Banisaad Thaqeef Taif	88660				(3082)	91,742
	160,141	284,863	239,839	34,848	5,554	725,245

Source: Agricultural Census 1964. Ministry of Agriculture and Water

Beside trees, there is in Assarah a wide range of bushes and shrubs, most of which are of the flowering variety. These are used for various purposes from grazing, to various domestic purposes, to more particular purposes, such as for tanning and adding it to the manure, to some medicinal uses. As a result bushes and shrubs are most affected by both man and animals, except in the well-protected areas.

Range grasses are in a very bad state, especially after the severe draught which the country underwent during the period of 1965-1967, when there was excessive overgrazing.

Although the bulk of Assarah is excessively over-grazed, some isolated tracts are still in good condition. This was only possible because such tracts, for one reason or another, have not as yet exceeded

their carrying capacity, or because they are under the traditional conservation practice - Al-Hema.

The institution of Al-Hema, which will be elaborated on later in Chapter X, is one of the most important traditional devices for checking over-grazing of range land and over-cutting of forest land. These traditional reserves are also the best tangible indication of Assarah ecological capabilities, not only in terms of the thickness of the vegetational cover that it is capable of maintaining under good management, but also in terms of water resources development, soil conservation, flood control, scenery and landscaping, and a wide range of other aspects of environmental development.[1]

The future of the vegetation cover is difficult to foresee with certainty. If one is to judge by the past trend over the last two decades, at which time the demand for the direct and indirect uses of vegetation cover rose steeply in the wake of economic growth, the future would seem quite bleak, especially when one sees that no serious attempt has been taken to deal with the problem. It seems that during the last drought of 1965-67 the overgrazing, in particular, and the vegetation cover, in general, reached the ebb of degradation. Had it not been for the availability of alternative materials which substituted for direct and indirect consumptive uses of the natural vegetation, the existing meagre cover could have been stripped off years ago with disasterous consequences. Luckily the availablity of imported timber, the introduction of reinforced concrete in construction works, the importation of animal products and live animals, and above all the availability of petroleum-derived cheap fuel, and the availability of a wide range of other materials, all worked as an agent checking rising rates of cutting and overgrazing. Although the above argument is partly hypothetical and

1. Draz, O.A. 1965 op. cit., pp 37-47 and 67-91.

TABLE 6.7

THE BASIC PRINCIPLES OF HYDROLOGICAL WATERSHED MANAGEMENT

	The Problem			The Solution		
	The Cause	The Determinant Factors	The Result	The Treatment	The Desired Effect	The Feedback Effect
Upper watershed	Raindrops Minor run-off Minor erosion	Kinetic energy & rain intensity Land gradient, and bare soil	Water on the surface more run-off more erosion	Afforestation terracing and contour farming	Mechanically insulating the soil from rain drops partially negating the effect of the gradient	More infiltration More transpiration less run-off
Middle Watershed	Raindrops and run-off	Gradient, soil bareness, & the volume & velocity of the upper catchment run-off	Sheet erosion gullying and more run-off	All the above where possible and small dams	Reducing volume & velocity of run-off	more infiltration & less run-off
Lower watershed	Torrential floods	The volume & velocity of the middle catchment run-off	Various damages & human disasters (deposition)	Major dams and reservoirs	Storing water & averting disasters	Security
	The Vicious Circle: Once negligence occurs in the upper catchment, it soon leads to more run-off resulting in more erosion, more gullying, more torrential floods and more damages and disasters, making the treatment of the problem all the more difficult.			The General Feedback: Once treatment is started at the upper watershed area, it becomes easier to undertake treatments all through the system, leading to more water available, better resources and land quality. This will raise the general well-being of the community, making it all the more able to maintain such conservation measures.		

somewhat anachronistic, had it not been for the general economic expansion, demands could not have risen so sharply, nor have partly been met by other materials, which illustrates the criticality of the situation.

The relationships between vegetation cover and hydrological regime on the one hand and the quality of the land and the general well-being of the community on the other, are complex and dependent on a multitude of variables. The general principles which govern these relationships are summarized in Table 6.7.

It is believed that the rate of erosion and therefore the rate of land resource destruction in an environment like that of Assarah, i.e. high gradient, intense and frequent rainfall in amounts which are neither high enough to allow really protective vegetation cover, nor low enough for the virtual disappearance of regular water erosion, is higher than in most other environments.[1]

However complex the above mentioned relationships may be, it is quite clear from the above table that they work in two different processes. Each process, once started, is self-stimulating - one is constructive and the other is destructive - the choice is therefore clear. It is only logical that treatment of land degradation, which results from bad watershed management should start where the problem itself starts, i.e. at the upper reaches of the catchment area.

From the three preceeding chapters a unique picture of a particular environment emerges. In this picture the high elevation and the consequent favourable climatic conditions provided the stimulant and attraction for sedentary settlement. The rugged terrain and limited rainfall imposed serious constraints on such human occupance. Terracing was man's response to this challenge. Once such interference with the natural environment

1. Kirkby, M.J. 1969 op. cit., pp 230-238.

was necessary, further human adjustments had to be made. In the following section an attempt will be made to reveal the human environment and to discuss some of the more salient interactions that take place between man and his environment.

SECTION THREE

THE HUMAN ENVIRONMENT

CHAPTER SEVEN

THE ASSARAH COMMUNITY SYSTEM

Having described the physical structure of the stage upon which the community lives and obtains its livelihood, we can now turn to discussing the human environment, not merely as a social phenomenon, but as a series of interactions involving both physical and human factors. However, it is necessary to stress one very important point which represents a cornerstone to most of what follows, i.e. when studying a subsistence peasant community like that of Assarah with the view to analysing its problems and formulating solutions in order to realize betterment in the community, a holistic view is necessary and a holistic approach should be adopted. It is certainly hoped that what follows will provide a general background necessary to more detailed problem solving studies. This is not to say that analysing each problem in isolation is in itself valueless, but rather that a holistic understanding is necessary if specific problem solving is to be successful. Without this, the individual approach to specific problems may become wasteful of time and energy. Even more important, because the problems are intrinsically interrelated and interwoven the analysis of any particular problem, particularly given the quality of data available, may be unsatisfactory unless put in the context of other problems, even some which may not seem at first completely relevant. In this respect De LaBlache says,

> "Man and nature become moulded to one another over the years rather like a snail and its shell. Yet the connection is more intimate even than that, so that it is not possible to disentangle influences in one direction, of man on nature, from those in another, of nature on man. The two form a complicated amalgam."[1]

1. De LaBlache, quoted in D. Grigg: "Regions, Models and Classes," in R.J. Chorley & P. Haggett 1967 Models in Geography, p. 465.

In this context it appears wrong to consider agriculture, for example, merely as an economic activity; it is, along with social activities, a way of life and an intricate entirety at that. An attempt must therefore be made to reveal as much as possible of the infrastructure of this complete way of life and to synthesize in academic terms the way it functions. In order to do this the whole entity must be broken down into component functional parts, each part being viewed from as many of its facets as possible. All this is necessary for the analytical simplification, rather than for the identification of individual forces and phenomena which, in the actuality of things, have no separate existence.

GENERAL MODEL:

As a way of getting around the lack of data and the absence of literature which would expose the nature of the community system, an attempt will be made to construct a model. The model is meant to provide a simplified picture of the general structural skeleton of what we can call the community, genre de vie, the system, or the agricultural subsistence community. Too general for the identification of any particular problem, it is basic in the sense that it amplifies the significance of the interdependence of main components and explains the necessity for a holistic approach.

The model is based on two main assumptions. First, all activities in the community, economic and social alike, are inseparable in their functions and relationships except in the way of general conceptualization for the purpose of facilitating a better perception of the whole. The second assumption underlying the series of models which follows is that the state of affairs being examined developed over a very long period of time in the past until a stage was reached where the old institutions reached near their full capacity and no more significant development was

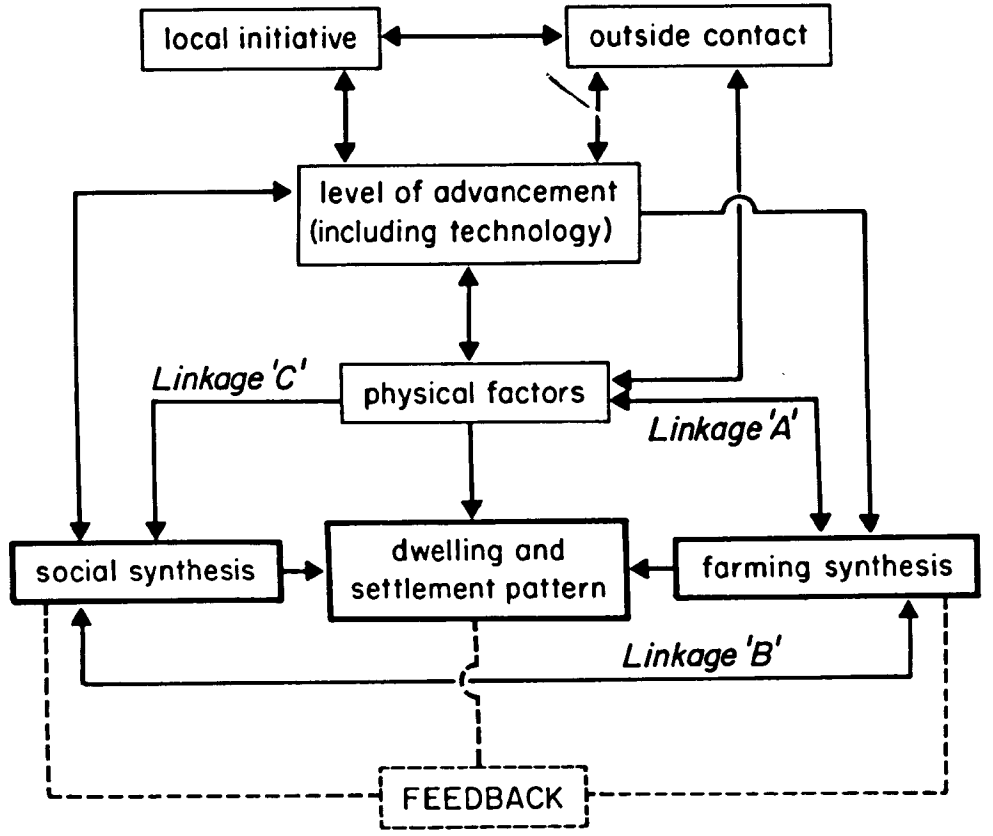
possible without the introduction of change into the system. Such change did not come about until very recently because, for reasons which later will be examined, there was no internal or external pressure.

At present the long waited-for factors of change are having their impact on this stagnant system, individually and in combination. The strain is great and the community requires external assistance in adjustment if change is not merely to mean disintegration of the traditional community.

The structural model, Figure 7.1, at its simplest is based on a division of the whole system into three major components; the farming synthesis, the social synthesis, and the settlement and dwelling pattern. Each of these is influenced directly by two clusters of factors, i.e. physical elements, which have been discussed in the previous section, and what we may call the level of advancement which encompasses all cultural and material attainments including technology. This level of advancement can be influenced either from within, through individual ingenuity and adaptation or, from without through contact forcing adaptation. These two groups of factors are in constant interaction. Their interaction in turn produces a causal chain of events in which, at all levels, there is a feedback process. In any system this feedback is, by definition, both a beginning and an end of any linkage. In a developing society such feedback may be described as dynamic and positive, producing inducement to readaptation and change which in turn transform the relative weights attached to components in the system. In a static society, on the other hand, feedback effects merely reinforces the structure of the system, strengthening internal rationality and therefore opposing change. Deutsch put it cogently by stating that,

> In traditional cultures that have moved up to the very limit of subsistence, further innovations promise very modest and marginal rewards, but swift and terrible risks which are

Fig 7·1 Community General Model



> intensely salient. To this degree, it becomes a mechanism for teaching its people to fear and distrust innovation."[1]

In the former case some initial input of stimuli - that is initial to development - must have existed. In the latter case such stimuli may be presumed to be weak or absent; such was the state of Assarah for centuries, a state of quasi-dormant existence on a low level of self-sufficiency.

A breakdown of what is termed in the general model as farming synthesis and social synthesis is sketched in Figures 7.2 and 7.3 respectively. The series of these models illustrates the system and are used here for three main purposes: a) to expose the infrastructure of this way of life and some of the interaction that exists within it; b) to help us make a retrospective analysis or assessment of the system by enabling reverse extrapolation from the present position in which change is now occuring; and c) to help us predict to some extent how the factors of change, which are now operating are likely further to affect the traditional situation so that intervention to assist in adjustment can be planned. These utilitarian aspects of this study can be best understood in the light of Dalton's statement: "Understanding the structure of what is and what has been is necessary to those people charged with formulating intelligent policy on what ought to be."[2] This may appear to be too ambitious a claim for these system analysis models, but I would like to stress that although they do not achieve anything in themselves, in providing a general conceptual framework they can be used in the designing of specific investigations and planning. Similar models could be applied to many similar highland agricultural communities in other semi-arid areas of the world although the only claim here made is their applicability to this study of Assarah

1. Deutsch, K.W. (1971) "Developmental Change: Some Political Aspects" in J.P. Leagan & C.P. Loomis (eds) Behavioral Change in Agriculture (Cornell University Press) pp 30-31.
2. Dalton, G. (ed.) (1967) Tribal and Peasant Economies (The Natural History Press) p. XI-Introduction.

Fig; 7·2

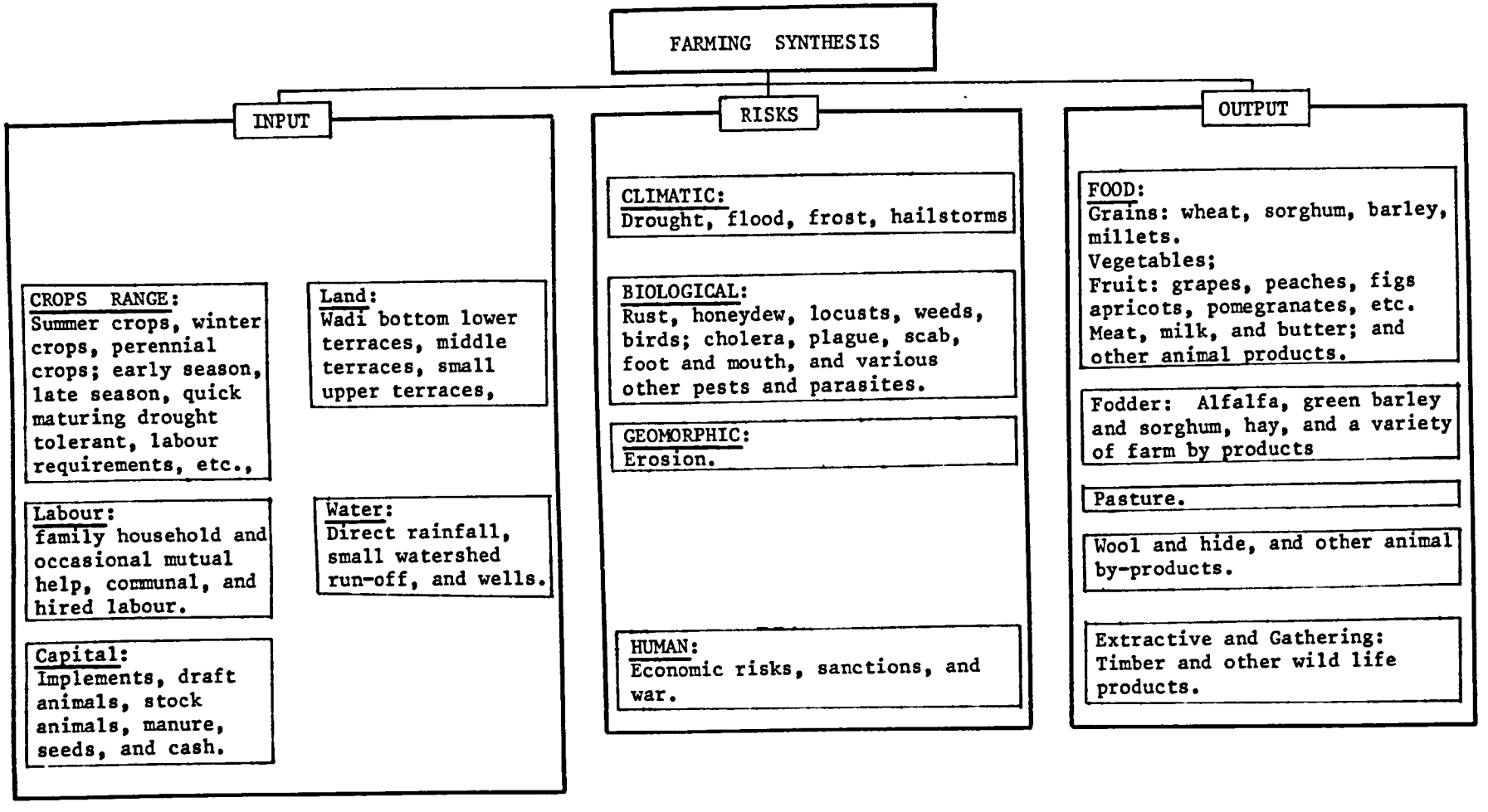
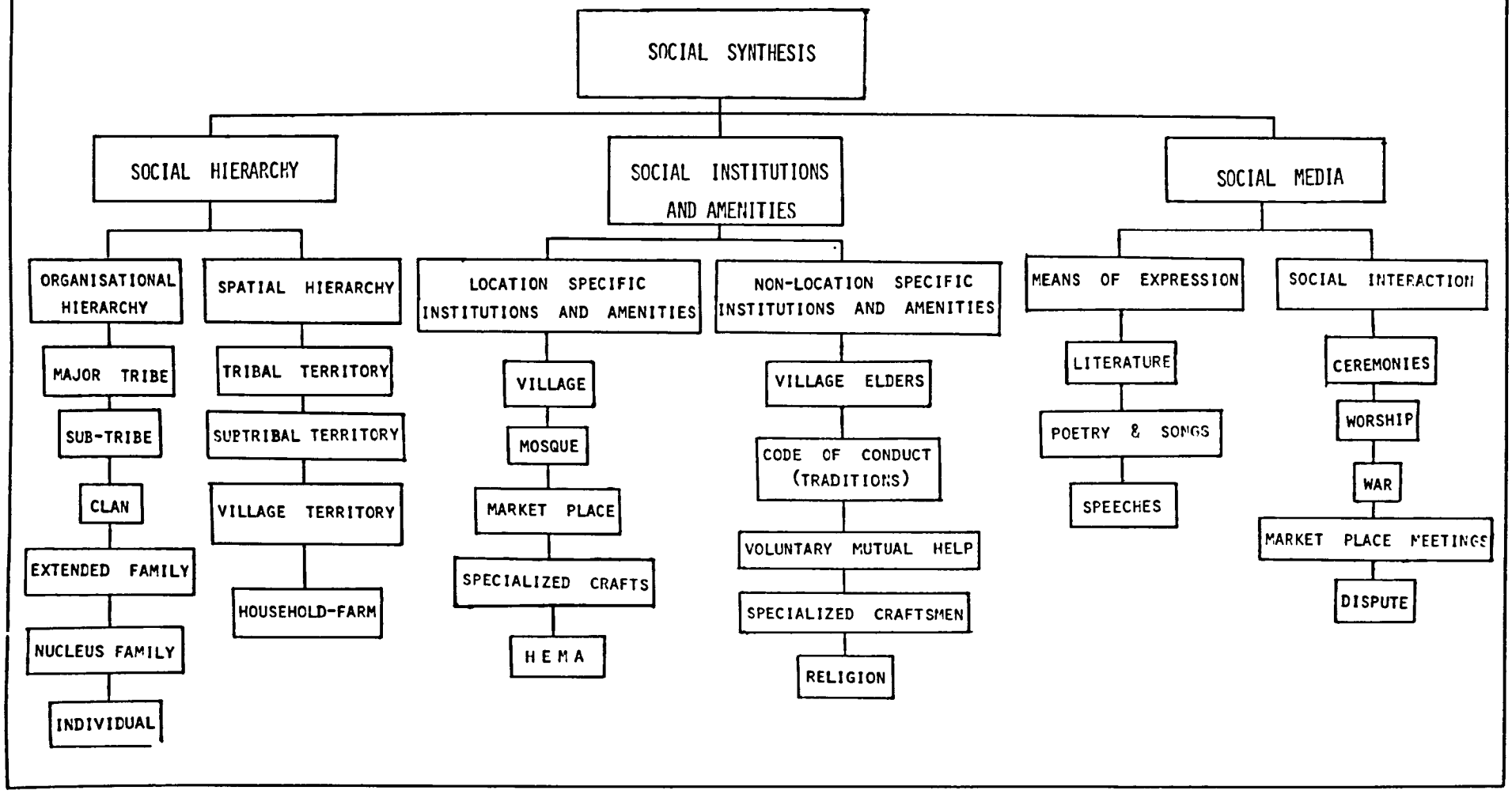

FARMING SYNTHESIS
INPUT
CROPS RANGE:
Summer crops, winter crops, perennial crops; early season, late season, quick maturing drought tolerant, labour requirements, etc.,
Land:
Wadi bottom lower terraces, middle terraces, small upper terraces,
Labour:
family household and occasional mutual help, communal, and hired labour.
Water:
Direct rainfall, small watershed run-off, and wells.
Capital:
Implements, draft animals, stock animals, manure, seeds, and cash.
RISKS
CLIMATIC:
Drought, flood, frost, hailstorms
BIOLOGICAL:
Rust, honeydew, locusts, weeds, birds; cholera, plague, scab, foot and mouth, and various other pests and parasites.
GEOMORPHIC:
Erosion.
HUMAN:
Economic risks, sanctions, and war.
OUTPUT
FOOD:
Grains: wheat, sorghum, barley, millets.
Vegetables;
Fruit: grapes, peaches, figs apricots, pomegranates, etc.
Meat, milk, and butter; and other animal products.
Fodder: Alfalfa, green barley and sorghum, hay, and a variety of farm by products
Pasture.
Wool and hide, and other animal by-products.
Extractive and Gathering:
Timber and other wild life products.

FIG. 7.3


SOCIAL SYNTHESIS
SOCIAL HIERARCHY
SOCIAL INSTITUTIONS AND AMENITIES
SOCIAL MEDIA
ORGANISATIONAL HIERARCHY
MAJOR TRIBE
SUB-TRIBE
CLAN
EXTENDED FAMILY
NUCLEUS FAMILY
INDIVIDUAL
SPATIAL HIERARCHY
TRIBAL TERRITORY
SUPTRIBAL TERRITORY
VILLAGE TERRITORY
HOUSEHOLD-FARM
LOCATION SPECIFIC INSTITUTIONS AND AMENITIES
VILLAGE
MOSQUE
MARKET PLACE
SPECIALIZED CRAFTS
HEMA
NON-LOCATION SPECIFIC INSTITUTIONS AND AMENITIES
VILLAGE ELDERS
CODE OF CONDUCT (TRADITIONS)
VOLUNTARY MUTUAL HELP
SPECIALIZED CRAFTSMEN
RELIGION
MEANS OF EXPRESSION
LITERATURE
POETRY & SONGS
SPEECHES
SOCIAL INTERACTION
CEREMONIES
WORSHIP
WAR
MARKET PLACE MEETINGS
DISPUTE

the only claim here made is their applicability to this study of Assarah and the neighbouring highlands of the Yemen.

In the remainder of this chapter the discussion will be limited to the three main interrelationships and linkages which are thought to be of the most important effect on both social and farming synthesis. These linkages, indicated in the general model Figure 7.1 as A, B, and C, will be examined and analysed only in as far as they apply to our study area. The third main component in the general model namely dwelling and settlement pattern will be discussed later in Chapter IX.

An important qualification which must be emphasised here is that most of the concepts put forward in the model and much of what will follow of descriptive accounts are meant to apply to the community of Assarah before undergoing the recent drastic changes. Specific institutional and other elements touched on in this chapter are examined more fully in Chapters X-XII.

GENERAL EXAMINATION OF THE RELATIONSHIPS BETWEEN THE PHYSICAL ELEMENTS AND THE FARMING SYNTHESIS: (LINKAGE A)

When examining the relationships between physical elements and farming systems certain facts emerge providing, among other things, a partial explanation of the static nature of the community and illustrating the magnitude and intricacy of the socio-ecological interaction. These relationships and the characteristics associated with them reveal themselves in many different ways. Sometimes they are prominent and sometimes they are more subtle and less apparent. For the sake of clarity these facts and relationships will be grouped under three headings, each group comprising a function or a network of functions operating over a large sector of farming synthesis. Each of these is given a key word which reflects the general characteristics of the group and its components.

1. Production Pursuits: (Uncertainty)

Here is the essence of the whole existence of individuals as well as groups; people work laboriously to make their living, yet their efforts are enveloped in a dim uncertainty. The harsh character of the physical environment and the unpredictable behavior of many elements results in a high degree of human uncertainty. The subsistence system in itself is in many ways a response to and reflection of the magnitude of uncertainty. The peasant of Assarah as a subsistence farmer has much at stake; he is preoccupied with the fear of many hazards: drought, frost, a wide range of diseases and pests (see Figure 7.2). This does not deter him from action for two important reasons: first, the possibility of a successful harvest is in itself sufficient incentive. Survival optimism is a natural ingredient of survival in hardship. Secondly, there is the simple lack of an alternative, the significance of which will be further elaborated when dealing with the recent decline of agriculture.

Perhaps this uncertainty has contributed to the so-called fatalistic attitude which is said to prevail in the subsistence and peasant societies[1] (see below). It has also led to the creation of a wide range of crops with differing properties to suit the varying physical conditions, a particular form of diversification which has nothing to do with commercial economics, and also led to other forms of agricultural decisions. The role of uncertainty in the production function is best manifested in common sayings the people of Assarah often reiterate,"Law hasab azzarraa ma zara" implying that if the farmer were to

1. Ortiz, S. 1971 "Reflections on the Concept of 'Peasant Culture' and 'Peasant Cognitive Systems'" in Shanin, T. Peasants and Peasant Societies (Penguin), pp 332-356.

calculate all his costs against the returns he would not farm at all.

The feedback effect of such a high degree of uncertainty associated with the production function tended to curb innovations for these entail extra risks. Another aspect of this is that the amount of effort needed to be able to cope with the already existing risks leaves the peasant in no mood to engage in problem-solving thinking. In other words, he is too busy with the day-to-day quest of subsistence to engage in research of ingenious ideas and to afford to carry them through. This should not be taken as to imply that the peasant has no leisure time. He has a leisure time which is an integral aprt of the system. But inventions and innovations are not pasttime activities. The peasant is so absorbed in his self-perpetuating cyclic way of life that he is not in the right mental attitude which is conducive to invention and innovation.

2. Environmental Perception: (Conservative Conservation)

It is difficult for an outsider to conceive of the high value which these peasants attach to their environment as an asset which has to be fully exploited and yet fully conserved so that it remains eternally productive without waste and without deterioration. This conservationism is not limited to one or two of the physical assets, such as water or soil. It applies to all aspects of agricultural and non-agricultural activities. People here practised natural conservation, perhaps unconsciously, but it is so strongly rooted in their traditional values that it has become part of the cultural ethos. Terracing techniques and the "Hema" practice are only two outstanding examples of this mature environmental perception.[1] This age-old relationship

1. "Hema" is an Arabic word which means 'protection'. It refers here to a traditional institution or arrangement by which an area of land is protected from grazing and cutting to become a natural reserve, see Chapter X.

between man and his environment has resulted in a feedback which tended to create an ecological equilibrium in which physical and human factors fused into a "complicated amalgam."

During field work I came across many families who no longer depend for their living on agriculture, yet maintain uneconomic cultivation mainly to keep their fields in good condition. Some gave up farming altogether years ago but they would not tolerate weed growth or physical deterioration of field edges and terraces so that the fields remain intact, this partly for prestige and to keep up with local tradition, and partly in case they might need the land again.

When in Assarah one cannot help feeling that this area has been agriculturally utilised in the fullest extent, and, up to recent years, without over-exploitation of or adverse effect on the ecological system. This conclusion is reiterated in the works of the few people who have visited these areas. Twitchell states that "This high country 6000 feet to 8000 feet a.s.l. is wonderfully terraced and is cultivated, or has been in the past to the fullest extent."[1]

The significance of this can be seen in two respects; first, this fragile ecological equilibrium is now being unwittingly disturbed in a manner that might lead to harmful consequences. Secondly, many lessons can be learnt from the traditional conservation methods and techniques. The reintroduction of some of the traditional practices may be useful in redressing the balance and correcting some of the damages. In addition to this, many of the concepts underlying the traditional conservationism are still relevant to the present day problems.

3. Land Value and Psychic Man-Land Relationships: (Attachment)

It has been frequently repeated that the limiting factor in all

1. Twitchell, K.S. 1943 Report of the U.S. Agricultural Mission to Saudi Arabia. See also: Naval Intelligence Division, 1946, op. cit. pp 475-477; and Dequin, H. Die Landivirtsbhaft Saudisch-Arabiens und ihre Entwicklungsmoglichkeiten The English Summary, p. 217.

arid and semi-arid lands is the water. Although this is by definition true, in Assarah, being a mountainous area, there is another equally limiting and important factor, namely the shortage of cultivable flat land. This terrain factor is as important as water where life depends to any significant degree on sedentary agriculture. Such shortage of land is well borne out in the agricultural census which indicates that Assarah has the lowest acreage of cultivable land, i.e. the land which is not already under cultivation.

Terracing was the solution reached by the indigenous population to compensate for the shortage of cultivable flat land. However, as expansion in terracing is itself limited by physical and human factors there has always been a great demand for land. This is the context in which a greed toward aquiring agricultural land developed, and in which the conservationist attitude developed. As a natural result the farmer grows very attached to his land, in psychological and emotional terms. He would often die than give his land up. In this respect Crary states that "To the peasant, the land is the basis for material security; the desire to own it is deeply rooted in his philosophy of life."[1] This has contributed to the raising of the value of the land by adding a prestigious value to the role of the land buyer and by the extra price that is necessary to compensate for the humiliation of the seller who knows that he is going to lose face and status in his community. Referring to the subsistence farmer Parsons says "...the holding of land was more like our conception of holding public office than of commercial relation. To us, also, the buying and selling of 'public office' is offensive."[2]

This attachment to land is also reflected in the fact that the

1. Crary, D.D. 1955 "The Villager" in Fisher, S.M. (ed) Social Forces in the Middle East (Cornell University Press) pp 43-59
2. Parsons, K.H. 1971 "Agricultural Economics" in Leagans, J.P. and Loomis, C.P., op. cit., p 201.

migrants from Assarah to the towns are the last among migrants to cut their ties with their villages. There can be no quantitative data to substantiate these statements, but from interviews and personal knowledge many examples can be adduced, e.g., many families who moved completely to town thirty and forty years ago still keep their land and regularly send money to maintain it and repair terraces, wells and other essential features. The feedback of this state of affairs has created a false scarcity of agricultural land in addition to the already acute true scarcity.

The above-mentioned three relationships between the physical factors and the farming pattern extend to a wider scope far beyond the farming domain to affect the whole system.

GENERAL EXAMINATION OF RELATIONSHIPS BETWEEN HUMAN FACTORS AND FARMING SYNTHESIS (LINKAGE B)

The relationships here are more complex and intricate since the human factor is involved at both ends of the relationship and is unstable and constantly variable. Adopting the same analytical approach which was used in discussing linkage A one could trace four groups of factors which originated in the social organization and had far-reaching effects on the farming practice. These factors represent social institutions which means that the historical factor is involved. In this respect, as will be indicated later, Assarah lived in a historical isolation unaffected by the major world events. The only historical current which was strong enough to reach such an isolated community and to affect the infrastructure of the social life was the introduction of Islam, not merely as religion, but as a social system bringing with it institutions ready-made to the last details.

1. Inheritance: (Gavelkind)

According to the Islamic Law, which has been strictly adopted and applied in Assarah for over fourteen centuries, there is elaborate and very detailed legislation catering for almost every contingency. The most significant features of inheritance legislation which have a bearing on the present analysis are as follows: First, in the case of more than one child, the male gets twice as much as the female and this applies equally to all sons and daughters. Secondly, some relatives get a fixed share, which varies under different conditions. For example, a wife gets a quarter if the deceased has not got any offspring and one-eighth if he has. Thirdly, there is a priority order underwhich some relatives would not get anything except in the absence of the cidevant relative of that priority order.

One important side effect of this inheritance system, though not necessarily a consequence of the legislation, is that nearly everything is subject to division. Money and property, including land and houses, are subject to minute division and subdivision. Examples of houses being divided on the basis of different floors given to different families are not infrequent. Such legislation helps even out the distribution of wealth and helps to curb the formation of excessively large holdings. This serves the social and economic wellbeing of the vast majority of the population by driving toward securing a certain level of fixed capital to each individual more or less according to his needs. Such a concept of broad base of wealth is perhaps an unconscious expression of the need for community survival. In other words the legislation serves an urgent human need in such a stable peasant community. The necessity to alter, modify or substitute for this law did not arise, unlike the situation in many other parts of the Islamic world where political, military and economic pressures have

precipitated many alterations in the law, or at least new interpretations were arrived at and the emphasis on some of the old interpretations were shifted.

Another feature of the law is that inheritance, with other transactions, includes as an inseparable part of the property, the right of access, water rights, and many other rights which exist at various orders and in different proportions. This division and subdivision of land led among other things to a serious fragmentation problem. The analysis of this problem will be attempted later on (see Chapter XIV) suffice it here to say that fragmentation coupled with a scattered dispersal of holdings played a restrictive role on the capability of the peasant family to expand its holding in area or to improve on production beyond the subsistence level.

The feedback of this problem was the accentuation of the marginality of many parcels and many holdings due to the increased labour and time requirements of the processes of the preparation for the farming phases, the assembling and dismantling of implements and the actual travelling to and fro. These increments are deliberately referred to here as labour and time requirements to avoid the term "economic cost" which implies a judgement based on economic reasoning on the part of the peasant. This is not the case, at least not in a monetary or commercial sense.

The effect of all this was the pushing further of the farmer towards the perpetuation of his living standard at the subsistence level. However, this is not a consequent of the inheritance law as such, but rather a result of the narrow resource base and land shortage. The legislator's aim is to ensure equality; if the provision which is to be shared out is too meagre, it is inevitable that hardship will follow. The alternative is to let some people have large shares and therefore live happily, while a large number will have to die of

starvation, leave the community or subject themselves to one kind or another of serfdom. Whether such consequence could have been better or worse for the community is another matter.

2. Land Tenure: (Owner occupier)

Unlike many other peasant regions of the Middle East, land tenure in Assarah has remained constantly on an owner-occupier basis and a family undertaking affair. The reason behind this is that the socio-economic and political pressures which led to the development of large scale land control by non-cultivators as in Iran or Egypt did not even appear in this region. This was due largely to the remoteness of Assarah from the main political arena and partly to the secluded nature of the community which is discussed below (linkage C)1). Other reasons may be found in the inheritance system which tends to trim off holdings. Even if there is a would-be landlord in the village, there are two factors which play against him developing a large holding: first, the farmer's unwillingness to sell his land for prestigious reasons (see linkage A.3). Second, the fact that the wealthy man is more likely to have a large family means that by the time he aquires an above average holding, it will be divided among his many heirs upon his death. This will reduce the individuals' holdings to or below the average. No wonder then that hired or leased holdings in the agricultural statistics of Assarah are virtually nil and that hired agricultural labour is very small.[1]

Beside the owner-occupier land tenure there is a kind of share-cropping in the region, but nothing like what is usually referred to as share-cropping in other parts of the world, in the sense that it is not contracted between a rich landlord and landless tenants, but rather

1. Ministry of Agriculture: Agricultural Census 1964

a mutual agreement between two small-holders. There are three situations under which such share-cropping takes place. First, if the family households, for any reason, cannot provide the necessary labour force to cultivate their land, then they would give some of or all their plots to any other family in the village willing to take it. Secondly, if some parcels are too distant or too small to justify the efforts to farm it, the owner may allow a neighbouring peasant to whom the efforts are more justifiable to work the land. Thirdly, when the family no longer lives in the village it could give its land to a share-cropper more often for the sake of maintenance rather than for the crop. After taking the seeds and tithes from the yield the share-cropper usually gets half the remainder, in the case of rainfed crops and more than half in the case of irrigated crops. The landless share-cropper is non-existent. Even this type of share-cropping is so insignificant that it does not appear in the agricultural census.

The absence of landlordship facilitates a form of stability which is advantageous not only because the land, being the chief economic asset, is more evenly distributed, but also because in any further agricultural development program the redistribution of land, which has been the prime constituent of most agrarian reforms, does not really arise. The general characteristics of this owner-occupier type of land tenure is not peculiar to Assarah, but common in the whole country. This may, perhaps, explain why the government in its efforts to develop the agricultural sector adopted a policy of distributing newly reclaimed government land rather than redistributing from the richer to the poorer, for there are not many excessively large scale holdings in the first place.

Absentee landlordism did not appear in any significant proportion until recently. People migrated to the towns first as individuals and later took their families with them, (see Chapter VIII). This recent

migration has had many repercussions. To consider farming, fields have gradually fallen out of use and a general agricultural decline has set in, not just because of a decline in the labour force, however valid this may be, but also because such migration provided alternative income, thus weakening the incentives to labour with the land.

The feedback of this operative relationship between such social institution as the land tenure and the farming synthesis comes in the form of small scale economy. It resulted in many small land units and many small working units. The multitude of such units must have altered the rationality of margins. This is evident in the fact that many a small parcel or holding were marginal because of their size, while on the other hand the scarcity of land and the absence of any other livelihood resource made the people push the margins of their input to an extreme. Thus a sizeable area of marginal land and a sizeable amount of marginal labour were all employed in the production function.

3. Water Rights: (Control and Sharing)

Here is a good example of a confluence of relationships where all physical and human factors concert to create an institutional system essential for the survival of the community. Such an institution is safeguarded, like all other institutions in such traditional peasantry, by unwritten laws which fermented in accumulated experience and matured as traditions and customs which are accepted and defended by all.

Water rights in Assarah are mainly of two kinds; namely those related to run-off water and those related to ground water in wells. In respect of the run-off there are two orders of allotment. First, we have the immediate catchment run-off. Since the cultivated fields are scattered in narrow wadis flanked by hilly terrain, most parcels have a watershed area close by. These catchment areas are in most cases communally owned, belonging to a whole village or tribe. Yet each field

or rather terrace has the right to the run-off of the immediate catchment area by which the owner usually channels that run-off to that terrace. The second order is concerned with the overflow or surplus of the upstream plots and the run-off of the more distant catchments. In the latter case the priority order follows the contour downwards; the upper field gets flooded first, then the lower. This type of distribution involves hard work in channelling and sometimes ditching which is carried out either collectively by all the beneficiaries or by individual owners each doing his immediate share.

The second type of water rights concerns wells. A well is usually dug when it is felt that more irrigation water is needed and when the proposed site is agreed upon by several farmers. The construction of the well is usually carried out by a group of families since the task is usually beyond the capability of a single family. Each family which will have water rights from the well will subscribe proportionately to the construction. Then, even before the actual digging, the well is divided into shares and allotted to participants according to their contribution, which corresponds more or less to the size of the fields which would be irrigated from this well. The well site is considered as a part of the contribution. When the well is successful and ready for use the shares are reallocated in terms of days of drawing water with a minimum share of half a day in a turn of a week or two weeks. When one's turn comes it is up to one to take it or leave it. In the event of the well being damaged the cost of repair is allocated proportionally to the shares.

The significant effects of water rights on agriculture can be seen in the intensive use of both run-off and ground water. The former is illustrated by the extensive use of terraces and watershed channelling. The latter is apparent in the density of wells in irrigated areas (Fig. 6.2). Both practices led to the improvement of both the

soil and the water resources, hence the general potential agricultural output.

The feedback of this relationship is that stress and emphasis are put on the mutual co-operation and understanding. The keeping up of all these water rights and the safeguarding and maintenance of water resources require more and more communal co-operation. A final remark on water rights is that they are an integral part of a wider ownership right. From a legal point of view transactions include these rights explicitly and implicitly.

4. Communal Relations: (Cohesion)

In a subsistence community where each family depends for its food supply almost entirely upon the efforts of its members, and where each family is therefore self-sufficient, one might assume that the relationships between families are weak. This is a false assumption, because family independence is only partial. For example, all farm lay-out and management and all subsequent decision-making are the responsibility of the family head. Yet, however independent he may seem, his freedom is limited by the old traditions which call for conformity, and he obliges. Besides, in the actual every-day activities whether agricultural or otherwise the family capability of handling all its affairs is even more limited. Indeed, a host of tasks necessitates a collective handling. With regard to farming activities, irrigation basining and harvesting are some of their tasks. On the domestic side a significant example is the roofing of the houses. When a man builds himself a house he may spend as long a time as he likes, but when it comes to making the roof it has to be done within

one day,[1] so the whole village turns up to help. Yet another example are emergency situations when families as well as individuals become totally dependant on the help of the community. In the case of fire or drowning and in the case of an animal being lost, it is the responsibility of the whole village to give immediate help to recover, salvage and correct whatever possible, and no one shall be excused.

Such communal responsibilities go even further to cover all the functions which in an urban community are performed by such institutions as the police, welfare office, the army and the social security. For instance, if a member of the village experienced some unfortunate accident through which he suffered a considerable loss, all members of the village meet and assess the extent of the damage and decide on a(fargah) the contribution which every household has to make. This usually comes in the form of a fixed cash payment. Such old traditions are still very much in evidence not only in the rural areas, but also among the village migrants in the urban centers. I have witnessed a couple of instances which took place in the industrial settlements around the oil fields in the Eastern Province. In one of them a migrant from Assarah was involved in a traffic accident in which he was sued for damages and imprisoned. In another a migrant shopkeeper suffered a considerable loss when a fire gutted his shop. In both cases the other co-villagers met and decided on some fixed fargah to compensate for the damage and to pay for a solicitor.

This cohesiveness is reinforced by a deep feeling of insecurity among the rural population due, to a large extent, to the inherent

1. The roofing needs to be completed within one day for three reasons: 1) being made of beams, thatches and mud the roof will be more consistent and cohesive; the risk of rainfall spoiling the roof is minimized. 2) Since the whole village is going to help, it is in the interest of everybody to get it over with in one day. 3) The roofing occasions the final stage of construction after which the house becomes a habitable home. This is a significant social happening worth celebration. If the operation is dragged over several days it will lose its thrill.

irregularity of the physical environment and its resultant unpredictability as already mentioned in linkage A. When the villagers were asked why do they oblige such traditions, their answers came in three forms: either that this is the proper course of action a real gentleman should take, or one should not abandon his brother in time of need, or that this fate comes from God and it could happen to me.

There is also a religious backing to this cohesiveness. Islamic teaching took every chance to preach togetherness, brotherliness and the communal co-operation between the faithful. One of the phrases which are repeated in every Friday Prayer says "hold to the community for God's hand is with the community, he who deviates deviates to hell." The prayer itself which is held several times a day is in itself a good example of the religious influence in propagating a good community spirit. Beside this religious backing to the communal relationships there are certain social sanctions which are resorted to to reinforce conformity. Any individual or family who deviates from community norms is despised, let down in times of need and rejected from the community social functions, a severe penalty only a few people would risk.

The feedback of this social cohesion assumes the form of yet further cementing agent to the traditional structure making the people more respectful to the old traditional values and making any attempt to change their attitude all the more difficult.

GENERAL EXAMINATION OF THE RELATIONSHIP BETWEEN THE PHYSICAL FACTORS AND THE SOCIAL SYNTHESIS (LINKAGE C)

In this relationship the physical influences seems to be dominant; hence the direct effect moves only one way. The influence of social synthesis on physical environment is rather of an indirect nature filtering through the farming practices as has already been mentioned (Linkage A.2 and linkage B.3). The effects of physical conditions on

human aspects in any society are of varied nature in both intensity and clarity. Some of these effects are strong and conspicuous, others are only secondary, subtle and sometimes indistinctive. One of these problematical effects is the influence of physical conditions on the physique and mental characteristics of the people. Although one can notice certain traits which distinguish one geographically or ethnically isolated community from another, it is difficult to ascribe such traits which distinguish one geographically or ethnically isolated community from another, ~~it is difficult to ascribe such traits~~ to a single factor, because one cannot be sure as to how much of it can be ascribed to environmental factors such as climate or topography and how much can be ascribed to anthropological and genetic factors.[1] Diet, in itself a result of both physical environment and social habits is a further confusing factor. Since such effects are only of minor importance and because of the complexity of their analysis which is beyond the scope of this thesis, the discussion will be confined to the more important physical influences which contributed to the formation of the community system under consideration.

1. Physical Accessibility: (Occlusion)

Assarah is clearly an isolated region as already mentioned in Chapter III. Such physical isolation was strengthened by the fact that all the Arabian Peninsula was in a political and cultural isolation for many centuries in the past.[2] This made the occasional contact which took place between Assarah and its immediate neighbouring

1. Coon, C.S. 1965 The Living Races of Man (London: Jonathan Cape) pp 7-9 and 209-265.

2. Asfour, E.Y. 1972 "Prospects and Problems of Economic Development of Saudi Arabia, Kuwait and the Gulf Principalities," in C.A. Cooper and S.S. Alexander (eds) Economic Development and Population Growth in the Middle East (American Elsevier) p 369.

areas of little bearing in affecting change. Up to twenty and thirty years ago the only effective means of transportation was the camel. Commercial traffic was rather of an outward nature limited to exporting agricultural produce and importing a very few commodities.[1] (see Chapter X).

The only physical contact between Assarah and the outside world was in the form of a few Turkish garrisons which came in the wake of some local political conflict thought to be related, to some extent, to the international political and military conflict prior to and just after the First World War (see Chapter VIII). Another contact was in the form of a few people from Assarah who, perhaps being more ambitious than others, migrated to the Sudan, Eritrea, and Abyssinia in the search for work. Most of those kept in contact with their homeland.

The very geographical factors such as terrain, climate and environment exploitation which distinguishes Assarah from all other areas set certain limits which made social customs and habits such as diet, costume and means of expression contrast with other areas. This added yet another social uniqueness to Assarah. It is true that physical and social differences between regions do often encourage economic exchange;[2] in the case of Assarah we have another factor. Although the physical inaccessibility did not stop some sort of economic exchange, the special character of Assarah did certainly inhibit many of the exchanges which may otherwise have taken place. To give an explanatory example, the clothing and costume of the cold upland cannot be exchanged with those of the hot, damp, coastal plains,

1. Mughram, A.A. 1966 (An article in Arabic on transportation and communication in Assarah region) in Bulletin of the College of Education Vol 2, Mecca, Saudi Arabia, pp 98-110.

2. Porter, P.W. 1965 "Environmental Potentials and Economic Opportunities: A Background for Cultural Adaptation" reprinted in P.W. English and R.C. Mayfield (eds) 1972, op. cit., pp 136-146.

and most of the implements and utensils of the agriculturally based, settled tiller cannot be exchanged with those of the pastoral migratory bedouin. We know from other regions, for example, south-western Iran, that nomadic pastoralists have in fact significant but limited in range exchanges of goods with sedentary villagers[1] and this to some degree also occurs in Assarah (Chapter X). The point to be emphasised here is that the life-styles of the high-mountain villagers are so very distinctive that the range of mutually beneficial exchange is more limited than is usually the case. The same inexchangeability equally applies to the mental attitudes and values, because they stem from and are tied up to these social habits.

Another consequence of the lack of transportation can be viewed from another angle, the remoteness of Assarah from the urban centres. Jedda, Mecca and Taif are the largest towns near the northern tip of Assarah. Although the central part of Assarah is only a few hundred kilometers from these towns, the actual journey was exceptionally difficult because of both the mountainous terrain and the poor transportation means. Before the coming of the motor vehicle the trip from any of these towns to any part of Assarah used to take about as many days as it takes hours now, or even longer. For example, the journey from Taif to Baljorashy used to take about seven days by camel. When the motor vehicle first came to Baljorashy the journey took about three days due to the appalling road conditions. When road conditions were improved it took only one day. Now that a part of the road is paved with asphalt it takes only six to seven hours and this time is decreasing as the asphalt is extended southwards. In other words Assarah was remote in terms of the efforts required to get across. (For a further discussion of distance effect see Chapter XIV).

1. Barth, F. 1961 Nomads of South Persia, (London)

The result of this physical isolation was an enclosure of the community in itself, and this curbed and confined the community's sphere of influence and provided physical fortifications for its inherent resistance to change. The first-hand sphere of familiarity or the terra cognita of the average villager was confined to the radius of one day return trips, or, to use Sonnenfeld's phrase, the "behavioral environment"[1] of Assarawi peasants was very limited.

The feedback of such isolation and occlusion was the detachment of Assarah as a region from the neighbouring regions and the detachment of each individual community in Assarah from every other. This is very much evident in the wide range of accents, costume and other social habits which vary slightly from village to village, but widely from tribe to tribe. In this sense one can hardly find more appropriate description of this occlusion than De LaBlache's statement:

> "Mountains not only bring communities into being, they preserve them, once they have been created.2

2. Environmental Unpredictability and Hardship: (Challenge)

The extent of the environmental unpredictability and physical hardship has already been discussed in Chapters IV and V, particularly with regard to topography and climate; also some of the major risks with which the farmer of Assarah had to live are indicated in Figure 7.2. Despite the fact that the physical conditions over Assarah are more favourable to human settlement than in the interior deserts, it is still far from being comfortable or accommodating. Thus when we consider the environment as a whole we find that it posed a kind of

1. Sonnenfeld, J. 1972 "Geography, Perception, and the Behavioral Environment" in P.W. English and R.C. Mayfield, op. cit., pp 244-251.
2. De LaBlache, P.V. Principles of Human Geography

challenge which people can only barely accept. Survival in this harsh environment can only be achieved at a high price of hard physical endeavour and emotional and mental strains. In other parts of the world where more generous environments can be found, the mountain areas like that of Assarah serves only as pasture and woodland areas. To make a living a peasant family in Assarah has to fight against many odds; it has to create the soil, manure it, irrigate it, and preserve it. It has also to be prepared to receive any degree of loss without warning; seasons may fail and epidemics may strike at any time. The terrain is harsh and unyielding. Food is sometimes plentiful and sometimes very scarce.[1]

The result of such influences was the development of a mental attitude of mixed inclinations, in which people became both fatalistic and deterministic. These two seemingly contrasting attitudes co-existed as a balance and counter-balance. Such a mental characteristic is by no means peculiar to Assarah, it is a common feature in many subsistence communities.[2] The reason behind its conspicuousness here is largely due to the magnitude of the physical elements which induced it.

This mental attitude is often mistaken by the uninitiated for passive fatalism. The important point to stress here is that such an attitude is not an inherent motivational character which dictates passiveness in the face of adversities. It is rather a psychological refuge to which the peasant reverts when results, both good and bad, fall outside the boundaries of his narrow expectations. It is an easy

1. For further amplification of the natural hazards and their perception see: Burton, I. and Kates, R.W. 1964 "The Perception of natural hazards in resource management." Reprinted in P.W. English and R.C. Mayfield (eds) 1972 op. cit., pp 282-304.

2. Ortiz, S. op. cit., pp 330-335.

way of interpreting the contradictions between his limited rationale and nature's erratic behavior. The peasant does not sit back counting on God or fate to take care of things; he does not hold his hands behind his back believing that he cannot interfere in nature's actions. On the contrary he works extremely hard and he knows his work will result in certain benefits, but he knows also, that many forces beyond his perception, let alone control, could interfere at any time and drastically change the outcome.

CHAPTER EIGHT

PEOPLE

ETHNOLOGY:

All the peoples of Assarah are indigenous, except for a very small minority which will be mentioned later. They consist of a multitude of tribes. The vast majority originated from the very old Yemani super-tribe Qahtan, while the rest belong to Adnan, the other northern super-tribe. The remaining are a mixture of the two or controversial in origin.

Racially, the people of Assarah, like the rest of the Arabs, belong to the Mediterranean race with a high degree of purity,[1] due mainly to their seclusion and the fact that southwestern Arabia has been a source of many intermittent waves of migrations, rather than a recipient. Although interracial mixing had taken place in some peripheral parts of the peninsula a long time ago and in some interior parts very recently, such as Taif and Riyadh, Assarah and its continuation into the Yemen, along with some central parts, is still the least racially diluted.

The racial physical characteristics of the people of Assarah seem to agree with those cited in many physical anthropological books as belonging to the pure Mediterraneans.[2] Such characteristics as being brunette, moderate-sized (165 cm, 5'5"), sallowish-skinned, with thick wavy hair, highbridged noses, mesocephalic head and brown eyes are common. Among the physical characteristics cited in the nation-

1. Abo Al Ula, M.T. 1965 (in Arabic) The Geography of the Arabian Peninsula Vol 1, Saudi Arabia, p 136.

2. Coon, C.S. 1965 op. cit. pp 72-77.

ality certificate forms issued by the Government of Saudi Arabia as identifying features are skin and eyes colour. Perhaps it is not surprising that the clerks who issue these certificates have developed two terms as colour adjectives describing the most common colours of the skin and eyes which they encounter. They refer to the skin colour as being wheat-like and the eyes as being honey-like in colour.

The only racially alien minority among these people are the Africans who were brought to the region as slaves. Most of them are in-bred. From their physical features one can notice that the majority of them are of negroid origin while the rest are Hamite. The vast majority of these ex-slaves have black pigment of the deepest dye.

Although quantitative substantiation is lacking one gets the impression that Assaraweyen (people of Assarah) are more nourished than their bedouin neighbours to the east or the Tehameyen (people of Tehama) to the west. This is not unexpected because the food supplies are relatively more abundant and the climate is healthier. This is shown in their slightly superior physical measurements.[1]

Whatever doubts there may be as to the pre-historical racial purity or mixture of these people,[2] there is little doubt about their ancestry and tribal affinities. Nearly every single family belongs to a particular clan and every clan belongs to a particular tribe. All these tribes descended through a long chain of ancestors from one of the two major forefathers, Adnan and Qahtan, from whom all Arabs everywhere claim descent. Such clarity in ancestry in Assarah is only matched by the clarity and distinctness of the

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1. This is based on observation. There ~~is~~ are no vital statistics available for comparison.

2. Dunlop, D.M. 1971 Arab Civilization to A.D. 1500 (Longman) pp 3-6

territorial sovereignty.[1] Apart from private property, every village, clan or tribe knows exactly where their border line with their neighbouring village, clan, or tribe is to within a yard. Ironically, this did not rule out territorial disputes but rather made them more fierce.

The ethnic aspects of these people have no bearing on their number, distribution, or their life style (i.e. whether they are nomads, Sarrawi villagers, Tehami villagers, or Tehami pastoralists). This is evident in the fact that many tribes, such as Ghamid and Bani Shihr and others, have many sub-tribes living in Tehama, while the major bulk of the tribe is found on the highland (i.e. Assarah); yet more subtribes roam far and wide in the hilly country to the east. Other tribes, like Zahran and Bani Malik, consist only of Tehamis and Sarrawis without bedwins. Moreover, tribes like Shahran have the bulk of their people and territories east of Assarah, extending from Bishah to Khamis Moshait where they lead a nomadic or oasis life with only a few sub-tribes living as Sarrawi villagers and none in Tehama.

The name of the tribe usually refers to a long past ancestor. Although it is sometimes literally true that all individuals among a tribe are genuine descendents of that ancestor, evidences and examples are ample of a clan originally from a certain tribe which finds itself obliged to make alliance with another tribe and even becomes an integral part of it. Such alliances take place at all levels, from an individual leaving his village and allying with another village, to a tribe making alliance with another tribe. The circumstances which lead up to such social dismemberment and regrouping are lengthy and beyond the scope of the present thesis. Suffice it

1. Wahba, H. 1967 Arabia in the Twentieth Century (in Arabic) p. 34.

here to say that these circumstances nearly always involve some kind of otherwise insoluble dispute resulting from internal rivalries and frictions.

With regard to the geographical distribution, there is not, to my knowledge, any map which shows delineated tribal territories. However, Figure 3.3 can be considered as an approximation of the distribution of the major tribes in Assarah. Every such major tribe comprises either a number of subtribes, a confederation of smaller tribes, or both. The distribution of the subtribes within the major tribes is even more difficult to assertain, however, Figure 10.2, which shows the geographical distribution of the subtribes of Ghamid and Zahran can be considered as an example.

HISTORY:

It is not within the scope of this dissertation to delve into the past of this community, nor to verify or refute certain historical events. The attempt will be limited to giving a brief account on the evolution of the community of Assarah in order to give the reader an idea of the background of the present-day situation. It is also hoped that this account will shed some light on whatever events have resulted in any change in the way of life, if any.

Writings about the history of Assarah are very rare and those that are available are limited in scope to the recent history which goes back only one or two centuries. Indeed, one is struck by the lack of writings on this region, not only in Western languages, but also in Arabic. The people of Assarah themselves were largely illiterate. Those who were literate did not seem to be concerned with their history. This is reminiscent of a comment once made on Russian peasantry: "This people has no historical memory. It does not

know its past and even acts as if it does not want to know it."[1]

It is ironic that Assarah, one of the best agricultural areas of the country, is the least documented. Indeed, one can find more publications, especially in English, on the Empty Quarter than on Assarah. Possibly the reason is that indigenous historical interest seems to develop only in areas with widely based and hierarchical social organization where urban environment and the need for some kind of education can develop. In other words, history is recorded where it is made. Assarah had not, until recently, attained such a stage of development. In view of this, historical writings had to come form outside sources, and unfortunately, there is not much to be gained from these sources. The reason is that Assarah did not attract many outsiders. Exogenous interest in a particular area would only develop if there were a political interest, an economic prospect, or an aesthetic attraction. Assarah had none of these. It has never been a center of a major issue of any international political or strategic significance. There was no economic bonanza to attract foreign investment; no remains of a grandiose past to be marvelled at or uncovered; and no special natural beauty or unusual natural phenomenon to attract tourists and travellers. The Empty Quarter had at least one or two of these attractions. Assarah was simply a plain peasant community the likes of which were to be found everywhere. If one adds to this the uninviting climate around it and its difficult terrain, one wonders why should anyone, other than its people, take the trouble of going there.

Thus Assarah never assumed any historical significance so as to attract special attention from the few historians and geographers who

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1. Gorky, M. "The Barbarians" (Excerpts from M. Gorky, On the Russian Peasantry Ladyshnikov, 1922) reprinted in T. Shanin (ed) 1971 Peasants and Peasant Societies (Penguin) pp 369-371.

could have documented its history. It was always on the periphery of some other center of gravity.

The historians speak of the old Yemeni Civilization as represented in the three kingdoms which flourished during the first millenium B.C., the Pre-Islamic Meccan Community, and of the more advanced civilizations which flourished in Northern Arabia and beyond. The first thing we hear about Assarah is that during the early Christian era, after one of the old Yemeni kingdoms began to fall and when the land could not longer support its people, a major tribe called Asd set out northwards. A group of this tribe settled in Assarah, the remainder continued the march leaving similar branches on their way at Mecca, Yathrib (Madena) and Petra. A group of the same tribe went to Oman.[1] The three later localities were known to have an already developed settlement. As for Assarah, no definitive answer is given as to whether there was any previous community or not. The newcomers, one assumes, having acquired their agricultural skills from their original home and having settled in an area geographically similar to their previous land, went about their activities more or less as they were used to. Beside the intermittent waves of migrations, the historians speak of regular trade between this civilization center in southwestern Arabia and the civilization centers of north Mesopotamia, Palestine and Egypt.[2] The route of such migration is always assumed to be parallel to the Red Sea shore, but whether this followed the coastal plain or the highlands no one ventures to say. There may have been more than one route.

The most significant historical event took place in A.D. 631

1. Nearly all major books on the history of the Arabs mention the migration and dispersion of the tribe of Asd. Among the classical writing see for example Ibn Kaldon, (Ketab Al-Ebar) Vol II, pp 524-528.

2. Al-Ali, S.A. 1955 (in Arabic) Lectures on History of the Arabs Vol I, pp 10-76.

when the people of Assarah embraced the new religion - Islam - and sent a delegation to Madina to see the Prophet Mohammad, expressed their adherence to Islam, and asked for enlightenment about the teachings of Islam.[1] The new religion seemed to have appealed to these previously pagan people. Soon afterwards, and most important, the expanding spirit of Islam and the new horizons which it opened to all Arabs swept in its fever many a warrior from Assarah who fought under the banner of Islam with fanatic enthusiasm and heroic zeal.

Within a decade or two people from Assarah reached Egypt, North Africa, Syria, Mesopotamia and beyond.[2] They settled in the new territories, many of them and their off-spring assuming prominent positions militarily, socially and culturally. Historically this outflow of people, who never came back, constitutes yet another population overspill which Arabia had experienced several times in the past. What happened to the people who remained in Assarah? The books do not reveal much in this respect.

However, the adoption of Islam meant the abandonment of the old gods and idols along with the old ways of worship. The new teachings and rules of Islam did not meet any hostile reaction from the people, perhaps because Islam did not run contrary to their interests in any serious degree. The ensuing migration, one assumes, absorbed the increases of population, and that drained away at least some of the old territorial agressiveness which in the past made the intertribal wars the norm. Since then Assarah has been administratively tied either to Sanaa in the south or to Mecca in the north. The border between these two wilayat (provinces) was never permanent and oscillated

1. AnNaami, H.S. History of Asir (in Arabic) pp 96.
2. Al-Jasir, H 1971 In the Sarah of Ghamid and Zahran (in Arabic) Riyadh, Saudi Arabia: Yamamah House) p 255.

over the whole region. In addition, some other small centres of administration such as Zabeed, Saada, and Taif have occasionally assumed some local importance.

For about a thousand years after the early period of Islam we hardly hear anything of importance about Assarah or its people. It seems that neither their way of life nor the system of production had undergone any significant change (see Chapter X). This long period of cultural dormancy among other things perpetuated the society's technological attainments at a low level and fossilized its style of life, arresting its advance.

In the last two centuries we start to have very few glimpses of news and events in Assarah. The northern parts of Assarah used to be under the rule of Mecca Sharief whose loyalty was to the Ottoman Empire. When the Sharief decided to break his ties with the Empire his decision did not affect this area in any significant way. This diminishing influence of the central government at Istanbul and the provincial government at Mecca was due to the fact that Mecca was on the periphery of the Empire and Assarah was on the periphery of Mecca's provincial domain. Indeed the religious importance of Mecca and Madina was the only linkage between the Empire and western Arabia.

Further south in Asir and Najran the area experienced different kinds of subordination to the Imamate in Yemen, the Ottoman Empire and to local rule, all of which had little impact on the administration, in particular, or on the tribal structure, in general. Under the Ottoman Empire the senior administrators were generally Turks who hardly felt any obligation towards the welfare of the region. Besides, the Turkish administration was largely based on military, rather than economic or cultural concepts. The tribal doctrines and the inter-tribal politics and quarrels remained the main spring of local politics.

Before the turn of the eighteenth century we know that the Saudi rule and the Wahabi religious movement reached Assarah for the first time and were taken up for a limited period. However, this influence soon receded.[1] Since then the whole area from Mecca to Sanaa both in Assarah and Tehama underwent many local wars caused by small regional state rivalries through which Assarah's nominal sovereignty swung from one side to the other. Nevertheless it remained the main supplier of most agricultural products to the towns around it. The early eighteenth century also witnessed the introduction of rifles and gunpowder, and perhaps a few other innovations. Over the whole of the nineteenth century and the first quarter of the twentieth century many wars, both political and intertribal, coupled with severe droughts and many plagues contributed considerably to the agricultural and environmental deterioration which is still evident. One chronological manuscript which I found in Baljorashy lists eight severe droughts, nine wars, three serious locust invasions and five plagues during the period from 1796 to 1920. Sometimes two or three of these disasters took place simultaneously (see Chapter X and Table 10.1).

POPULATION:

The idea of a census is a strange procedure for the whole country. However, ten years ago two government agencies (the Ministry of Finance and the Ministry of Agriculture) launched, separately, their first campaign to produce a census based on actual house-to-house investigation. The response from the people was a mixture of suspicion, and indifference. Accordingly, their answers were cautious, non-commital, or one must say, straight forward. No doubt the census had many shortcomings. It was the first experience for both the people at large, and the agencies

1. An Naami, H.S. op. cit., p 156.

and their personnel who conducted it. This is, perhaps, one of the reasons why the government did not disclose the findings of the general census. The findings of the agricultural census conducted by the Ministry of Agriculture among the agricultural population only, was however, published; perhaps because it was thought that it had no significant bearing on the general census in that it revealed nothing on the urban or nomad population.

However, the numerical aspects of the data, though more reliable than some of the estimates, should not be relied on in a matter of serious planning. Even if such data is to be used only as an indicator, it can be assumed to lie at the under-estimate side of the scale, because in such a first experience the interviewers are highly liable to miss individual houses or even a whole village due to access difficulties or misleading information; there also are normal gaps. Besides, the interviewees do not take too easily to strangers who intrude into family affairs, and if it were not for the fear of the government most people would have slamed the door in interviewers' faces. The overall trends, patterns and percentages which the data reveals can be relied on more than on the actual absolute figures. For instance, the percentage difference between one district and the other and the percentage difference between male and female are nearer the truth and more likely to illustrate relationships than the actual total number given, because the deficiencies resulting from errors and missing may be assumed to be equally represented. Another discrepency of this census is that it does not include any age structure data nor does it include any literacy indices. Such criticisms of the agricultural census should be born in mind whenever a reference is made to it.

For Assarah and its population, the total number is not less controversial than the country's total population. The agricultural census

is concerned only with the settled farming communities, hence excluding both the wholly nomadic and the town people. All the estimates of Assarah's population are on a tribal basis and many tribes have their people across more than one district. Furthermore, the approach of this thesis does not make the matter any easier because we are concerned here with a geographical region (Figure 3.2) which transcends many tribal regions and administrative districts.

After consulting most of the sources available, the population data of Assarah can be summerized in the following points:

1) There are estimates made by people from the region itself based on the estimate of the number of the individual tribes which gives Assarah a total population of just over one million (Table 8.1).

2) There are estimates made by other writers alien to the region which give Assarah about 650,000 inhabitants.[1]

3) The agricultural census gives our area a population of just over a quarter of a million (264,793). This figure corresponds to the fingure given in this census to the whole "Inner South Area" (268,151).[2] The former figure was arrived at on a different basis, by excluding "Inner South III" and some localities in "Inner South I" because they are outside our geographical region, and by adding the parts of Taif District which lay in Assarah (see Table 8.2).

The difference between these three figures is wide, yet on a closer examination a better picture emerges. The figure in the first estimate of over one million should be taken as a number representing all the people belonging to all Assarah tribes, whether they be at home or absent. This is indeed what people understood when referring to the total number of their tribe, clan, or village, considering too

1. Hamza, F 1933 (in Arabic) The Heart of Arabia p 78.
2. Ministry of Agriculture: Agricultural Census

TABLE 8.1

ESTIMATIONS BASED ON LOCAL SOURCES OF THE NUMBER OF VILLAGES AND POPULATIONS OF THE MAIN TRIBES OF ASSARAH

Area	No. of villages	population
Sarat Qahtan	220	195,000
Sarat Asir	170	100,000
Sarat Belahmer	40	30,000
Sarat Belasmer	44	40,000
Sarat Bani Shehr	124	200,000
Sarat Bani Imr	59	70,000
Hejaz Bal-Garn and Bashoot	?	?
Sarat Shomran	?	?
Sarat Ghamid	175	81,000
Sarat Zahran	260	120,000
Sarat Bani Malik	?	?
Balharith	?	?
Bani Saad	?	?
Thageef	?	?

? - Refers to areas etc. for which estimates are insufficently reliable.

TABLE 8.2

VILLAGES, HOLDINGS AND POPULATION OF THE SUB-AREAS OF ASSARAH ACCORDING TO THE AGRICULTURAL CENSUS

Sub-Area	No. of Villages	Holdings (household)	Population	Male	Female	Family Average
Dhahran of the South	141	1910	12223	5469	6754	6.4
Sarat Alrida	135	2397	16723	7366	9357	7
Abha	325	6072	39062	17863	21199	6.4
Khamis Moshayt	88	2354	14390	6469	7921	6.1
Belahmer	53	437	2484	1036	1448	5.7
Belasmer	85	933	6702	2908	3794	7.2
Tanomah	73	886	5295	2305	2990	6
Nemas	144	3082	20722	9110	11612	6.7
Bani Imr	38	873	5624	2472	3152	6.4
Balgarn	12	1111	7446	3507	3939	6.7
Bashoat	5	1143	7397	3504	3893	6.5
Ghamid	138	5293	38636	18386	20250	7.3
Zahran	171	4105	28429	13562	14867	6.9
Bani Malik	198	2387	14810	7059	7751	6.2
Balharith	67	1497	9077	4397	4680	6.1
Bani Saad	96	1160	7615	3632	3983	6.6
Taif (W & S)	93	2667	19910	9885	10025	7.5
Thaqeef	17	359	2322	1097	1225	6.5
	1879	38666	258867	120027	13884	6.5

that these people did not get used to permanent settlement in towns until recently. In this respect, from the investigations and observations which I made in the area it seems that in aggregate terms there are almost as many people away as there are at home in the villages (see Table 8.3). The local people are inclined to exaggerate the total population of their tribes rather than to underestimate it, apparently for tribal pride. If we assume that there is roughly 50% of the population away as Table 8.3 indicates, and if we assume 10-20% exaggeration, we will be left with about 400,000 inhabitants.

Nothing needs to be said about the second estimate except perhaps that it must have been based on the first estimate and was cut down to a level more acceptable to the writer. The agricultural census is supposed to be more accurate but unfortunately for the reasons given above, it was not. If we estimate the difference between the Agricultural Census figure and the real population to be 15-20%, and if we make allowance for the non-agricultural population, the figure would rise to 350,000. If further we make another allowance for the natural increase in population, the number would rise to about 400,000 inhabitants. But this then becomes merely another estimate.

The overwhelming majority of the population, certainly all those appearing in the agricultural data mentioned above, live in villages dispersed along Assarah. These villages number 1879 (see Table 8.2), and this figure falls into line with the local estimate of 1859 villages. This number could reach many times this number depending on the definition of the village. The vast majority of these villages have satellite settlements, some of which have acquired the full status of a separate village, and others are in the process of doing so. For example, among the thirty villages which make up Baljorashy sub-tribe there are at least five villages which can be considered as two distinct units, and

TABLE 8.3

DISTRIBUTION OF ONE VILLAGE POPULATION BETWEEN VILLAGE RESIDENT AND TOWN RESIDENT

Household reference no.	In the Village	In the Town	Total
1	7	7	14
2	1	2	3
3	3	-	3
4	13	2	15
5	-	12	12
6	8	9	17
7	5	1	6
8	8	2	10
9	1	-	1
10	1	10	11
11	1	6	7
12	3	7	10
13	3	8	11
14	2	10	12
15	7	2	9
16	4	7	11
17	6	1	7
18	4	18	22
19	-	4	4
20	5	-	5
21	1	1	2
22	10	-	10
23	6	2	8
24	-	1	1
25	1	15	16
26	9	2	11
27	-	9	9
28	5	1	6
29	4	1	5
30	4	1	5
31	1	9	10
32	2	7	9
33	12	22	34
34	11	-	11
Total	148	179	327
Percentage	45.3	54.7	100

at least two other villages which can be considered as three units. The new townships (such as Baljorashy, Nemas and Abha) aside, the population of the individual villages varies from fifty to two thousand. The bulk of the villages are of about four hundred people.

The agricultural data suggests that the masculinity ratio is 6:5 and I believe that is correst, at least as far as the time when the data was taken (1963-64) is concerned (Table 8.2). Perhaps the difference between male and female was slightly higher a few years prior to that date. The difference is narrowing now, or is at least constant because more and more people are taking their families with them when leaving the village. Although quantitative substantiation is lacking, the expanding towns all over the country support this assumption.

It seems that there are proportionately more people at both the lower and upper ends of the age groups scale i.e. under 15 years old and over 50 years old. There is a notable absence of the male age group of 20-30 years of age. This is expected because it is the more able-bodied young men who migrate to the towns.

When dealing with such demographical aspects such as life expectancy, birth rate, and death rate, one is bound to take into consideration the influence of the recent improvements in hygiene and medical care. In Assarah up to twenty years ago medical care (such as doctors and hospitals) was almost non-existent except for Taif at the northern tip of Assarah. Most certainly, forty years ago all the area south of Taif saw no doctor. Now the picture is different; there are a few hospitals and many clinics scattered throughout the region. However, these facilities are far from adequate and there are still many localities with no access to any modern medical care. The general awareness of the principles of hygiene came as a result of

came as a result of contact with the towns further north and as a result of expanding education. Medical improvement is apparent in the wide use of vaccinations against diseases which used to take a high toll of the population, especially smallpox and cholera. The improvement in hygiene is also evident in the people's appearance looking cleaner. Another indication is that more and more people are using indoor lavatories and piped water; though to my mind these two latter features are not necessarily always evidence of hygiene, because if not kept at a high standard of cleanliness they, themselves, become a source of contamination and infestation.

Consequently, life expectancy is lengthening. The death rate is declining and it will continue to decline before it evens out. The birth rate is definitely rising and it will continue to rise for some time to come. In the absence of vital statistics it is difficult to be precise, but all evidence points to a rise in the specific fertility rate i.e. more children live-born to mothers. In addition there is evidence of lower marriage age; 30 years ago girls remained unmarried until 20 years old or later, but now it is regarded as exceptional for marriage to be delayed later than 16-17 years of age. Hence, the birth rate in the villages is increasing, at what rate, nobody knows, but what is known for certain is that all the increases are siphoned to the towns inside and outside the region. Indeed some villages have now less population then they used to have in the not-too-distant past owing to migration. It is perhaps relevant to mention here that the people's attitude towards contraceptives is less conservative than one would expect in a pious community.

Population Density:

According to the estimate of population mentioned above, the density in Assarah is between 65 and 70 inhabitants per square kilometer.

However, the absolute density is hardly relevant; indeed any density index can only be valid if taken in conjunction with the resources which themselves do not constitute a fixed factor. The resources change over time and place depending on the level of technology and on the economic and political conditions.

As far as Assarah is concerned at present, the region is in a state of transition and density figures actual or potential, if at all obtainable, are difficult to evaluate. In the past it is evident from some abandoned villages and long neglected terraces that the area did support a population larger than its present population.[1] On the other hand, given the present economic situation and the rising standard of living, Assarah could not support its present population applying traditional technology.

Migration:

The flow of outward migration started with the on-set of the transitional period which followed the formation of the Kingdom of Saudi Arabia in 1932[2] and gained momentum with the economic expansion following the increases in oil revenues after World War II. The flow is still continuing. Although the economic environment of Assarah was not all that generous and despite the fact that the people lived through considerable hardship, they were in no way pushed out - certainly not in the same sense in which the age-old major waves of migrations from Southwest Arabia were in response to push forces. The people did not experience any major crisis that might have pushed them out, but were rather attracted by expectations of personal gains and higher standards of living in the new growing nation. The centres

1. Twitchell, K.S. 1944 "Water Resources in Saudi Arabia", Geog. Rev. Vol 34, p 373.

2. Royal Decree No. 2716, Omm Al-Qura (The official newspaper) No. 406, 23/9/1932

of attraction were situated north in the expanding commercial towns J.M.T. (Jedda, Mecca, Taif); in the rapidly growing new capital, Riyadh; in the wealth-producing oil industries in the Eastern Province; and the subsequent growth in the administration and the forces. Indeed this attraction went far afield to attract many people from the area that is now the two republics of Yemen.

It is interesting to note that new employment and jobs in towns vary in their appeal to Assarawis. Their old habits, traditions and customs have affected their preference to a particular job and their rejection of the other. Yet among them there is a slight difference in preference. For example, the Asiris, Shihris and their neighbouring tribes seem to prefer army careers, while among the Zahranis, the police force is a popular employer; on the other hand, Ghamidis have a stake in commerce, retailing and private business. The job which has a common appeal to all Sarrawis immigrants, expecially those not lucky enough to get the former jobs, is driving lorries, cars and taxis. This applies equally to all other tribesmen. Although this job is not an easy one nor the pay good and certainly it is not the safest, they still like it. The reason I believe is that because this motor vehicle business gives them freedom and authority, if only over a vehicle, and a sense of ownership and responsibility. This takes the comparison beyond what one tends to think when it is said that the motor vehicle substituted for the camel to include the psychological substitution and the man-pet reciprocity.

The significant point here is that nearly all migrants keep well in touch with their villages both physically and emotionally. They bring home money, ideas and prosperity. Now that a number of urban centres are growing after the appearance of new townships in Assarah itself, a new type of in-migration to these towns from the villages

of Assarah and from outside sources is taking place and is bound to affect the area profoundly; Abha and Khamis Moshait are striking and significant examples. Further aspects of this phenomenon will be discussed in the following chapters.

Family Status and Aspects of Fertility:

What concerns us here are not the enumeration aspects, but some of the general changes in attitudes towards marriage, progeny and children, and the socio-economic factors influencing them. One of the most apparent and noteable changes which has occurred is in the marriage age. In the past, that is up to thirty years ago, late marriage was the norm; i.e. 20 years old for the female and 20-30 for the male being about the average. The reason behind that lies in the girl's father's desire to keep his daughter longer to help the family and in the time taken by the male to establish his independent economic and social status. Wedding expenses did not create difficulties and were directly related to the general prosperity of the whole community i.e. in the years of abundance and good harvests the occasion would be lavishly celebrated, and in the years of hardship the dowry and the wedding party were only nominal.

Nowadays the majority of girls in Assarah get married before reaching the age of sixteen and boys before twenty. Although the males have had a wider marriage-age span during the last 20 years, a girl's family would not like to have their daughter unmarried later than seventeen years old. This change was due to a rush to get married which followed a relatively sudden economic improvement in the lot of emigrant males following economic expansion, and accentuated by a preferance for younger wives. The mechanism of migration has played an important role in creating this rush. The younger male migrated to the towns in search of cash income. Some were able to obtain good

incomes fairly quickly, while others had to spend a longer time to save adequate cash to start a family. After a time-lag both types came back to the village with a new image of the ideal husband and requiring young and beautiful wives.

Thus, in terms of supply and demand there were a proportionately larger number of males between 18 and 35 years old competing for females under twenty, a situation which inevitably led to the lowering of the girls marriage age to as low as fourteen, and instances of even younger wives occur. There are some indications towards readjustment and moderation of this trend. In the fore of these signs is the influence of education and its implications. The influence of education made some people at least realize the disadvantages of very early marriages including the fact that the pursuing of secondary school and sometimes university education delays the start of personal earnings and hence marriage capability. The latter point is slightly off-set by the fact that some families bear the burden of the wedding expenses and that the new couple may stay with them in the same household.

It is perhaps pertinent to mention here polygamy, not because it affects either the birthrate or the fertility, but because it is sometimes wrongly thought to do so, and because it is wrongly thought to be widely practiced. In the Islamic Doctrine there is a legal provision for the man to have as many as four wives at any one time, provided that he treat them equally in all respects. However, being legally possible is something, and being widely practiced is something else. Indeed such polygamy has never been practiced on any large scale and it has been over-publicized among non-Moslems in the Western World mainly because of its unconventionality and because some isolated historical incidents dramatized the matter out of all proportions. In

the context of Islam the one wife is the preferable form of marriage. In Assarah polygamy amounts to less than 5% of all marriage cases. This was not concluded from any data, but through many observations. I found that some villages have only one or two cases and some have none at all. Two wives form the overwhelming majority of all polygamy cases, three and four wives are rare.

Divorce is an Islamic legal provision that is more commonly resorted to, as is remarriage which tends to off-set the effect of divorce and reduced the number of widows and widowers. When one of the couple dies, the other is more likely to marry than not, men having a far better chance than women in this respect. The age disparity does exist to the extent that a man may be married to a woman who is young enough to be his daughter. Cases of more than ten children from one couple is not uncommon. Endogamy is practiced, with some local variations in the degree of observance of such marriage. This tendency is neither as strong as in some other parts of the Arabian Peninsula nor as it used to be in the past.

The Household Composition and Structure:

The family in Assarah, as in all other parts of the Middle East, is strictly patriarchally based. The father is the family head who looks after the family's interests, organizes and supervises its activities. The mother has a very important, but subtle, role looking after the household. In the absence of the father and other adult males in the family the mother may exercise authority, but is always represented by a younger male, if even a child. The family head's role does not involve any mystical or religious association. He carries many responsibilities and enjoys some privilages, mostly nominal ones, his authority and status is usually proportional to his

"earnings" in the widest sense of the word. Although it is usually the oldest male in the family who assumes the family-head status, this is not without exception.

The extended family has been and still is, to a large extent, the norm of family type. However, a new tendency towards smaller families is evident. Families of three and four generations involving brothers and patrilineal cousins with their wives and children actually working and living in one household are very common. Consequently, the number of people in the household is rather large. The agricultural statistics show an average of 6.5 - 7 people in the household (Table 8.2). This average is highly distorted by broken families and some invalid households. Instances of families consisting of twenty and thirty people are not uncommon. However, the actual number of a valid household is rather illusive because there are usually two parts of the family - one in the village and one in town - who often consider themselves one unit (see Table 8.3). Their assets and earnings in both town and village end in one pool. The separation is only geographical and when they happen to be all in either residence they do actually make one household.

The extended family, apart from being of a tribal organization, is an economic prerequisite in the peasant community where the family is the enterprise unit and the prime production institution and where their labour is the largest single input. Consequently, the larger the family the bigger the assets, the more diverse the activities and production, the more safety there is against crop failure, and in the event of some of the family being ill or unable to participate in the production activities. Nevertheless there is an upper limit to the family size at which the members become unmanageable. It is this enterprise-unit viability which preserved the extended family and this

is why I found many a family consisting of only a couple and two or three children complaining about being lonely. Certainly they do not mean the social loneliness, but the economic loneliness i.e. the lack of helping hands. Such loneliness was further accentuated for some families by the sending of their children to school. This progression to nuclear family type sometimes is associated with the greater use of machinery and modern technology.

CHAPTER NINE

SETTLEMENT

The purpose of this chapter is to discuss those main characteristics of human settlement in Assarah which distinguish it from other regions, in particular the "normal" traditional characteristics, and to discuss the conditions underwhich this type of settlement evolved and the physical and human factors that influenced it in the traditional period prior to recent changes. Also an attempt will be made to discuss the new trends and changes in settlement patterns.

By settlement is meant land occupance as is reflected in two interlaced aspects of manifestation: First, the type, form and arrangement of dwellings as individual houses, whole villages and other types of dwellings, and secondly, the type of land utilization inasmuch as it affects settlement as such. In other words, this is a study of human occupance as a socio-ecological expression of man-nature interaction. The factors that affect the making and development of settlement group into two clusters: physical factors such as geology, terrain, slope, site, climate, and construction materials, and, socio-cultural factors such as: social organization, world view, way of life, aspirations, kin and clan factors, religion and tradition, defence, utility, economics, and technical capabilities.

Although these factors vary in their weight and priorities, none of them has a prime determining influence; what matters is the end product effect of them as a whole. The nature of the interaction that goes on between them is that every single factor has a scale of weight graduating from weak to strong depending on the aggregate influence of the others; thus, each factor opens up a range of possibilities and

choices which in turn is narrowed by the restrictions imposed by the other factors. Such limiting effects result in a narrow range of choices rather than with a single unmodifiable inevitability. So much for theory; in practice this theoretical range of choices is either narrowed even further in traditional societies as a result of a human intrinsic attitude of conforming with the past and not opting for novelty and experimentation, or widened out in industrial societies as a result, among other things, of a love for change and novelty. Hence the settlement patterns are determined by the collective influence of all the factors mentioned above. When these factors are considered in conjunction with time as another medium of interaction, regional variations and future trends become discernible.

In Assarah the settlement pattern needs to be considered within this theoretical framework so as to best understand its character. The type of settlement here is sedentary-subsistence orientated, based on a mixed farming peasantry and a tribal system of social organization. Historically, we do not know exactly how this type of settlement did come to take its traditional form, but we know that it has been essentially like this for well over 2000 years (Chapter VII) and but few minor modifications have taken place.

Before proceeding to the discussion of the physical and human factors affecting the settlement pattern in Assarah, a brief review of the most conspicuous characteristics of settlement in this region is appropriate.

There is a striking succession of villages along the tops of the mountain ranges from south to north. Although the density of villages in any particular part of our region depends, among other things, on the availability of cultivable land, the linear succession of villages is unmistakably evident. If one travels from the highland plateau

north of Aden to Al-Hada northwest of Taif, one would be travelling for a distance of well over 1200 kilometers through villages each within sight of another with hardly a gap in excess of ten kilometers. The spread of villages across the region (i.e. across the axis of the mountain range in an east-west direction) varies from almost nil to some tens of villages depending on the width of the region (see Figure 3.2).

The village is by far the most valid and important settlement unit, more important than the individual houses, albeit the latter are the basic constituents; this is evident in the fact that there is no individual household standing on its own without being incorporated in a village. Some houses can be found at some distance from the main village, but function as integral parts of the village rather than as independent homesteads.

The settlement in general is characterised by dispersed nucleated villages. The buildings of each village are dense and clustered while the villages are dispersed in various approximities. The former phenomenon can be attributed to the structure, development, and function of the village which required closeness for safety and other social and structural reasons (see below). The latter is due to the availability of cultivable land and the tribal boundaries. Thus appears a natural refinement of man-resources density without necessarily implying any rational or optimal pattern.

Another feature of the settlement is the permanent nature of the constituent dwelling-house; once built it is meant to be a permanent home. This needs to be mentioned because such permanency is less evident in the neighbouring regions east and west of Assarah.

THE PHYSICAL FACTORS:

Terrain and Site:

Among the physical factors influencing settlement, the terrain and geology come first in determining whether the surface of land is suitable or unsuitable for tillage and terracing, either because of bed-rock outcrop, very steep slope or the lack of soil. Technically most of the areas which are neither cultivable nor potentially terraceable are potential settlement sites except perhaps for the very high cliffs and sharp peaks. Secondly, site considerations limit the choice even further. Here we can see how two contrasting considerations adjust to each other's requirements; we have the defence obligations which demand a commanding site unattainable to an enemy which often means the highest peak of the highest mountain, and we have the access conditions which require nearness to the fields and water sources - which imply residence in the bottom of the wadi. The result is that a reasonably defensible site nearest to the majority of the fields is finally chosen, usually on a sandstone or rock outcrop hummock, on elongated hills, at the foot of the mountains or half way up (Figure 9.2). In most cases more than one of these features are found in one site.

It is striking how all the villages of Assarah conform to these criteria of site; each village has to be on high ground so as to save arable land, keep away from the highest flood level, command a defensible site in case of war, and finally, because at high ground the stones for building are more likely to be abundant. Encroachment on arable land occurs, but only on a minimal scale as an expansion of the village. If one examines the land use map around Baljorashy (Appendix I) one finds that all villages are situated on the rough land close to the irrigated areas.

The climate does not affect the site or the village's final shape except perhaps inasmuch as the site is chosen away from the wadi course so as to avoid floods, but it does affect the form of the individual houses and their orientation. The southern and western winds are invariably gentle and pleasantly moist when compared to the northern and eastern winds which are dry, stormy and in most cases dusty. This explains why most of the houses are of southerly orientation and if a house is otherwise oriented it is usually in a built enclosure. Such a southwards orientation becomes more important in those areas where there is a habit of leaving the front door open all day long, most apparent in the Ghamid and Zahran area.

The structure of the house is thick with few openings; climatically the winter can be very cold and the rain can be heavy, so the fewer openings in the house the warmer and drier it can be kept inside. The flat mud-laid roofs are adequate when the rain is intense enough to drain away before it seeps into the ceilings. This is usually the case, but sometimes when low intensity rains persist for several hours or a whole day these cause an annoying dripping inside.

Construction Materials:

Stone built houses are by far the commonest form of construction along Assarah. However, in the lower reaches of major wadis and in some places (as at Taif and Abha) a few mud houses appear, yet even here the foundations of the houses are built of stones. The roof is always flat, made by laying wood beams over the walls, and when the span is wider than three or four meters supporting beams are used. Over the roof beams there is a layer of thatch over which mud, a foot thick, is laid. The roof gradient is very slight in order to avoid erosion and drains towards the back of the house where the water ends

up in a wooden gutter casting the water away from the wall.

All old houses are built of local materials, the most important items of which are the building stones and timber. The availability of those materials varies from place to place. The quarrying sites are dependent on the geological formation of the region. In areas where there are bedrock outcrops of quarryable quality one finds a wide variety of granite, gneiss and other rocks. In the non-volcanic formations, the stones are abundantly available such as in the area extending from Taif to Bani Malik, the area immediately around Baljorashy, and the areas south of Abha. Indeed the area immediately around Baljorashy is favoured over the rest of the region by a white microgranite which is super-abundant. As a result of this favourable position and following the advent of the introduction of the tipper lorries which made such trade possible, an expanding quarrying business has developed in Baljorashy challenged only by reinforced concrete and cement bricks. In the volcanic formation areas people quarry by excavating any suitable stones from beneath the surface. They usually follow the geological dikes and fault lines where they can get various kinds of granite; alternatively they use schiststones. The main disadvantage of the latter is that it is thinner, more friable and less durable.

The timber for roofing and for the making of windows and doors used to be exclusively of local origin until the past few decades when the demand rose sharply and the ways were open for imported timber. The remaining patches of woodland suggest that trees of quite strong and tall variety were more wide spread in the past particularly at high altitudes (2000m to 3000m) near the escarpment line. The most important variety of tree used as timber is "Arar" (Juniperus Procera) which can reach ten to fifteen meters high and as much as 50 cm in

diameter. Because this tree is straight and hard it is used mainly for roofing. "Talh" (Acacia) and "Sider" (Zizyphus Spini-cristi) are also used. The timber of these latter trees is hard but not straight and is used for making the main supporting beams and sawn into thick boards for making doors and windows. These two trees supplied the strongest timber.

HUMAN FACTORS:

Any type of settlement, representing a community response and adaptation to the natural hazards and unconveniences and to internal social organization, lends significance to the notion that "houses and settlement are the physical expression of the 'genre de vie', the last term including "all the cultural, spiritual, material and social aspects."[1] Looking at it from another angle it appears that the choice and evolution of a particular settlement is dependent on the individual and collective conception of ones own being and quiddity, and on the individual and collective conception of the outside world, the non-ego universe, its extent and function, and finally on the relationships between these two cosmos.

Such a view of one's self and the world outside is important in that it affects one's aspirations and reflects on one's conception of the ideal.[2] An Assarawi's idea of himself is that of a member of a bigger ethnic group. His actions and intentions though independent should conform to the groups ethical principles in return for acceptance and protection. His view of the outside world is limited to the immediate neighbourhood. An Assarawi's life, like that of most illiterate people, has its full share of myths and superstitions.

1. Rapoport, A. 1969 House Form and Culture (Prentice-Hall) p. 47.
2. Ibid., p. 2.

Beside the earthly people there is a parallel existence of non-tangible worlds of jinnees and spirits. The divide between the two worlds can be transgressed in the form of a jinnee's sharing the body of human or animal. Such myths affect people to the extent that old deserted or partly demolished houses become haunted with spirits. Also instances were observed in which a snake may live and breed in the house for such a long time that it becomes a co-lodger with mutual respect for privacy; such a snake is thought of as half snake, half jinnee and politely referred to as the house guard.

In Assarah the actual dwellings is only one part of a wider abode where people actually live; the whole village, its houses, roofs, lanes, mosques, fields, well heads and surroundings all form the habitat for all members of the village. The house is dormitory, shelter and place for personal privacy. When members of a family are not asleep they are in the fields from dawn to dusk, having their breakfast and lunch in the fields. This extended meaning of home is evident in the emotional side of the relationships between the household member and the fields, trees and wells of his family. It is also evident in the feelings of familiarity and intimacy a villager experiences when entering his village territories after long absence.

The conception of neighbourhood is mixed up with kin and clan considerations. Although mutual respect and mutual exchange of services prevails, it is difficult to distinguish how much is motivated by ethnic loyalty and how much by neighbouring good will, simply because people of the same kinship invariably cluster together. Perhaps each consideration has a part. Certainly the peasant's limited means makes him dependant on neighbours' help, or, to put it differently, the peasant way of life is a complex of interdependence where no single household can exist self-sufficiently or in a social vacuum. Animosity

and antagonism is another side of the neighbourhood atmosphere resulting from various disputes and transgressions which are common whenever people crowd at one place. This may partly explain why the majority of cases before the judges all over Assarah are those of disputes among relatives and neighbours.[1]

The idea of erecting a house is first motivated by pure physical need and stems from bare necessity for shelter. When the house is built it serves a multitude of functions. Apart from the mosque which is built for worshiping purposes and the fortress-like, "Hossn", for defence (Plates 9.1 & 9.2), all other buildings are houses for residence. Other specialized buildings which are found in other peasant communities such as the village cafe, the bakery and others, did not exist in traditional Assarah, but their functions were incorporated in each house. Each family used to mill its own grain and bake its own bread and each house had a large reception room capable of catering for as many as fifty or sixty people.for festive occasions and ceremonies (Figure 9.1). Other craft specialists such as saddlers, tailors, and carpenters were no more than ordinary peasants who practiced their craft as a sideline to farming and lived in typical houses like everyone else.

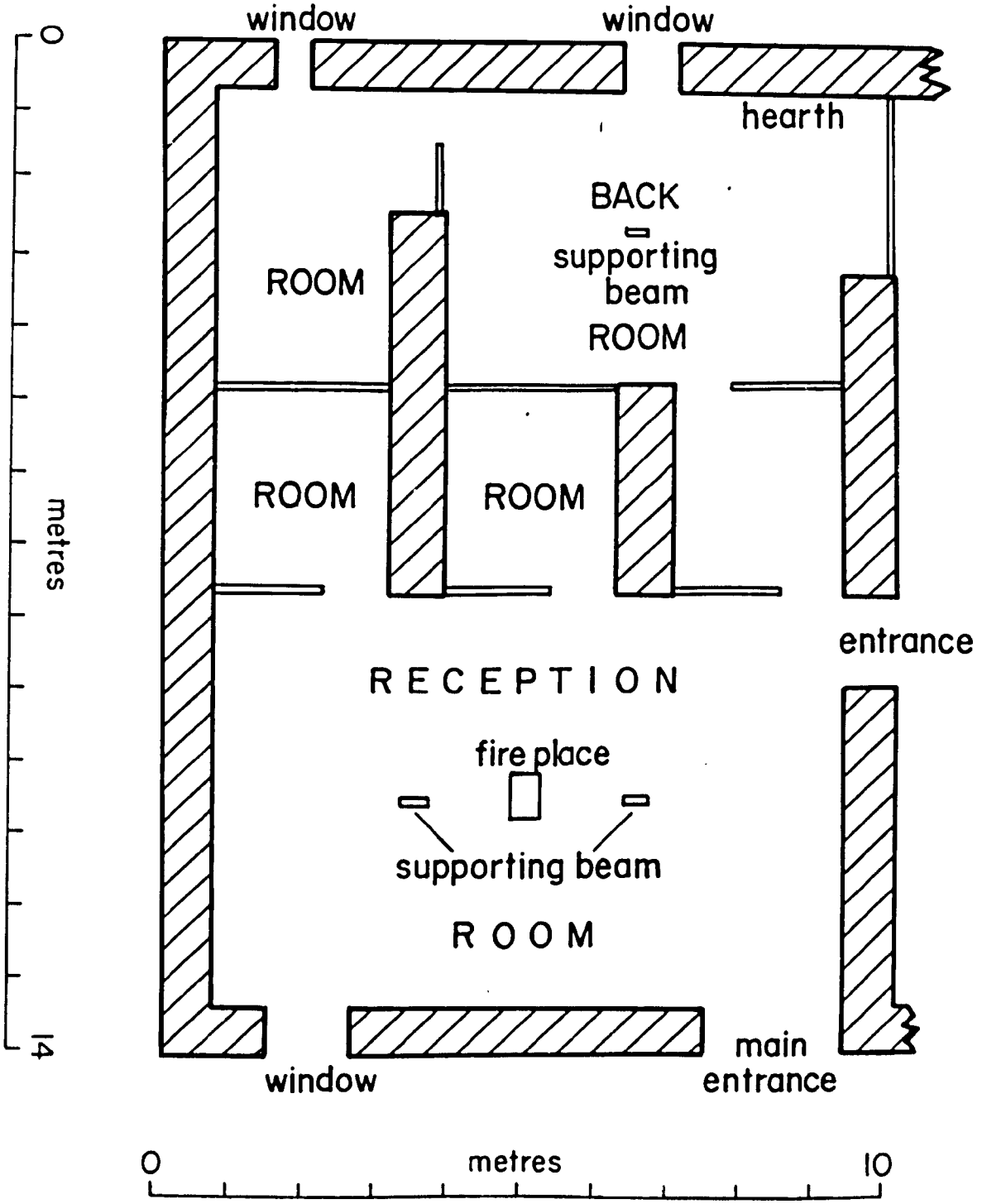
The point here is that the sideline special skills of a settlement in Assarah do not have any distinguishing feature discernable in the shape or form of the settlement that have any association with that skill. This applies to the individual houses as well as to the villages, because many villages are famous for a particular skill or craft where the majority of families practice the same craft. For example, there is a village[2] whose members are exclusively carpenters,

1. There is no data on this, and it would be difficult to extract such cases from the court records. However, this is an impression I had from conversations with some judges and court clerks in Assarah.

2. Al-Makarimah, near Baljorashy

Fig: 9.1

Typical house lay-out in Ghamid and Zahran Area



other villages may be tanners, butchers, folk doctors, or rope makers and so on. Yet all these specialities are secondary to farming and have no reflection in the settlement form.

The building skills were based purely on a traditional vernacular architecture where all the procedures and end-products were generally preconceived norms where everybody knows what to expect. The owner usually hires a building team consisting of a builder and two or three assistants who otherwise are ordinary peasant farmers like himself. He consults the builder about the orientation and the size, then the team starts building. Upon finishing the superstructure the owner hires a carpenter to fix doors, windows and roof beam. The actual roofing, as has already been mentioned, is none of the owner's concern, it is a task carried out by the whole village - men, women and children - and it is an occasion of celebration and feast.

The house plan is always open-ended, capable of expanding vertically and horizontally. The walls are thick, about a meter or more. The doors and windows are about three to four inches thick. An average house in Ghamid and Zahran, for example, would consist of a large reception room with one window, two or three or more inside small rooms which are used as bedrooms or stores, one of them with a window, and a backroom where cooking is usually done. In this latter room there is also a window (see Figure 9.1). The walls in the interior are characterized by many wall pegs for hanging various personal and household articles, and several pigeonhole-like square cavities serving as shelves. The house forms in the north and the south are slightly different. Toilets were not provided in most Assarah houses and people used the land outside for the lavatory conveniences.

The Place of Animals:

The keeping of animals was an integral part of this way of life. Indeed, the whole system would not work without the incorporation of farm animals. The animals here were closer to being a part of the household than of the farm, if such distinction could ever be made. Each family used to have a cow with a calf, a bullock or two, a flock of sheep varying in number from ten to a hundred or more, a donkey, and a camel. The effect of this on the house lay-out is not significant in that no special building is constructed for these animals. They are kept in an open compound around the house during the summer and are housed in old houses, ground floors, or assigned a particular corner or small room in a section of the main house during the winter. In addition, every family had a few fowls which were housed in a separate coop. Among the family animals the camel and cow are by far the most important and the most cared for. They are loved, petted and handled with great care. An important, yet strange feature also, is that camels, cows, and bullocks are often fed by hand, not only as an expression of human consideration given to them and not only to make sure that they get planty of food, but also because these animals would not otherwise eat such fodder as dry sorghum stalk which could be several years old (when it is cut in mouthful pieces and wrapped in green alfalfa, it not only becomes edible but also nutritious). It is commonplace to find the family sitting somewhere in the fields or in their house having their coffee or resting and at the same time hand-feeding a cow, a camel or bullocks. The bullocks especially are hand-fed while they are working by a person standing at one end of the field or at the lower end of the draughting track handling the pair of bullocks one mouthful at each turn, and preparing for the next in-between.

The cat is kept in the house, not for any sentimental reason but to catch mice and harmful insects. The dog is sometimes kept as a watch dog and is usually associated with large sheep flocks to keep the wolves away. It is never allowed in the house. Some families have beehives and they usually keep them on the roofs of the houses.

Defence and Settlement:

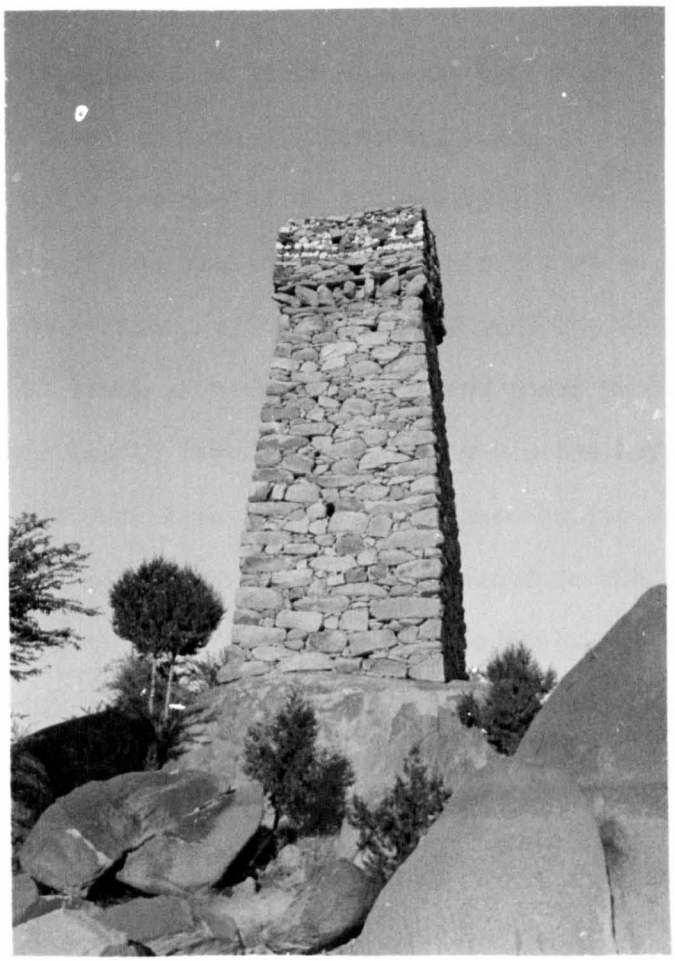
Defence considerations play an important role not only in the siting of houses and villages, but also in the over-all settlement pattern. The number and distribution of villages are influenced by the population of the tribe and by the size, shape and resource distribution of its territories. The tribal boundaries are subject to some change from time to time as a result of disputes arising very often over pasture land and building up to a war. Sometimes a war may lead to the evacuation of a whole tribe, but in most cases it only results in a few skirmishes, like those between the Baljorashy and Arrahwah sub-tribes in 1953 as a result of a dispute over rough land pasture; the government intervened and averted bloodshed. A few years later another war flared up between Anazah and Al-Jamajim, two villages which belong to one subtribe of the Zahran. Fourteen people on both sides were killed before the government intervened and stopped the fighting.

Before the Saudi rule such tribal and territorial fighting used to go on unchecked taking its heavy toll of the population. As a result of such a state of affairs there developed two features which have a bearing on the settlement pattern. First, the "Hossoon", the fort-like towers (Plates 9.1 & 9.2) which are built on prominent sites in or near the village or on a high ground over a rock outcrop

Plate 9.1

"Hossn" (pl. Hossoon), the fortresses of Assarah

Plate 9.2



appeared. The structure of the "Hossn" is square, measuring two to three yards inside and consisting of several storeys, each one being just slightly more than a man's height. Walls are loopholed for shooting. The number of these towers increase near the tribal borders which indicates the more frequent intertribal wars which used to take place there in the past.

The second feature is the occurrence of many places suitable enough for settlement and tillage, but which because of their location in a disputed or communally owned territory, reverted to waste or are utilized only for pasture while near-by settlements are in short supply of cultivable land.[1]

Village Morphology:

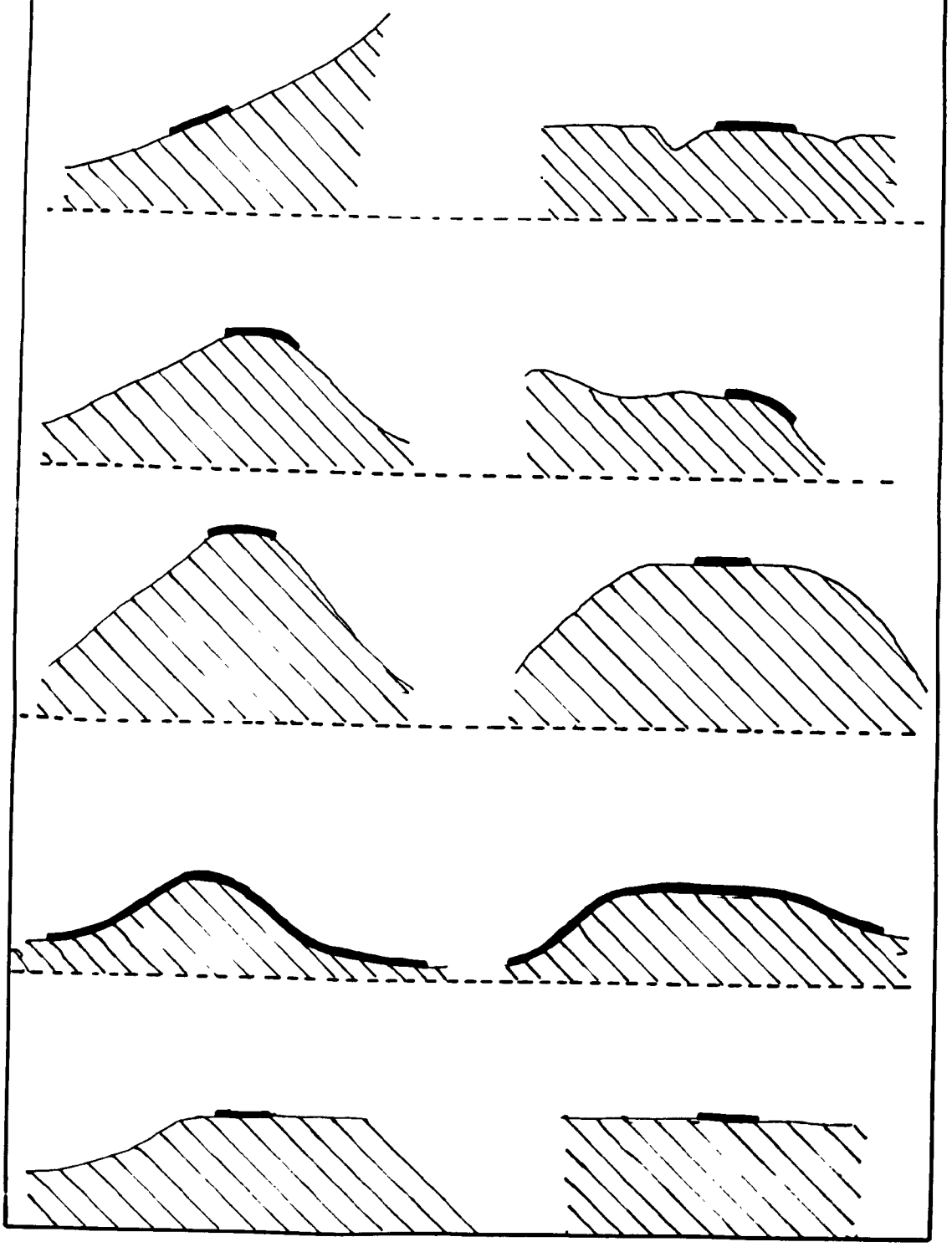
If we exclude the slope and alignment of the village site which usually influences the shape of the village, the ideal shape for an Assarah village would be packed houses clustering in a rounded shape with narrow lanes and steps. However, since the shape of the site, its extent and slope moulds to a large extent the vertical and horizontal levels of the village, one can trace four kinds of village configuration. First, villages upslope with the floor of the upper houses almost level with the roofs of the lower houses; secondly, villages on a nearly level high ground where the houses are more or less on the same level; thirdly villages on two different slopes i.e. a village going uphill to the top and down the other slope, or converging around one end of the hill; fourthly, villages each consisting of two parts on two slopes opposite each other with terraces and drainage channels in between; and fifthly, a township which is

1. This type of land appears in small patches rather than large expanses and are not readily cultivable, but require some reclamation.

an outgrowth of a village or a number of villages (Figure 9.2 and Plates 9.3 & 9.4).

In respect of the number of storeys, it is evident that one or two storeys are the norm, three storeys and more are less frequent. It has been mentioned above that the houses in the villages are closely packed and clustered on the site. There are four factors which lead up to this phenomenon: 1) The site, being usually sloping, limits the expansion of the village downslope by the need for terraces for cultivation and upslope by sheer steepness which makes access difficult. 2) The social functions of the villages requires the closeness of the houses. Indeed, the village is considered but a large household in which all people share all communal events. 3) The defence of the village is made easier by the closeness of the houses because it lessens the area to be defended per man and makes the penetration of the village more difficult for the enemy. 4) The structural feature inherent in the house form in the vernacular architecture - that the plan is always open-ended - means that much of the village expansion is in effect an organic expansion i.e. extensions and annexes to the same old structure. This latter factor is accentuated by the fact that the structure is so durable that it passes from generation to generation with the result that houses become subdivided, making the building of a new house near an old part more practical. When a family decides that they have no suitable site within the village, they start negotiating for a new site. Their chosen site could be more than a mile away from the village, and could start a new settlement nucleus. The dispersal of the settlement does not appear in the form of dispersed individual houses but rather in the form of dispersed clusters of houses and villages (see Map-Appendix 1).

FIG. 9.2 Simplified cross sections of typical village sites



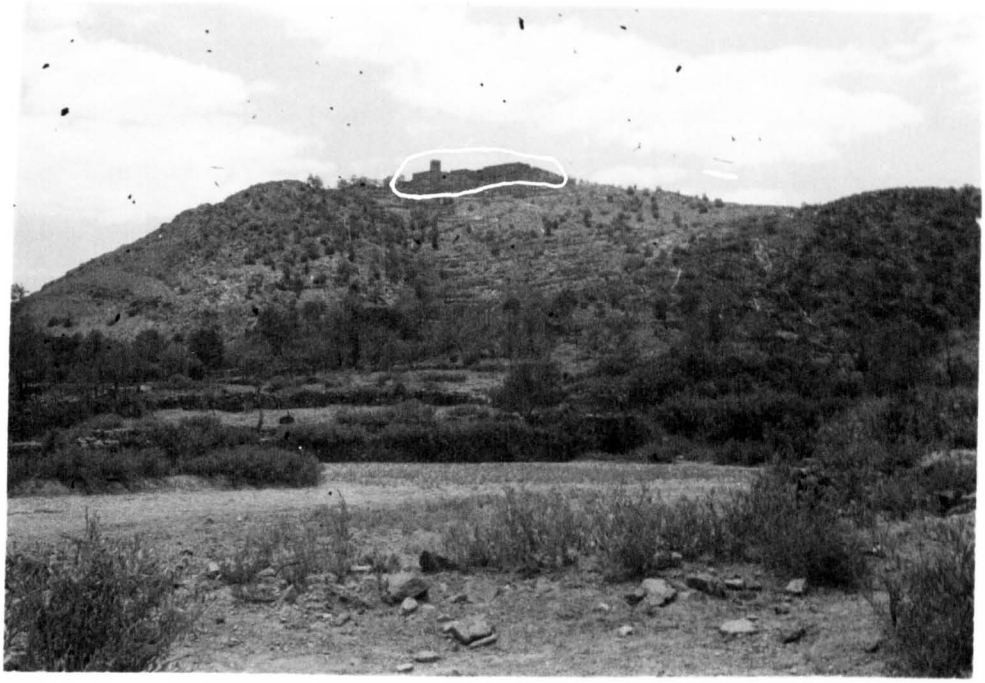
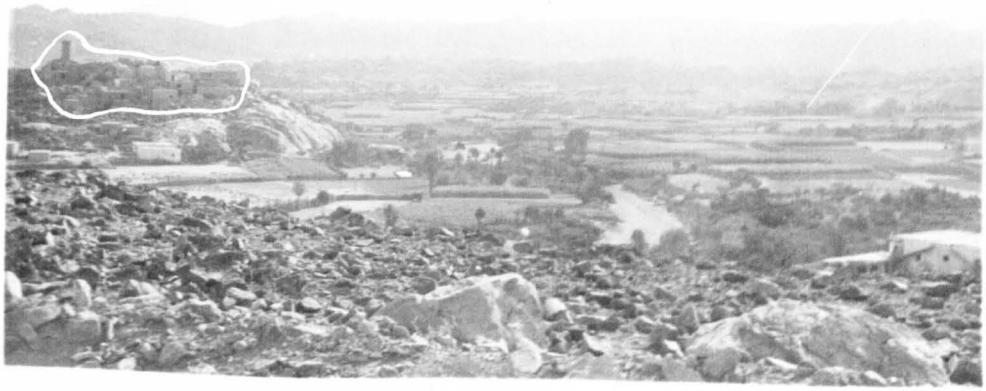


Plate 9.3

Village sites are always on high ground.

Plate 9.4



The mosque is usually situated in the middle of the village. However, this does not necessarily imply that the village is built around the mosque, because the mosque appears as a consequent to the settlement and not vice versa. The mosque structure does not differ from that of the average house. It consists of a big room for prayers and a court yard for discussing village affairs after prayers. There is also sometimes a small room attached to the mosque and offered to a needy stranger or a poor passer-by as a night's lodging. The minaret appears only in the mosques of the main villages.

An important part of the village settlement character arises from the non-built form in the vicinity of the village. In and around the village there are orchard trees such as peaches, figs and almonds, along with extensive rows of prickly pears (Opuntia decumana), but nothing like a distinctive belt circling the village. Another feature is the animal manure mounds which are heaped in many places within and around the village. Animal night-soil is collected every morning and accumulated in these mounds to be put into the fields as the need arises. Finally, the cemetery is no more than a well drained patch of land with the grave markings barely visible above the ground.

Some main villages have a market place, which is not more than an open ground in the centre of the village, or at one side of it. In most market places there are a row or two of coarsely built cabin-like stalls consisting of three walls and a roof without a door, usually occupied on the market day by the well-to-do merchants and left empty for the rest of the week. In recent decades this type of shop has given way to more spacious brick-built shops with doors and locks and which open on a permanent basis (Chapter X).

Thus one can conclude that the settlement forms, both houses and villages, are characterized by their utiliterian nature. This pragmatism

in Assarah is rather implicit in the very nature of such a harsh environment where man is always striving to satisfy his essential needs, and where wastage and extravagance are unknown luxuries. The built abode was meant for basic living needs only, i.e. shelter and privacy, and very little was given to religious needs. Personal prestige and status symbols did not manifest themselves in the built form. Grand buildings and splendid monuments were non-existent in Assarah.

RECENT TRENDS AND RELATED ASPECTS:

In the last two or three decades modern factors started to have their impact on the settlement pattern and dwelling forms in Assarah. In the remainder of this chapter an attempt will be made to describe the major characteristics of the ensuing changes.

1) House form is adopting a more universal type i.e. thinner walls, lighter structure, different lay-out with provision for more rooms and different orientation. In the old structure the orientation of the house was in response to the prevailing wind, now the orientation is predetermined either by the alignment of the street or by the best scenery, irrespective of climatic considerations. Also, the new house form provides more openings allowing for better lighting and ventilation. These openings tend to make the house colder in the winter. Along with these trends appeared more specialization in the usage of rooms. For example, the kitchen appears as a totally separate room, the fire place in the reception room is disappearing completely as are signs of animals in the living quarters of the house. The new houses are more class-indicative than the old ones in that they contain more status symbols in the structure and in the interior and exterior decoration. This ostentation antagonises the ill-to-do peasant. In the interior

there is more colour and gaiety; the walls and timber-work are painted in strong colours; green, red, blue, yellow, silver and gilt making a stark contrast to the traditional black tar on the doors and main supporting beams and herbal green on the lower part of the walls. The exterior is lavishly coloured contrasting to the bare stone or whitewashed older houses. The staircase is now constructed inside instead of outside as it used to be in the past. The verandah is a new structural innovation, though in many instances the weather is too cold to justify it, especially in areas like An-Nemas at 2600m above sea level where the July mean maximum temperature is about 24°C.

2) The incorporation of a lavatory and bathroom in the newly built houses is taken for granted and even the old houses are being provided with such conveniences. This is of course an appreciated and welcomed measure but there are disadvantages. Each builder tends to build an underground sewage disposal room where the sewage is allowed to infiltrate in the porous subsoil sandstone. The sewage will, in the long run, inevitably reach the water bearing aquifers and cause contamination of the pure and fresh water of the wells. This danger is more likely to happen near the main villages and towns until a sewage network is established to control the disposal in a harmless way.

3) There is now almost a complete dependence on imported construction materials, such as cement, iron rods and sheets, galvanized metals, timber and all kinds of paints and fixtures. The only local materials used are the building stones, and gravel and sand for bricks and concrete works. The bulk of the cement is brought from the Jeddah plant. An increasing percentage of the reinforcement iron comes from the Jeddah iron plant, while the rest comes from abroad.

4) The role of the village as a uniting agent which binds all individuals

into one coherent entity is weakening because the functions that helped maintain that role are not being taken over and replaced by functions emanating from the new towns. The village is no longer as independent a settlement as it used to be. In the past the village used to feel and acknowledge some ethnic association with other nearby villages, but hardly felt any obligation towards any one but its members. Now this is being replaced by a feeling of geographical association with the nearby town and new obligations extending far afield. From another angle, the new government administration agencies and the urban institutions such as schools, clubs, restaurants, hospitals and all other specialized professions and the commercial machinery of the town have drained the village of its significance as the supplier of social and communal needs. This has rendered the individuals less dependent on the village and made most of the old values less valid.

The weakening bonds of the village are evident in the weakening authoritative power of the village elders. Individuals are not as dependent on village opinion as in the past, and the elders are not as free to exercise the traditional sanctions and punitive measures as they used to be. This is not to say that the village authority has disolved completely, but merely to indicate that the major and important ties are shifting from the old family-village ties to the new individual-town ties. The impact of this on settlement is that more and more people are building their houses away from the main clusters of the village. Such changes have just started but cannot yet be envisaged as destroying all village characteristics and functions. A premature breakaway from the village and its traditional aminities can still be dangerous especially in such cases when the new urban settlements have not yet acquired the full range of amenities to replace those of the village.

5) The rate of expansion of the built-up area is highest around the main villages and towns compared with a slow rate of expansion in the small villages. The rate of expansion varies from place to place depending on the history and function of the town or village. The town of Taif which is by far the largest, has developed over the centuries and witnessed a boom during the last two decades. Abha was a small and old garrison town but it experienced a fast expansion over the last decade and it is now undergoing fast urban development. The expansion of Khamis Moshayt which sprang from a mere market place to a town bustling with all urban noises is a direct consequence of the strategic significance which the south region gained during the sixties. Although there is no population data for the town I estimate that Khamis Moshayt has a population of not less than 20,000 inhabitants. Other townships like Dhahran of the south, Sarat Abida, An-Nemas, Al-Alaya, Baljorashy, Albaha and Al-Atawela have grown as local market places, district capitals, and/or sub-distric centres. Baljorashy is perhaps the largest of them.

6) The market villages are in a reshaping process depending on the significance of the market place in each village. Some are dwindling and losing business to other neighbouring markets while others are thriving and attracting business and investment. This is due, among other things, to changing spatial relationships. The primary spatial criterion for the market is a one-day trip radius. A traditional weekly village market has an average servicing area of about three hours walk, beyond which is the region of the neighbouring market. This is the distance which allows a villager to make a trip down to the market, do his selling and buying and make his trip back within the same day. This does not of course rule out the overlapping of markets nor the longer than one-day trip.

In the past such one-day trips had to be made on foot or on camels and donkeys, hence the three hours or so did not get one very far and therefore the markets were close to each other. Now that the motor vehicle has superseded the animals as a means of transport, the peasant can cover longer distances in three hours and this gives him a wider choice. The traditional markets were too numerous to survive on the same old footing and consequently, they underwent a selective process which is still going on at this time. It was inevitable that some had to expand their zone of flow on the expense of others. The present picture is that around every major market there are a few declining or stagnant ones that have been undercut by the former. It would be of great value and interest to study in more detail this process of selection and the factors that influence it, especially the density of people and villages, the transport routes and other social factors. Such a study would have a bearing on the allocations of development projects.

7) The new main highways and other roads are affecting the settlement in three distinctive ways: First, they are attracting new houses, thus pulling the configuration of the settlement in the direction of the routes. Where a highway cuts through a town, the main direction of expansion is along the street of the in-coming and out-going traffic. Where the highway by-passes the town, the expansion of the half that is near the route is proportionately higher than in the other half. Secondly, many agricultural enterprises, mostly of a small scale, have developed along or near the routes, encouraged by easy access for machinery and goods; this is evident almost everywhere. One area where such agricultural development could not have been possible to envisage without the new road is at Al-Homayeta about 65 km south of Taif. Thirdly, the transport routes have created centres of settlement engaged in the

servicing of vehicles and passengers, such as cafes, restaurants, and petrol stations. However, most of these stations are of a semi-permanent type due I believe to three reasons: a) most of the people who operate them come usually from pastoralist communities and are not well adopted to the permanent way of life; b) the road routing is not yet finalized in many places and the route that is busy today may decline tomorrow; and c) the quick improvement in road conditions tends to upset the staging intervals.

From what has been said in this chapter, one can conclude that settlement in Assarah was based on a local resource base - which is farming -, and served a local function - which is village self-sufficiency. Now that Assarah is exposed to exogenous factors, both the physical resource base and the function of settlement are changing. Settlement is being increasingly tied up to regional and national networks of communications and hierarchies. This inevitably leads to changes in the lay-out, size and distribution of individual houses and their agglomeration. More important, perhaps, are the changes in the hierarchical order and their spatial pattern which follows. Since the bulk of the factors which stimulate all these changes emanate from outside Assarah, a close watch should be kept on the growth and other changes in settlement especially the new urban centres. There is the danger that these settlements might out-grow the capacity of their resource base.

SECTION FOUR

A REGION IN TRANSFORMATION

CHAPTER TEN

THE TRADITIONAL COMMUNITY

INTRODUCTION:

One of the main themes in this dissertation is that Assarah as a region is undergoing many socio-economical changes. Such a notion presumes a particular norm prior to the process of change. It also implies a sequence of events making up the processes that are happening, events whose consequences and total or partial effects we call change. Finally, it presumes an orientation towards a particular direction. This raises, in the course of analysis, three related questions: what was that norm; what is the range, sequence and scale of events leading to that change; and in what direction is the community heading?

The answers to some or all of these three questions run through the whole present investigation, and some aspects of these answers have been dealt with in general terms in the past three chapters. However, in this chapter a more detailed discussion will be attempted in order to answer the above-mentioned questions. Because the questions imply some kind of measurement, they present the problem of quantification. Indeed a quantitative approach seems imperative in answering these questions especially in regard to the time scale and trends. However, the data which would allow such approach is lacking. Instead a number of factual observations collected during the fieldwork trip, some government bulletins, and some literature will be drawn upon. Whatever data there are will be utilized as far as possible. Meanwhile I will draw on my own experiences and knowledge of the area, having lived there for years and having visited and revisited the area many

times.

It has been established in the first section of this thesis that Assarah is physically and culturally a geographical region which has been subject, more or less, to the same historical events, or the lack of them. Nevertheless, such homogeneity should not obscure the transitional effects on the margins and the subregional local differences. After all, it is only the magnitude of such local differences that sets regions apart.

When discussing the factors of change in the Assarah region the appropriate approach would be to investigate the region as a whole in order to see the overall pattern of change and to point out where the local differences exist. But such a task is difficult under the present state of knowledge, logistically and theoretically more so when only one person is undertaking the task. In other words, such a task would be adequately carried out only if more research data and materials were readily available and/or if a well-equipped team of investigators had spent at least as much time as the present writer spent on fieldwork in the area itself.

Owing to these limitations, the discussion will be limited here to the highland part of the Ghamid and Zahran district in the hope that this small area will serve as a good representative sample of the whole region (Figure 3.3). The reasons for selecting this area can be summarised as follows:

1) The district is situated nearly in the middle of Assarah, slightly to the north, but giving a full east-west section of Assarah. It is also situated almost half-way between the two main urban centres in Assarah - Taif in the north and Abha-Khamis in the south. It is still predominantly a rural agricultural land.

2) Crossed by latitude 20°N, it represents a transitional area climat-

ically where the winter Mediterranean influences are still significant, but declining southward. The summer monsoonal influence, though not significant, is still evident (Chapter V).

3) Altitudinally, the highland of Ghamid and Zahran is between 2000 and 2400m above sea level, thus being at an intermediate elevation within Assarah itself, i.e. between the areas where the elevation is only 1800m and a high elevation of 3000m. The bulk of Assarah is between 2000 and 2400m above sea level.

4) In terms of the standard of living, stage of development, and the level of technology the Ghamid and Zahran district is under the influence of a host of modern factors of change, - yet it is not as advanced as Taif or Abha towns and their vicinities, nor as backward as some other areas in the region.

5) With regards to other social and cultural aspects such as tribal structure, traditions, farming practices, values and attitudes, Ghamid and Zahran is typical of the rest of Assarah, allowing of course for some minor local differences.

Ghamid and Zahran country, to use the old traditional name, refers to the lands occupied by the two tribes Ghamid and Zahran. Specifically this comprises what is now know and administratively termed as Al-Baha District, previously known as Baljorashy District, and even before that as Azzafir Centre, depending on where the provincial administrative capital was situated. Before the Saudi era and until 1951 the district administrative centre was at Azzafir, after which it moved to Baljorashy where it stayed until 1963. It was then moved to Al-Baha where it still is today.[1] Since Al-Baha, Baljorashy and Azzafir refer to names of villages which developed to be small towns, I prefer to use the tribal name because it refers to the whole territory and has been consistent

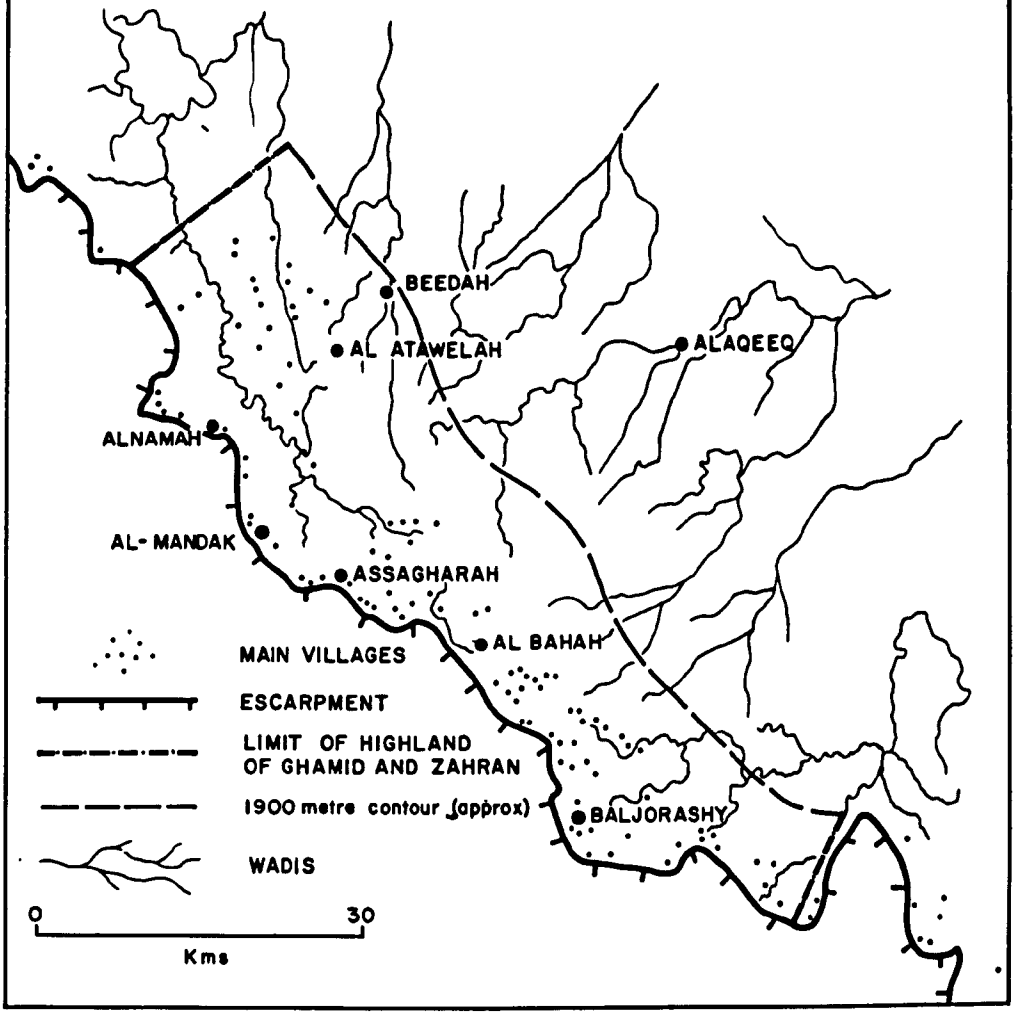
1. Al-Baha and Azzafir are only a few kilometers apart.

for a very long time, and for the lack of any adequate alternative. However, attention must be drawn to the fact that, administratively, Al-Baha District extends across three geographically distinctive regions, namely: first, the Tehama piedmont hills and the pediplain beyond to the west of the escarpment; secondly, the highland immediately east of the escarpment crest; and thirdly, the hills and plateaus to the east. What concerns us in this discussion is the second region which is known locally as "Sarat Ghamid wa Zahran", literally meaning, the highland of Ghamid and Zahran (Figure 10.1).

Looking at recent development in Ghamid and Zahran in particular, and in Assarah in general, one cannot help noticing that the area is undergoing a transformation at a much faster rate than was previously possible. The two questions raised at the start of this chapter regarding the old norms and the new changes imply a particular date or particular period of time over which the new pattern decisively stood out distinct from the old norms. In Ghamid and Zahran the change-over came slowly and gradually, rather than abruptly and suddenly. If a particular period is to be chosen to signal the start of the new trends of change, then the 1920's seem to be the most suitable date. In 1921 both Abha and Baljorashy finally fell under Saudi rule. It is only in retrospect that one can choose this period, because at the time, the people did not feel any significant change from what they had been used to - the switching-over of their nominal loyality was not a novel thing to do. Apart from that, especially as far as the social, cultural and technical aspects are concerned, things remained the same until much later. Had events turned out differently a decade or two later, i.e. had the Saudi rule discontinued, no one would have had attached much significance to that date.

For the sake of simplicity, the 1920's will be considered here as

Fig10·1 THE HIGHLAND OF GHAMID AND ZAHRAN



the major watershed in the history of this district, and the following discussion will be divided into two parts: the first dealing with the pre-1920's society and way of life, the second with the period of change after the 1920's. However, this is not a historical analysis except inasmuch as it distinguishes between two different periods, but rather an attempt to learn more about the background of the present day problems of the society of Assarah, for it is only when such a background is understood that such problems can be adequately comprehended. However, it must not escape our attention that the divide between traditionalism and modernity is not only a relative one, but also an elusive one, because some of what has been labeled as traditional practice, belonging therefore to the pre-1920's, not only persisted until much later, but some of it may still be with us in the present time. In other words, the 1920s are not a divide between two different periods, but rather the start of a transitional period. The modern patterns, as opposed to the traditional, are at the moment in the making and have not developed full shape as yet. Also in view of the fact the life here was and still is dependant on agricultural production, and in view of the scope of this thesis, the emphasis in this study should always be put on agricultural aspects.

THE TRADITIONAL PERIOD

Up to forty years ago the community norms in Ghamid and Zahran were nearly the same as they had been for centuries before. As has already been mentioned in Chapter VIII, no major event had caused any major change and no important foreign influence had reached the area. As a result no departure from the self-perpetuating old customs had occurred; hence the main stream of life, activities and habits remained more or less consistent over the centuries. The purpose here is to

evaluate the total cultural and technological attainments of the people of Ghamid and Zahran prior to the 1920s, if only to analyse the stage upon which the transformation is taking place.

THE FARMING PRACTICE:

Farming techniques had reached the full development possible under the prevailing physical and cultural conditions. The iron-share plough was already in common use. Ploughing, cross-ploughing, smoothing and leveling were commonly practiced. (Plates 10.2 & 10.4). Ploughing was also used for uprooting some leguminous roots such as alfalfa, whose roots were regarded as a nutritious fodder, and for unearthing root crops like onions and garlic. Also a late summer and early autumn ploughing was practiced on the fallowed fields to uproot the weeds and loosen the soil in preparation for the next crop (the local term for this ploughing is Jehar). Broadcast sowing of wheat and barley was practiced especially before ploughing, while sorghum, though still hand cast, was dropped grain by grain into the furrow by a man following the plough. For trees and vegetable crops necessary cultivation and hand planting was used. Clearing the plot of stones before ploughing, and weeding after cultivation was carried out thoroughly. Manure was applied whenever possible. Soil fertility was understood and its maintenance was pursued with devotion. This is no surprise, because here man created the soil and he knew, though in a dim folk way, what went into the making of a fertile soil. Double cropping was often practiced and three crops could sometimes be harvested in one year. This would not be possible if the soil was not in good condition. Mixed cropping and inter-planting were practiced with a wide range of crops. Indeed, the barley and wheat were sown, harvested

Plate 10.1 Basining for irrigation

Plate 10.2 Ploughing and cross ploughing is standard practice in Assarah

Plate 10.3 Traditional plough

Plate 10.4 Traditional tools for levelling and basining.

and consumed mixed more often than not, so much so that the peasants considered this a separate category which they called Mashāora. Cow-peas were mixed with sorghum, but they were harvested and consumed separately.

The most characteristic farming feature in Ghamid and Zahran in particular and in the whole of Assarah in general are the terraces, their building and maintenance. This conservational technique has captured the admiration of everybody who has visited Assarah.[1] Terraces are built on high steep slopes and in narrow high gorges. In some instances the height of the terrace wall may equal or exceed its surface width. Impressed by all this, observers concluded that land reclamation had been already developed to the fullest possible extent, a fact which is reflected in the agricultural census which shows that the percentage of the cultivated land in Ghamid and Zahran is 95.4% and 98% of the arable land respectively, while the national average is about 50%.[2] Also, judging from what they found of neglected terraces, they concluded that in the past, population and total arable land were greater than at the present. All these conclusions are true.

However, with regard to the antithesis of having on the one hand a number of derelict terraces, and on the other hand, regarding the land as being fully utilized, I believe that the total terraced area has gone through an oscillation of expansion and retraction in direct relation to the number of population. What happened in the past, although there is no historical proof of this, is probably that whenever the population increased in an isolated community, the first means of coping with the excess number was by terracing an additional couple of

1. Twitchell, K.S. 1943 op. cit.
   Dequin, H. op. cit.
   Naval Intelligence Division 1946 op. cit.
2. Basic Agricultural Statistics, Ministry of Agriculture and Water

yards, which every individual family did on their own on the margins of their land, or by reclaiming old derelict terraces. When the population was reduced through epidemics, the remaining people were less than the number required to work and maintain all the terraces. Consequently, the marginality law acted against working the higher terraces which reverted to waste and disuse until the following increase in population brought them under cultivation again, terrace by terrace.

It must be born in mind that this does not necessarily mean that such presumed waves of epidemics coincided everywhere in Assarah, but that just as they might have coincided everywhere, they also would have varied locally. Perhaps a tinge of Malthusian theory can be found here on a miniature scale.

During the fieldwork I came across an anonymous manuscript which lists seventeen disastrous events which took place within just over a century in Ghamid and Zahran, or more specifically, around Baljorashy. A summary of those events is shown in Table 10.1. If this list has any value it indicates how the population was periodically checked and there is no reason to assume that this type of event is peculiar to one particular area of Assarah. Indeed, such events are typical everywhere in Assarah. Had the transformation and the social change not been well on course, the peak of the assumed oscillation cycle would have been reached in 1965,66 and 67 when drought was severe (see Chapter V) and crop failure was acute, not to mention diseases, locusts and wars, which had been checked thanks to the preventive measures taken by the government.

TABLE 10.1

DISASTROUS EVENTS THAT TOOK PLACE IN AND AROUND BALJORASHY THROUGH THE NINETEENTH CENTURY AND EARLY TWENTIETH CENTURY

Hijra Calendar	
1211	Severe drought resulted in heavy deaths
1224	Severe drought
1228	Tribal war
1233	War
1234	Rain followed by plague
1246	Plague and locusts
1249	War
1254	War
1275	Plague, smallpox, locusts, and starvation
1280	Cattle plague
1282	Locusts followed by starvation
1307	Drought
1315	Drought
1319	Tribal war
1326	Plague
1340	War

Source: Appendix 3

IRRIGATION:

Water, other than the direct rainfall, was applied in two ways; either by drawing underground water from the numerous hand-dug wells, or by means of channelling the run-off from over the near-by slopes to the adjacent terraces. The former was by far the most reliable way and the most widely used. The latter was dependent totally on the rainfall to the extent that the areas served by it were automatically classified as rain-fed areas rather than as irrigated areas. A small but not insignificant area was irrigated from the free flow of some small springs. The actual application of water was done by letting the raised water run from the well-head in a small channel to the field where the whole field was divided into small basins, 2 yards square, which were served by tiny channels that irrigated every basin individually in succession (Plate 10.1). In this way each basin was given from four to six inches of water. Peasants apparently realized some of the damages which resulted from over-watering, especially those which affected crops.[1]

The high number of wells in relation to the area irrigated has already been mentioned in Chapter VI. Among the reasons of such high density of wells was the slowness of raising water by the traditional implement (Saneya). However, when a favourable site was found and a high yield capacity could be realized, two, three or even four bores could be dug in the same site to allow for four, six or eight oxen to draw water at one time.

CROPS:

Winter wheat and barley were sown separately or mixed together.

1. They knew, for example, that over-watering of sorghum could cause lodging. They also knew that fruit trees are sensitive to the amount and timing of irrigation.

The varieties used were usually of the hard wheat types, some of them were drought resistant, such as the "Mabeya"; others like the "Kobary" and "Seeb" were responsive to irrigation. "Khawlaneya", a short maturing summer wheat was also used, which took from ninety to a hundred days from sowing to harvest. The main summer crop was sorghum ("Dhura") of which there was a wide range of strains to fit different conditions; early or late maturing, short or long stalks, water demanding or drought resistant, beside other differences related to the grains themselves; their hardness, nutritional value and their colour which varied from white to red and brown. The most significant physical feature of the varieties of sorghum cultivated in Assarah was that the seed cub or head was always compact and recurved. Other pulses and legumes were also in common use such as cow-peas and lentils. Beside these crops, people also used to grow two kinds of a very small seed millet, known locally as "Majdole" and "Seyal" for their storing property. They could be stored almost indefinitely, until total crop failure occurred and starvation threatened. This seed grains were claimed to stay sound for ten and twenty years. Rice was known but because it did not grow in the area and because the great trouble taken in its importation, it was considered as a luxury food consumed only by the well-to-do.

The vegetable range was limited to some wild annual plants of which there are many kinds, most of them growing as weeds among other crops. These wild edible plants included what was known locally as "Thafala", "Gorrass", and others. The cultivated vegetables included pumpkins and a cress-like grass. This latter grass, when young and tender, was boiled and eaten and sometimes eaten raw, though it was somewhat hot in flavour. When matured and hard it was given to the animals as a fodder which was believed to be very nutritious. Alter-

natively, its seeds were collected and used as a flavouring agent, or for medicinal purposes as it was believed to have a healing property. Also of great medicinal and flavouring value was the fenugreek seeds. In time of hardship people sometimes ate the young tender regrowth of alfalfa raw or cooked. Onions and garlic were grown, but not on a wide scale. A small and inferior variety of tomatoes were known but not consumed by the vast majority of the people. Potatoes however, were grown in another part of Assarah by the 1920s.[1] They did not enter the diet of the people of Ghamid and Zahran until much later.

Fruit trees culture was more advanced than that of vegetables. There were several varieties of white grapes, the most famous of which were the "Rasiqi" and "Farsi". "Ramadi" was another famous black grape widely grown in the area. It is said that in the past people used to make raisins from these grapes. Apricots, small green apples, pomegranates, quince, peaches and a very sour variety of plums were all well established fruit. Figs were extensive all over Ghamid and Zahran. However, almonds commanded the most favourable conditions in the district because they did well on the poor soil and once the tree was above the range of grazing animals it needed very little attention. It needed no watering nor protection and gave two harvests. The people would first pick some of the green tender fruit and leave the rest to harden as nuts. The almond was also favoured because of its suitability for long periods of storage and for its high value-weight ratio. These two properties were the decisive qualities in the old days before motorized transportation and made it possible to export almonds as far as the East Indies.[2]

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1. In An-Nemas area
2. Burckhardt, J.L. 1829 Travels in Arabia Vol 1, p. 67.

An interesting characteristic of fruit cultivation in Ghamid and Zahran was that traditionally fruit trees were seldom allocated separate fields. Instead, the best fields were given over to the irrigated grain crops and alfalfa. Fruit trees that needed a good soil and regular water supply such as grapes, pomegranates, apricots, and apples were grown on the peripheries of these fields. Although grape stocks might be in a good irrigated field, their vines were very often trained upon trees or a trellis over nearby waste land so as to save fertile land. The fruit trees were usually clustered around well-heads. Almonds took the worst sites, the stony and dry spots, and the high terraces. They did not grow well on heavy and well-watered soils.

In Ghamid and Zahran, or for that matter in any part of Assarah, one is struck by the wide expanses of prickly pear trees, Opuntia decumana, and its prolific growth. This cactus tree has sweet edible fruit about the size of a pear enveloped in a thorny soft skin which is easily peeled.

The main and most important fodder crop was alfalfa, Medicago Sativa known locally as "Gadhb" and outside the district by the name "Berseem." Nearly every family had a small plot cultivated with alfalfa at any one time. An apparent feature of alfalfa growing was the smallness of the plots allocated to it. This, among other things, indicated the small number of animals which each family had. Each family restricted alfalfa acreage according to its own domestic needs. Only in villages near the market places was some of the yield carried to and sold in the market. Alfalfa was a significant and indispensible part of the farming system, not only because of its high nutritional value as a fodder, but also because it helped make a wide range of other rough fodder edible when it was mixed with them. Beside this,

it was a soil-improving crop owing to its nitrogen-fixing property. In Ghamid and Zahran as well as in the rest of the country, alfalfa was an irrigated crop which demanded good care and fertilization. In return it gave as many as twelve cuttings a year. Beside alfalfa, inferior varieties of sorghum and barley were grown as green fodder. Also, when a barley or sorghum crop failure was imminent the crop could be cut early as a green fodder. However, cattle, sheep and other ruminant animals had to be prevented from eating the young sorghum plants in the early weeks of its growth because at that stage the new sorghum blades were so sharp at the edge and so very thin that they could stick and block the digestive apparatus and/or the respiratory system bringing an instant death. A number of animal deaths were due to this factor.

FARM ANIMALS:

The traditional farming system in this area was mixed in nature; cultivation, terracing, afforestation and animal husbandry complemented each other as one integrated system. These components were so interdependant that the improvement or damage in one of them affected the others. Indeed, it was only such interdependence that made this way of life the valid system that it was. In order to make a viable farming unit each family had to have some farm animals, the kind and number of which depended on the size of the household, the size of their land holding and the other customary rights that they had. By and large the average family had a milk cow, usually with a calf or two, one or two oxen, a donkey and/or a camel, a small flock of sheep and a few fowl.

This integration worked throughout all the factors of input and out-put to the small details in a manner which could have only been

possible after centuries of trial and refinement. The cattle fed on the farm fodder, the stubble and some domestic refuse, such as bran. In return they gave meat and milk which were consumed, drafting power that was employed on the farm, manure which was put back into the soil, and hide which was used in many different ways from ropes for water raising implements to footwear. The camel's place in the system was important in that beside the fact that it ate the grown fodder and other farm produce, it did well on a wide range of grasses, shrubs and trees which were totally inedible by other animals. For instance, the camel could graze on the whole range of acacia species which are too thorny for other animals. It also grazed on many other thorny shrubs and grasses like the very dry, harsh and thorny grass known in Ghamid and Zahran by the name "Jooj" similar in shape to the thistle. Also, the camel grazed high trees which were simply inaccessible to other animals. The camel provided the best beast of burden and could carry as much as five hundredweight for very long distances. It also provided good manure. In Ghamid and Zahran camels were not kept for the purpose of their meat, hide, or fur, though in other parts of the country this was done; nevertheless people here ate camel meat.

At this juncture a distinction must be made between two types of animal husbandry; the first implies keeping the animal for the sole purpose of raising their number by herding them to the pasture areas. This is practiced to the east and west of Assarah where a nomadic way of life prevails. The second is keeping a small number of animals for use on the farm and for some domestic uses in order to further agricultural production and to bring variety in the diet. In this case, which is common in Assarah, animals are fed on the farm products and grazed on the near-by rough land. In the latter type

great importance is attached to the draught power of the animals, at least as far as camels, bullocks and donkeys are concerned, and to manure as a by-product. In the former way of life, little or no significance was attached to these aspects and the only animal that was kept as a herd animal was the Ghanam (mixed flocks of Sheep and goats). It seems also that the keeping of Ghanam was in a way a means of utilizing the marginal labour of the children and utilizing the marginal rough land around the village and between ravines and terraces. However, larger herds reaching a hundred or more were more likely to be found in the villages towards the east of the region because pastures were more extensive in that direction owing to the absence of villages and agricultural land. Thus, in Ghamid area we found that Bani Kabeer villages, Balaodhoma and Al-Jarrar and Al-Azahera villages and others along this line had larger numbers of animals, especially sheep, than other villages.

Ghanam manure was highly valuable, both at the place where the animals graze, (because the manure would be eventually washed down to the terraces, or would benefit the pasture itself by enriching the soil), and at the barn as a night soil which was collected and accumulated until it was taken to the fields. The goats were herded with sheep in a ratio of between 1:2 and 1:4 in order to maximize the utilization of pasture, because although sheep and goats have generally the same diet, the goats due to their agility exploit more fully rugged terrain.

The shearing of wool and hair and the making of it up to the final wares finish was done in the house. Apart from shearing, all the work of teasing, spinning and weaving was exclusively women's work. Milk was often obtained from both sheep and goats. The hide was tanned locally and cut to various uses.

The donkey was a very hardy animal that tolerated the worst fodder and it provided a beast of burden for many agricultural and domestic uses. It also provided a quick means of transport carrying people from village to village before the advent of the motor vehicle.

Domestic fowls were kept in small number, roaming about feeding on kitchen refuse or grain left-overs and they provided chicken and eggs, an appreciated addition to the diet.

Bee keeping was very common in this area, especially in Zahran where an ideal environment for bee keeping existing. There were abundant flowering plants in the area. All the acacia species and "Sidr" Zizaphus spini-cristi were particularly valuable. Almonds, most fruit trees, and a wide range of shrubs and bushes also provided a good source of nectar for honeybees. The bees provided an invaluable return in the form of the highly renowned honey which sold at high prices everywhere in the country. Even more important was their role as pollinating agent for fruit trees.

AN EXAMPLE OF INTEGRATION:

An example that shows how genuinely this type of farming was integrated and mixed was the cultivation of sorghum. Sorghum is a summer crop grown at a time when the moisture in the soil and rainfall, though not totally absent, is low and the pasture is dry. This makes sorghum just as important a human food as it is an animal fodder. In order to get a good yield the crop needs to be irrigated and well-tended. Indeed it has the highest labour requirement of all traditional crops. In the course of the fieldwork investigation I attempted to calculate the man-day labour requirement of one dunum (0.1 ha) of this crop, the result of which is in Table 10.2. However, such a calculation must be kept in perspective and considered as a mere estimate,

for it is hard and sometimes meaningless to try to convert the peasant and his family's work which is characteristically variable in its intensity, duration and skill, into a rigid eight-hour-work-day in the same sense familiar to us in an industrial and time-conscious environment.

Sorghum cultivation can be looked at as a way of increasing the total food supply and adding different grain food stuff in the diet if only to break the monotony of wheat and barley as well as providing sufficient food supply for both people and animals through the long, cold winter. It also contrasts with the wheat and barley crops in that the latter are generally cropped extensively where all available land is cultivated, while the sorghum is concentrated on the best plots and near the water supply.

The sorghum is usually interplanted with cow-peas as an under-growth which trains on its stalks. This sideline crop provides a supplementary food and fodder out-put with no extra labour incurred except that of picking it, and it is resistant to some of the diseases and pests that affect the sorghum. When the newly-sown sorghum is four or five weeks old, a process of weeding out the weak or over-crowded plants is carried out. The uprooted plants are collected, mixed with other fodder, and then given to animals. This weeding may go on for several weeks until after the first watering during which time an amount of green fodder is obtainable. Indeed, all the time until the crop is ripe, a regular supply of fodder can be taken from the sorghum fields in the form of broken, unwanted stalks or by collecting the lower leaves of the plant.

Shortly after the heads appear and when the grain begins to form, a continuous bird warding-off has to be maintained until the final

TABLE 10.2

MAN-DAYS WORK AND DRAFT ANIMAL-DAYS WORK REQUIREMENTS FOR ONE DUNUM OF WINTER WHEAT AND SUMMER SORGHUM IN GHAMID AND ZAHRAN

Irrigated Sorghum			Rain-Fed Wheat and Barley		
Process	Man-day	Oxen	Process	Man-day	Oxen
pre-plowing, pre-sowing & watering	3	2	ploughing & sowing	1	1
ploughing, sowing & leveling	3	2			
Basining	3	-			
weeding	3	-			
first watering	3	2			
second watering	3	2			
third watering	3	2			
fourth watering	3	2			
bird scaring	20	-			
strapping	2	-			
fifth watering	3	2	reaping	2	
picking	2	-	transporting	2	
stalks cutting	2	-	threshing	3	1
carrying	4	-	storing	1	
threshing	3	2			

harvest. A platform about 9 feet high is erected in a commanding site on which any member of the family, often a youngster, stands to ward off birds by shouting and sling throwing. (Without such continuous protection none of the grains could be salvaged because the birds might eat all in a day or two.) Before the last watering the two metres or more tall stalks need to be strapped together. This serves as a protective measure against lodging and facilitates the final reaping. When the grains are matured and the plant is fully dry the harvest takes place, first by picking the cubs and then cutting the stalks, baling, carrying and storing them. The threshing is done by allowing four to six oxen to mill around over the sorghum heads on the threshing floor. The stalks are stored in a basement or arranged in a particular pattern between the branches of a large tree in the open to be used as a dry fodder, usually wrapped in freshly cut alfalfa and hand-fed to cattle.

SOCIAL ORGANIZATION:

The social organization in Ghamid and Zahran was based upon the tribe. The main loyality was to the ethnic group and decision-making was in the hands of the clan's elders. The ethnic loyality did not contradict the village loyality because the composition of the village was usually of the same ethnic group and where it was not, alliance or confederation arrangements were made to insure such loyality. Apart from what has already been said in Chapter VIII on tribal hierarchy, distribution and relationships, the intention here is to give a brief account of the distribution and social organization of the subtribes of Ghamid and Zahran in order to cast some light on some of the recent problems related to technological change. Ghamid and Zahran are names

of a nephew and a patrilineal uncle who, according to the genealogists, may have lived ten to thirteen generations before the rise of Islam (620s AD).[1] As the population increased, the two tribes branched off into many subtribes. Figure 10.2 shows the distribution of these subtribes and Table 10.3 lists their estimated populations.

The tribal bond reached its highest strength at this subtribe level, where individuals and villages identified themselves with subtribes such as Bani Dhabian and Bani Hassan, for example, rather than with the major tribe such as Ghamid and Zahran. This was also reflected in the importance of the subtribal chiefs, who counted in every matter of significance. The higher hierarchy relationships, i.e. Ghamid-Zahran relationships did not crop up except in matters of external policies such as the affiliation to a particular state. In this respect Ghamid and Zahran had been considered as one unit. In the political struggle between north and south before Saudi rule, they swung either way together. They still constitute one administrative unit at the present time.

The animosities that may have arisen between the two major tribes did not usually involve the whole tribe. It was usually a disagreement between two neighbouring subtribes from each major tribe and in this sense it did not vary in nature or extent from the animosities between two subtribes within the same major tribe. An example of such animosity is the conflict about ten years ago between Az-Zohran and Refaaa in Wadi Beeda and Maashoqa; the former being a nomad subtribe of Ghamid and the latter a village from Bani Aamer subtribe of Zahran.

A blend of tribal feelings and long established familiarity with a certain tract of land has strengthened the territorial feelings to a

1. Al-Jasir, H. 1971 op. cit., pp 280-306.

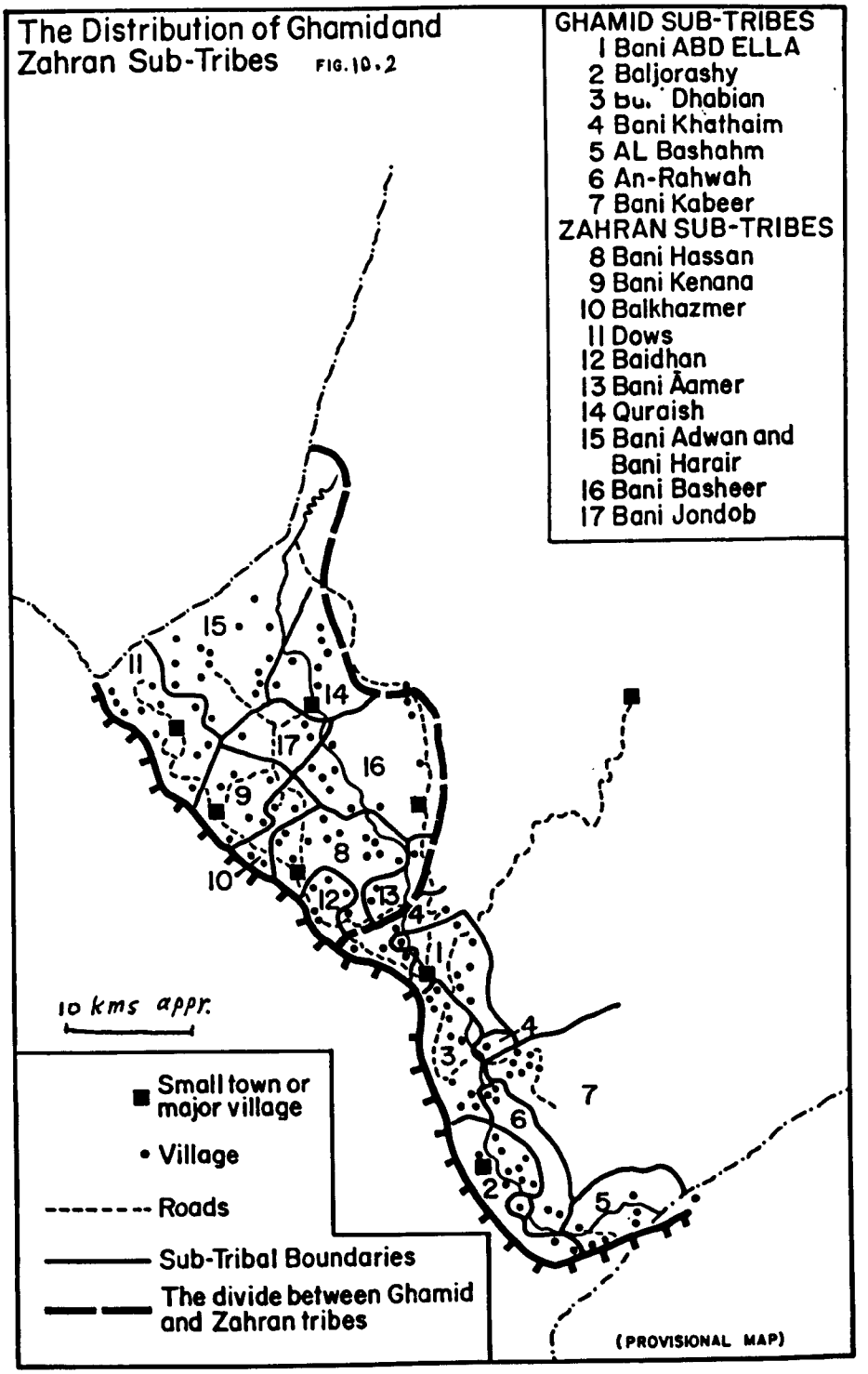
The Distribution of Ghamid and Zahran Sub-Tribes
FIG. 10.2
GHAMID SUB-TRIBES
1 Bani ABD ELLA
2 Baljorashy
3 Bu. Dhabian
4 Bani Khathaim
5 AL Bashahm
6 An-Rahwah
7 Bani Kabeer
ZAHRAN SUB-TRIBES
8 Bani Hassan
9 Bani Kenana
10 Balkhazmer
11 Dows
12 Baidhan
13 Bani Āamer
14 Quraish
15 Bani Adwan and Bani Harair
16 Bani Basheer
17 Bani Jondob
10 kms appr.
Small town or major village
Village
Roads
Sub-Tribal Boundaries
The divide between Ghamid and Zahran tribes
(PROVISIONAL MAP)

TABLE 10.3

THE NUMBER OF POPULATION AND VILLAGES OF THE SUBTRIBES IN THE HIGHLAND OF GHAMID & ZAHRAN, ACCORDING TO AN ESTIMATE BY MR. ASSALLOOK

The Subtribes	Population	No. of Villages
GHAMID:		
1. Bani Abdella	13800	25
2. Baljorashy	16150	35
3. Bani Dhabian	14100	37
4. Bani Khothaim	10500	23
5. Al-Beshahm	10350	16
6. Ahl-Arrahwa	8650	19
7. Bani Kabeer	7680	20
ZAHRAN		
8. Bani Hassan	26300	40
9. Bani Kenana	10630	34
10. Balkhazmar	14560	37
11. Dows Bani Fehm	10000	27
Dows Bani Ali	3000	4
Dows Bani Menhib & Battofail	7000	17
12. Baidhan	8000	11
13. Bani Aamer	6000	16
14. Quraish	8000	18
15. Bani Adwan & Bani Horair	10000	23
16. Bani Basheer	10950	16
17. Bani Jondob	5000	17

Source: Compiled from: Assalook, A.S. 1971 op. cit., pp 4-10

degree little known elsewhere in the Arabian Peninsula; hence the man-to-land attachment mentioned earlier in Chapter VII. For no matter how large the land was outside the tribal territories, and no matter how greener was the pasture on the other side, to use the phrase literally, every tribe had to make do with its own territories. This resulted in the individual family's continued cropping of their terraces however bleak the prospect might seem, while the group, at large, developed a mutual recognition of the communal interests within and outside the tribal units and a general willingness to abide by the rules that maintained those interests.

There are many examples which can be cited to illustrate various aspects of the social organization in Ghamid and Zahran, such as the marriage arrangements, the ceremonial practices, the intertribal behavior and relationships in peace and war, or many other aspects of social life and institutions. However, it is not possible within the scope of this thesis to explore all these aspects because this would lead us too far in the realm of sociology and social anthropology. Instead I will choose the Hema institution, not only because it shows significant aspects of social organization in action, but also, and perhaps more important, because it illustrates most clearly the integrated nature of social and agricultural aspects of the traditional community.

The Hema:

The Hema in Ghamid and Zahran was an institution by which a certain tract of land was designated as a communal reserve for pasture and/or forestry and as such, its protection and utilization was regulated by certain rules put down and agreed upon by the community. (The word Hema in Arabic means literally "protection"). It differed from other

Hemas in that here in Ghamid and Zahran, and in most of Assarah as well, the reserve was always a communal affair. In other areas, such as around Taif and further in central and northern parts of the country, the Hema could be private or state sponsored. The Hema ground in Ghamid and Zahran was usually of the rough terrain type, very often with patches of terraces interspersed between ravines. It was usually a common property of one village or a few villages. According to the purpose to which the Hema was designated, there were three kinds: 1) Hema for pasture only. 2) Hema for reserving timber trees. 3) Hema for both purposes i.e. for encouraging the increase of the natural vegetative cover including range improvement and woodland protection.

With respect to the utilization of these reserves, there used to be a variety of arrangements; for example in the woodland Hema, the cutting of trees was totally forbidden until most of the trees were over-grown or over-aged, then permission was given for a mass cutting ("Fashr"). This happened in Hema Shekran (south of Baljorashy) about fifteen years ago. The cutting of trees was always prohibited except when a genuine need arose. For example if a family needed an amount of timber for a new house, then they would apply to the rest of the village in one of its gatherings, as in the mosque after Friday prayers. The discussion would be chaired by one of the village elders and the right to speak followed an age order. Eventually permission was usually granted to the applicant to cut a specific amount from a specific place. Such an arrangement was the most common and widely used type.

In the case of Hemas being for pasture only, the animals were prohibited from entering the Hema boundaries for the whole year round except for a week or two during the summer. At this time all people herded their animals to the Hema to graze and each family would cut

as much grass as they could. In the favourable seasons the average family would get as much as two to three tons of grass which they stored and used as needed. However, if it was felt that the pasture was not good enough and if it was feared that the cutting and grazing might damage it, then such permission would not be issued at all.

The majority of Hemas were reserves for both pasture and woodland in which an annual grass-cutting and a few days grazing was allowed and occasional limited timber cutting permitted. In a few instances Hemas would be kept years and years with no cutting or grazing at all. Yet another arrangement was that a Hema would be protected during the growing season (January to April) and open during the summer and autumn; this latter arrangement was designed to protect the dispersed cropped terraces from the grazing animals and to allow the forage to increase and mature.

There was some supervision over the Hema in order to insure that its rules were not transgressed. First, a man or two from the village were appointed as protectors and caretakers. Their job was to attend to the Hema all day - every day, patrol the whole area discreetly, and watch over it from vantage points. When they saw somebody or some animal who should not be there, they had to drive them out and report the incident to the village elders at night. Such a guardian, or "Hami" got a specific contribution from every household at the harvest time, either in grain or cash. Beside these employees, every member of the community who noticed any suspicious thing in the Hema had an obligation to report it back to the village head. Indeed, everybody was only too happy to report any transgression, because he himself would have a share directly or indirectly in the fine which would be imposed on the offender. The highest standard of protection could be exemplified by the construction

of stone built enclosures around the Hema as the writer has seen in Hema Bani Maymoon south of Ghamid.

The penalty code was agreed upon before hand on a collective decision basis, and such code, though established as a tradition, could be modified to fit the circumstances. The normal procedure was that the whole amount was confiscated and an appropriate fine was imposed, usually in cash. Secondly, in the case of cattle, donkey, or camels being caught in the Hema they were driven out and the owner was fined an appropriate amount of money per head of animals. Thirdly, when a flock of Ghanam (sheep and goats) was caught in the Hema the villagers were notified upon their arrival home from the fields and other jobs at sunset. They would gather and head for the offender's house, pulling out a lamb or a goat from the herd according to their own choosing. They would kill the animal, cook it and eat it the same night. If they even wanted to annoy the offender they could quite easily do the cooking and eating in his own house, without his being able to refuse. Indeed, in most cases the offender, considering himself a law abiding member, took it upon himself to welcome the penalizing villagers as his guest and even willingly prepared the feast for them, if only to get his own share and avoid being accused of meanness.

The Hema, being the mature, highly functional and well-integrated institution that it is, must have evolved over a long period in the past. Since its origin and development are still obscure, here is a hypothesis of the evolutionary states through which it probably passed. At the first stage there must have been a communal feeling and a group or commune consciousness among the individuals, which acknowledged certain interests and conceived their realization. The second stage was the actual organization to meet these needs which necessitated a full management with all that it entailed of decision-making, rula coding,

delegating of responsibilities and assignation of tasks. The success of this stage depended on the voluntary co-operation of the majority of individuals and on the just and binding disciplinary measures. At the third stage, if all had gone well, an actual extra income became available in the form of crops being had from the Hema; forage could be cut and taken home to be used, a rich pasture was available at particular times of the year, timber could occasionally be had, as well as other products (firewood, thatches, wild berries, gum, wild animals and birds), which increased the natural assets of the community. The Hema helped soil stabilization by thickening the vegetative cover, increasing water retention capacity, discouraging rapid run-off and by increasing the absorptive elements i.e. the soil, the retentive materials and the retarding agents. Perhaps more significant, though sometimes less appreciated was that the system enhanced and promoted the soil fertility not only on the reserve ground, but also on the nearby terraces where the humus laden run-off was diverted. The Hema, no doubt, made possible the increase of organic matter, the humus content, soil micro-organisms and the general fauna and flora. These are all important assets which could not have been realized without the Hema. Finally, occurred a fourth stage in which a strong feedback process took place. The new physical assets increased crops and producing extra income. This income justified the firm management, and they both strengthened the co-operative attitude and the communal feeling among individuals; success bred success.

As the Hema is only one example of the wider conservational utilization spectrum, and only one facet of the larger social organization which is ever more interdependent, it is pertinent to ask the question,how far the traditional villager was aware of this interdependence of functions? The answer to this question has a bearing on the

process of change and consequently on the planning of development programmes and projects. However, there is no quantitative way of measuring this awareness, but it seems that the average villager could not conceive of the system as a whole complicated network of interdependencies nor as a long chain of action and reaction. He, however, was well aware of the immediate and sometimes secondary causes and consequences of a particular event or action. But he had unshakable conviction in the traditional system as a whole and believed that the old patterns of activities and behaviors were the right ones.

SOCIAL CLASSES:

In Ghamid and Zahran there were no major class distinctions. The concept of social classes as it is known in today's world can hardly be applied to the community of Assarah. There was no money-lender's class nor landlords' class. There were not any distinct merchant's class, towns' folk, officials, administrators or middlemen classes. This does not by any manner of means imply the absence of social disparities or wealth and poverty, nor does it mean the absence of functions which are usually performed by those classes. Instead of the class strata that exists in most peasant communities all over the world, here we had a different setting which could hardly be called stratification. All the people of Ghamid and Zahran, except for a fraction of one percent, which will be mentioned later, were owner-occupier peasants with an average holding varying from two to five acres (Table 10.4; see also Chapter VII). Everybody was basically a farmer and secondly, and incidentally, a part-time craftsman in one or another of these jobs associated with peasant communities. These jobs were performed in the spare time, in the slack periods and more important

TABLE 10.4

DISTRIBUTION OF HOLDINGS BY THE AREA OF PRIVATELY -OWNED LAND IN GHAMID AND ZAHRAN IN 1964

Dunum = 0.1 Hectare

	Ghamid		Zahran	
Area	No. of Holdings	%	No. of Holdings	%
less than 5 Dunum	3850	72.7	3078	75
from 5 to 10	1067	20.2	716	17
from 10 to 15	263	5	224	5.5
from 15 to 20	60	1.1	43	1.1
from 20 to 25	31	0.6	26	0.6
from 25 to 30	8	0.2	8	0.2
from 30 to 35	6	0.1	4	0.1
from 35 to 40	1	-	2	0.1
from 40 to 45	1	-	2	-
from 45 to 50	-	-	-	-
from 50 to 55	2	0.1	-	-
from 55 to 60	1	-	-	-
from 60 to 65	-	-	-	-
from 65 to 70	1	-	-	-
from 70 to 75	-	-	-	-
from 75 to 80	-	-	-	-
from 80 to 85	2	-	1	-
more than 85	-	-	-	-

Source: Ministry of Agriculture and Water; Agricultural Census of the Inner South (1964)

as a means of utilizing any excess labour within the family. The main such crafts and specilities are summarized in Table 10.5.

The exception to this was the smiths' crafts, especially the blacksmiths, the status of whom was so peculiar that it needs further explanation. The blacksmith was an independent vocation, not at all mixed with farming. The farmer considered such a vocation as menial and degrading and the people who practiced it as non-compatible with himself. Strangely enough, the blacksmiths despise farming as a vocation. As a result of this, no intermarriage took place between the two communities.

However, the two communities were totally dependent on each other for their livelihood and in order to balance this with the mutual contempt which they had for each other, a traditional relationship developed to insure a viable co-existence. Each village, or couple of villages, were served by one or two blacksmith families who did all the tasks required by anybody in the village, free of charge. Such tasks included making knives, axes, hoes, ploughshares, sickles, some kitchen utensils and various articles such as quarrying tools. The blacksmith also did all sharpening and repairing needed. Some surplus articles could be sold in the market place for cash. In return, the blacksmith was entitled to any charcoal that could be found in the village. A member of his household would collect it house by house at regular intervals. More important still, he was entitled at the harvest time to some of the crops of each household. He made the round himself picking about a man-load of the dry unthreshed sheaves or whatever he thought adequate. He was not expected to over-charge and nobody was expected to object to his rights, thus things went smoothly and in the end the blacksmith got as much grain and hay as the average farmer.

TABLE 10.5

LIST OF CRAFT SPECIALITIES AND OTHER JOBS

PRACTICED AS A SIDELINE TO FARMING

Sideline	Performed by: M-Men W-Women
1. quarrying	M
2. building	M
3. carpentry	M
4. tanning	W
5. saddlery	M
6. rope making	MW
7. folk medicine, including:	
bonesetting	M
ophthalmics	M
other folk doctors	MW
8. veterinary work	MW
9. weaving	W
10. tailoring and embroidery	MW
11. pottery	W
12. water diviner	M
13. land measurer	M
14. religious scholar conducting prayers, conducts marriage contracts, writes other contract documents	M
15. butcher	M
16. poetry	MW
17. women's hairdressing	W

The delicate situation of the small community of blacksmiths made them develop a strong alliance among themselves which transcended all tribal boundaries. This alliance was further enforced by the fact that they married within their group. A blacksmith was just as adamant about not marrying into his neighbouring farmers' families as the farmer was adamant about not marrying into his neighbouring blacksmith's family, not only because each one considered the proposition somewhat degrading, but also because a would-be wife was trained for different tasks.

In spite of, or perhaps one should say, because of this mutual dependence, the two communities were able to lead practical and peaceful lives. However, when a dispute happened it was, strangely enough, the blacksmith who had the upper hand. If any blacksmith got offended or badly spoken of in the slightest way, all blacksmiths would boycott the offender and would do nothing for him. The services which he badly needed and which he could not get done anywhere else were unfulfilled, a situation nobody liked to be in. So the offending farmer had to come to terms with the offended party before the ban could be lifted.

As the final stage of the abolition of slavery did not take full effect until much later, and since we are dealing with the traditional community up to the 1920's, the role of the slave in the social stratification and in agriculture in those days was not insignificant. Although there is no data on the number of slaves at that time, it is possible to make a rough estimate of their percentage based on the observed, though not accurately counted, exslaves who are living at the present time, and on some accounts given by a few contemporaries. The slaves must have been within a range of 1-2% in Zahran and 3-5% of the population in Ghamid. As for their status, they were by defini-

tion, subservient slaves who always did hard work. However, the environment and life in general was too hard for much differentiation between slaves and masters, and although the slaves used to take the worse of what there was, they were seldom maltreated. Indeed, in most cases they worked side-by-side with their lords, ate the same food and lived in the same houses. Rentz, in the context of the whole country, states that "slaves might have been considered a separate class, but the duties and rewards of many slaves were hardly distinguishable from those of free men doing the same sort of work."[1] An association seemed to have existed between the extended family, the large land holding, and slave ownership. This is not far-fetched when we remember that the labour was the highest input factor in traditional farming. Some families had twenty or thirty slaves. Nevertheless, families who led luxurious and comfortable lives merely by depending on the labour of their slaves, or for that matter of their tenants, did not exist in Ghamid and Zahran nor hardly anywhere in Assarah.

To conclude the traditional social structure in Ghamid and Zahran a few words must be said about the status of women, particularly as the woman's place in the community is misconceived by most outsiders - Arab and non-Arab alike. The sterotype image of an Arab or a Muslim woman is that of a veiled woman who spends most of her life at home not allowed to mix with other people. However, if such a woman's image could be true for the towns' folk, it was totally untrue in the countryside. Indeed, when you consider this matter from the village point of view, such an image was too much a luxury that villagers could not afford. Until the last few decades the veil did not exist

1. Rentz, G. 1966 "Saudi Arabia, the Islamic Island" in Thompson, J.H. et. al. (eds) Modernization of the Arab World, p. 118; see also Twitchell, K.S. 1947 reprinted 1969, Saudi Arabia: With an account of the Development of its Natural Resources (Greenwood, New York) pp 146-147.

anywhere in Assarah. Women used to work side-by-side with men in the fields and in the market places. They were able to meet strangers. In later years when the conservative religious movement was at its climax a cry of indignation and even violent actions were adopted to supress such open male-female relationships, hence came the veil. Also as the village women started to imitate the townswomen, they adopted the veil in the process (see Chapter XI).

CULTURE AND TECHNOLOGY:

In such a traditional peasantry reading and writing were not essential for everyone. Hence the emphasis on learning in Ghamid and Zahran was limited to the very minimal. Few people did learn to read and write mainly for the purpose of reading the Koran and for writing letters and essential transaction documents. Although the people who could read and write were rare, they did not enjoy any social privileges as such. Certainly more privileged were the poets whose talents were very much in demand, not only because they were the main attraction of entertainment and ceremonial occasions, but also because they were indispensible propaganda channels in tribal affairs.[1] Reading and writing were more associated with the needs and functions of the religious people, judges, the officials, and folk doctors than with the farmer's needs. The reason behind this was basically economic; why should the peasant farmer send his son to study or rather to be trained in a skill that he did not immediately need, while there were more pressing needs for the child on the farm? Even a child of four or five years of age could be productive.

Religion had somewhat departed from its early Islamic purity and had long been mixed with superstitutions. Islam was no longer the

1. Poets did not have to be literate.

inspiring and driving force for individuals and communities. It became a mere sustaining supernatural feeling. However, an upsurge of revival and renaissance movements developed in Ghamid and Zahran after World War II, though in general its leaders went too far towards religious puritanism. This was an expansion of what is usually referred to as Wahabism.

TRADITIONAL TECHNOLOGY:

Technology in Ghamid and Zahran, though simple, was vast in scope and almost entirely of local origin. It is in the field of technology that the geographical and historical seclusion is most evident. People had to depend on their local resources to develop the type of tools, implements and artifacts which they needed. In the field of agriculture the wooden plough with iron share (Plate 10.3) and the water lifting apparatus (Assania) were the most significant implements[1] (see Plates 10.5 & 10.6).

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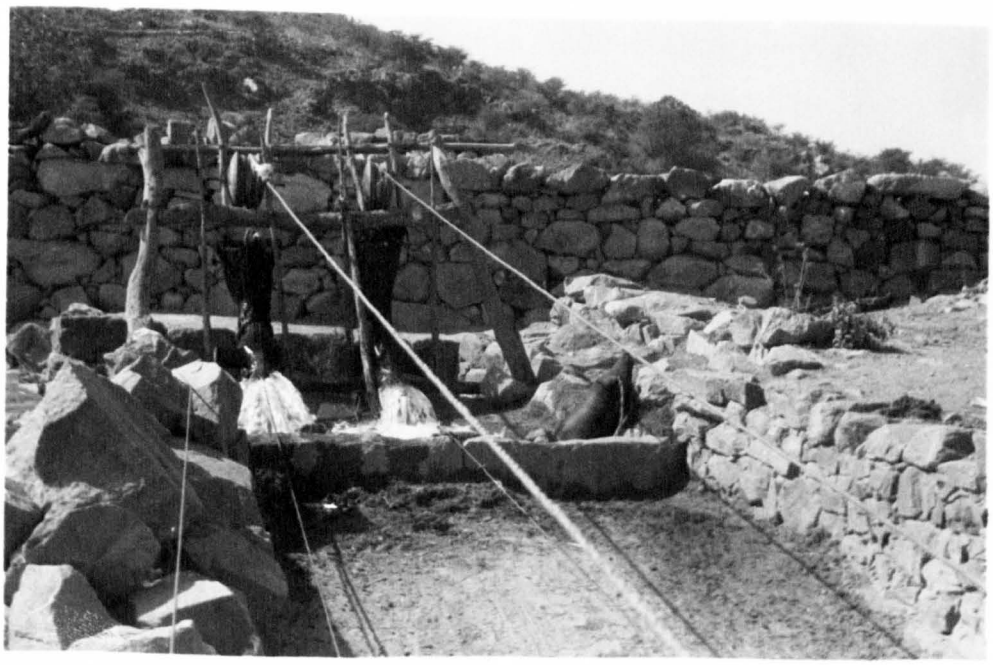
1. The water raising technique varied between Ghamid and Zahran; in the former each ox is separately assigned a water bucket to draw attached to a "saddle"(qatab) on the back of the animal. In this case as many as two draft animals could be driven together at the same time on one drafting track (majarra) (Plate 10.5). In Zahran the practice was that two oxen were usually tied together to a yoke and driven together hauling only one water bucket. The amount of water drafted was usually the same because the latter bucket was larger than the former. The advantage of having each ox drafting its own bucket was that with only one draft animal one would still be able to raise water. The apparatus itself consisted of three levels - three horizontal beams attached to two strong poles slightly tilted over the well. To the horizontal beam was attached yet smaller vertical poles with a hole in each pole where two pairs of wooden reels were put at two levels. The water bucket was made of two or three goatskins and tailored in a special way consisting of a small and a large part connected at an angle slightly larger than a right angle. The bucket was attached at both ends to two cowskin ropes; the strong one holding the larger part of the water bucket and passing over the higher reel and a lighter rope attached to the lower part and passing over the lower reel. The ropes at the other end were tied to the qatab or yoke at a point as to balance the water bucket at a topped up point and as to allow for the right drafting distance in order to assure automatic emptying of the water bucket as soon as the drafting animal reached the end of his track (Plates 10.5 & 10.6).

Plate 10.5

"Assania", the traditional water hoisting apparatus

Plate 10.6



The amount of water raised by Assania in each haul varied from ten to twenty gallons depending on the size of the water bucket and the animals. However the actual yield per unit of time was dependant on the depth of the well or rather the length of the draughting track.

The plough cut as deep as six to eight inches in the soil. Smoothing was done by a log, one and a half meters long (Plate.10.4), attached with a rope to a yoke on a pair of oxen.

In the home the grains were ground in a stone mill consisting of two stone disks one above the other, each one about 60-75 c.m. in diameter and 4.5 - 6 inches thick.[1] Other variations were used in other areas. In the house there was also a wooden manual weaving loom where some heavy winter clothing and some furniture and bedding and covers were woven. The most famous woolen cloth article which was also peculiar to Ghamid and Zahran is the Abaya.

With regards to weaponry, beside the familiar curved dagger common all over Arabia, there was a rather elongated sword-like dagger peculiar to Assarah.[2] Firearms appeared in Ghamid and Zahran as early as the beginning of the eighteenth century according to what I have gathered from a knowledgeable local informant and some local poetry. Musket and Martin types were in common use through the nineteenth century and up to the 1920's. A firearm was considered as an indispensible article in every household for use and as an article of great prestigious value to be displayed and to be proud of. The gun powder came along with the firearms and was and still is manufac-

1. The lower one was fixed on an elevated platform as to allow milling in the standing position. The operator, always a woman, turned the upper disk round by means of a wooden handle stuck near the edge of the upper disk while the grains were fed into the mill through a hole in the centre of the upper disk. The flour came out at the edge from between the two disks and accumulated around the lower disk.
2. This dagger varied in length from 30 cm to 70 cm with a double edged slightly curved blade. The handle and casing of it was ornamented with silver design, it had a belt and when worn it stayed horizontal along the waist.

tured locally in both Ghamid and Zahran. However, the bulk of it used to come from Tehama where the materials used in its making were more abundant. Gun-powder productinn rose significantly when explosion mining was adopted in quarrying works which started in the second half of the nineteenth century and remained the only explosive until recently.

The fuel was entirely fire wood. Kerosene, or paraffin oil was the only petroleum product known in the district and its use was limited to the necessary lighting by paraffin lamps. It was first imported through the port of Al-Qunfoda in the last quarter of the nineteenth century. Shell and Socony-Vacuum brands of kerosene used to come in four gallon size tin containers. During the 1920's and even much later a couple of ounces of it would be an adequate weekly supply for an average family.

From what has been said above it appears that the technology of Assarah was, in itself, a subsistence technology in that it depended on the local raw materials and was meant to fulfill the local needs. The few exogenous elements which have been mentioned, such as the firearms, were limited and of little effect in advancing technical knowledge.

OUTSIDE CONTACT:

The people of Ghamid and Zahran like most of their fellow Sarrawis travelled very little in the past. Most of their travelling was to their neighbouring communities east and west. The highest point of the peasant's ambitious desire for travel was to get to Mecca to discharge pilgrimage duties. However there was an internal movement of people stirred by and focused on the weekly markets. Atawela, Mandak, Safh, Naqaa, Raghdan, and Baljorashy were all important markets, especially the last one.

Tehama was no doubt in constant contact with Assarah. This is evidenced by the many routes cut through the precipitious excarpment face (Figure 10.3) and by the wide range of commercial exchange between the two regions (Table 10.6). Such population mobility was possible and practiced continuously, despite the sheer physical difficulty, due first to the fact that Tehama and Assarah were so bioclimatologically different that some of each regions produce was required in the other. Second, Tehama was relatively densely populated with many villages. Third, the markets being held on different days at different places provided a convenience for the more active merchant to frequent several markets in the week on a regular basis (Figure 10.3) (see below and the following chapter).

Towards the east in the Badia (nomad areas) population mobility was still evident, if only due to the very nature of the settlement being mobile nomadism, but the commercial exchange was much smaller. It was the bedouins who came to Assarah markets for trading rather than the Sarawis going to the Badia, for the simple reason that there was no such markets in the Badia area, except in very far dispersed oasis. Bisha, for example, east from Ghamid and Zahran at a distance of about two to three days camel travel, is an important oasis which was and still is a meeting place for the nomads from hundreds of kilometers around. There has always been some commercial exchange between Bisha and Ghamid and Zahran district, but on a less frequency than that between the district and Tehama, and was concentrated at the harvest time. The bedouins used to bring sheep, camels, wool, hair and dry dates and take grains, clothing and a few other necessary small items.

The contact between our district and the northern urban centres of Jedda, Mecca, and Taif, apart from pilgrimage, was evident in the

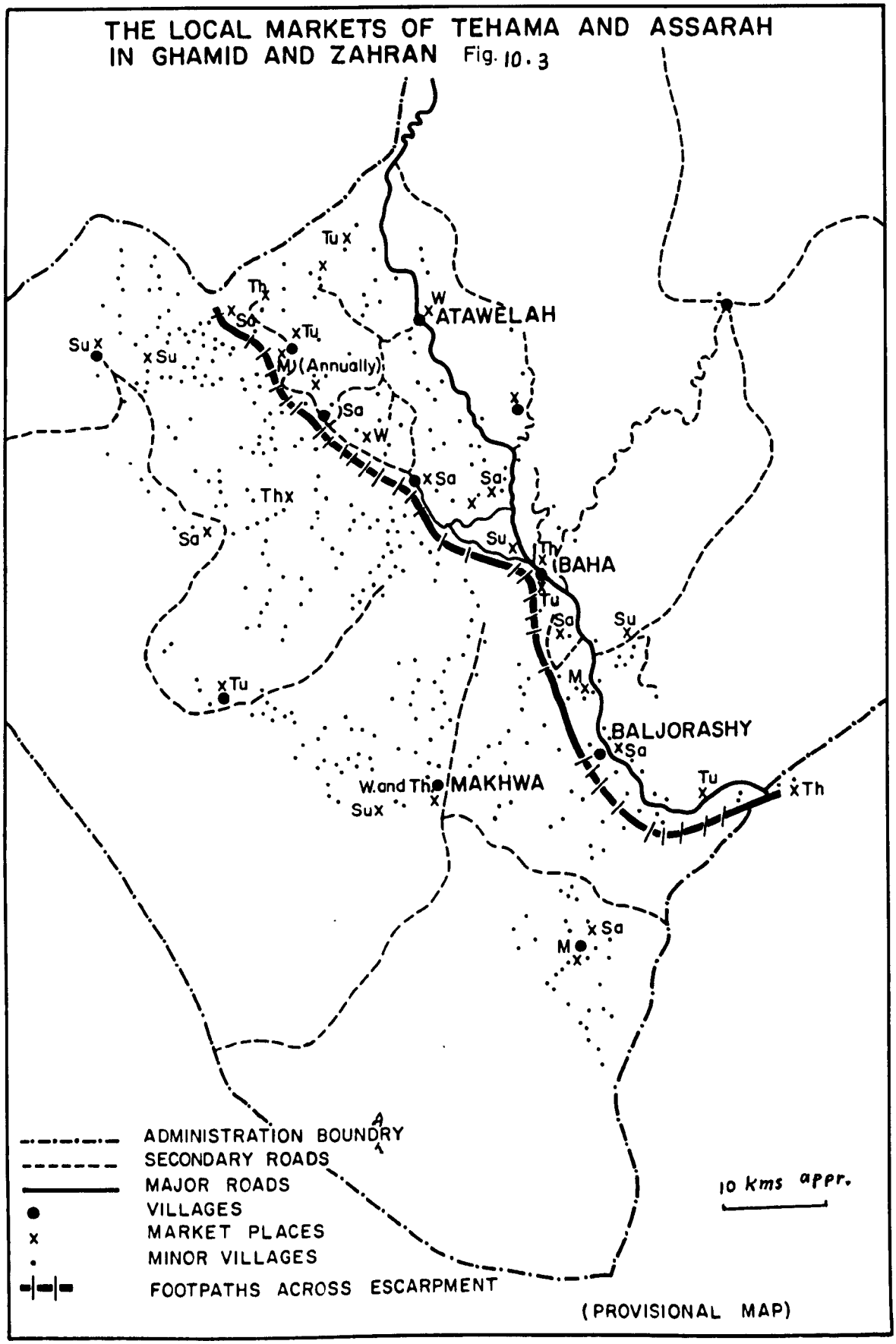

THE LOCAL MARKETS OF TEHAMA AND ASSARAH
IN GHAMID AND ZAHRAN Fig. 10.3
ATAWELAH
BAHA
BALJORASHY
MAKHWA
M (Annually)
W. and Th
ADMINISTRATION BOUNDRY
SECONDARY ROADS
MAJOR ROADS
VILLAGES
MARKET PLACES
MINOR VILLAGES
FOOTPATHS ACROSS ESCARPMENT
10 kms appr.
(PROVISIONAL MAP)

TABLE 10.6

RANGE OF GOODS AND COMMODITIES IN A TYPICAL GHAMID AND ZAHRAN LOCAL WEEKLY MARKET IN THE TRADITIONAL PERIOD

Commodity	Source	Remarks
GRAINS:		
wheat and barley	entirely local	
sorghome	local and from Tehama	
millets	local and from Tehama	
rice	foreign import through Jedda	only occasionally used
fodder	entirely local	
STRAW GOODS:		
mats	mainly from Tehama & some from Bisha	
a wide range of containers for crop carrying & storing, & baskets for domestic use & many other articles	from Tehama	
Hair and wool	local & from the Eastern nomadic areas (Albadia)	
Salt	from Tehama	
ropes	local	
wooden goods	local	
dates	from Bisha and other areas	
coffee beans & coffee bean husks	from the west facing slopes of the escarpment and from Yeman	
ginger	foreign import via Jedda	added to the coffee
sugar	foreign import via Jedda	occasionally used
tea	foreign import via Jedda	luxury beverage
vegetable oils (sesame oil)	from Tehama	
Tars and products	local	(gitran) as paint (mohl) as livestock disinfectant (oil)

- continued -

Commodity	Source	Remarks
Ghee	local & from Tehama & Al-Babiah	clarified butter
honey	locally & from the west-facing slopes of the escarpment	some of it is wild honey
seeds (mainly, alfalfa, fenugreek, garden cress & other legums)	local	
hide products	local	
pottery products	local	
blacksmith & silver-smith products	local	
cloth tailoring	local	
fruit & vegetables	local	except lemons & bananas
lemons, bananas & fragrant herbs	from the west-facing slopes of the escarp-ment	
livestock	local & from Tehama & al-Badia	
wood for fuel	from the escarpment & Al-Badia	
poultry	local	
cloth, threads, dyes, insense & some drug-store materials	foreign	
beef and mutton	local and from Tehama	

past, though greatly hampered by the difficult terrain and the frequent wars. A considerable proportion of the food stuffs needs of these three towns was supplied from Assarah. Beside grains, Ghamid and Zahran were particularly famous for their almonds, raisins, honey and clarified butter or ghee.[1] The export from this area to Jedda-Mecca-Taif area used to flow through two routes: one was through Assarah itself towards Taif and from there to Mecca and Jedda.[2] The other was through Tehama via Al-Makhwa, a small town immediately to the west of Ghamid and Zahran (see Figure 10.3), from which produce was taken directly to Mecca and Jedda.[3] This trading pattern and forms of contact with the neighbouring areas should not be understood to contradict the state of isolation which has been discussed in the general model (Chapter VII), because the range and intensity of such contact was rather limited to the necessary minimal level, and perhaps more important, because both Tehama and the nomad area lived in a similar isolation.

At this juncture it may be useful to study in more detail one of the most important weekly markets in Ghamid and Zahran, an example which I hope will show not only the above mentioned inter-regional commercial exchange but also some important geographical and social aspects related to the local markets as institutions. This examination will be important later on when we examine the present day situation as it will serve as a comparison part.

THE WEEKLY MARKETS:

There were certain features which characterised all market places

1. Al-Jasir, H 1971 op. cit., pp 368-369.
2. Burckhardt, J.L. 1829 op. cit., Vol I, p. 157.
3. Ibid., Vol I, pp 347-348 and Vol II p 389.

all over Assarah. Such features should be born in mind whenever discussing any aspect of the market place:

1. The market place, more than being merely a commercial exchange medium, was an institution of its own subject to tribal laws and traditional customs which protected its existence and regulated its traffic.

2. Attendance at and travel to these markets was a tribal right. The individual could attend only if the tribe to which he belonged had a definite right in that market, or only if the holders of such rights had no objection to such individual or tribes to attend. Usually in the time of peace such rights were very relaxed and almost everyone could attend unimpeded.

3. Many tribal wars flared up in the past as a result of disputes over the proportion of such rights, over the right of passage through other villages or tribal territories to and from the market, and over peace-breaching incidents in the market place itself.

4. The market day was a social occasion for which people dressed at their best, relatives and friends from different villages met, exchanged greetings and presents, and chatted.

5. The market place was a public gathering place where major events of tribal or governmental importance were announced, public speeches delivered, disputes solved, and arbitration were conducted.

F. Hamza summaraized such diverse functions as follows: (translated from Arabic)

> "The market day is the weekly holiday in the region as well as the shopping day. It is the day of litigation and judging, delivering the government's notices and announcements to the people; the day of punishing the criminals and of other affairs which people require for their living. In general it is a gathering day in which desires are accomplished and disputes and quarrels are solved. Hence the tribes take great

> care of their markets, defending them and doing their utmost to keep away anything that might affect their reputation or weaken their traffic. I have compiled a list of these markets in the area between Taif and the Yemen border and I found that they exceed one hundred markets."[1]

The market place itself was an open space usually on a well-drained patch of land in the middle of the village or just outside it. The allocation of the market place for the various trades was based on a customary and habitual usage not necessarily rational. There were no permanent shops save a row or two of cubicle-like stone built shops which had no doors and which were completely emptied once the market day was over. The individual sellers were allocated a customary stall site where they erected a framework of sticks holding a cover for shading; other displayed goods on the bare ground and without cover or shade.

BALJORASHY SATURDAY MARKET:

This description is just as true of any local market in Ghamid and Zahran as it is true of Baljorashy Saturday Market. This market was situated on the eastern slopes of an elongated hill. The hill itself was completely covered by an agglomeration of four villages which appeared like one big village known locally as Dar Assoog, literally the Market Village. These four villages were the core of the Baljorashy subtribe and the core of Baljorashy town. The town itself was surrounded by the rest of Baljorashy villages and beyond that by other tribes (see Figure 10.2).

In the past this market had been a magnet for an important local commercial traffic and it could be argued that the seemingly high

1. Hamza, F 1968 op. cit., p. 77. The list mentioned in the quotation is not available in the original text.

number of merchants in and around Baljorashy were a cause or a consequence of that traffic.

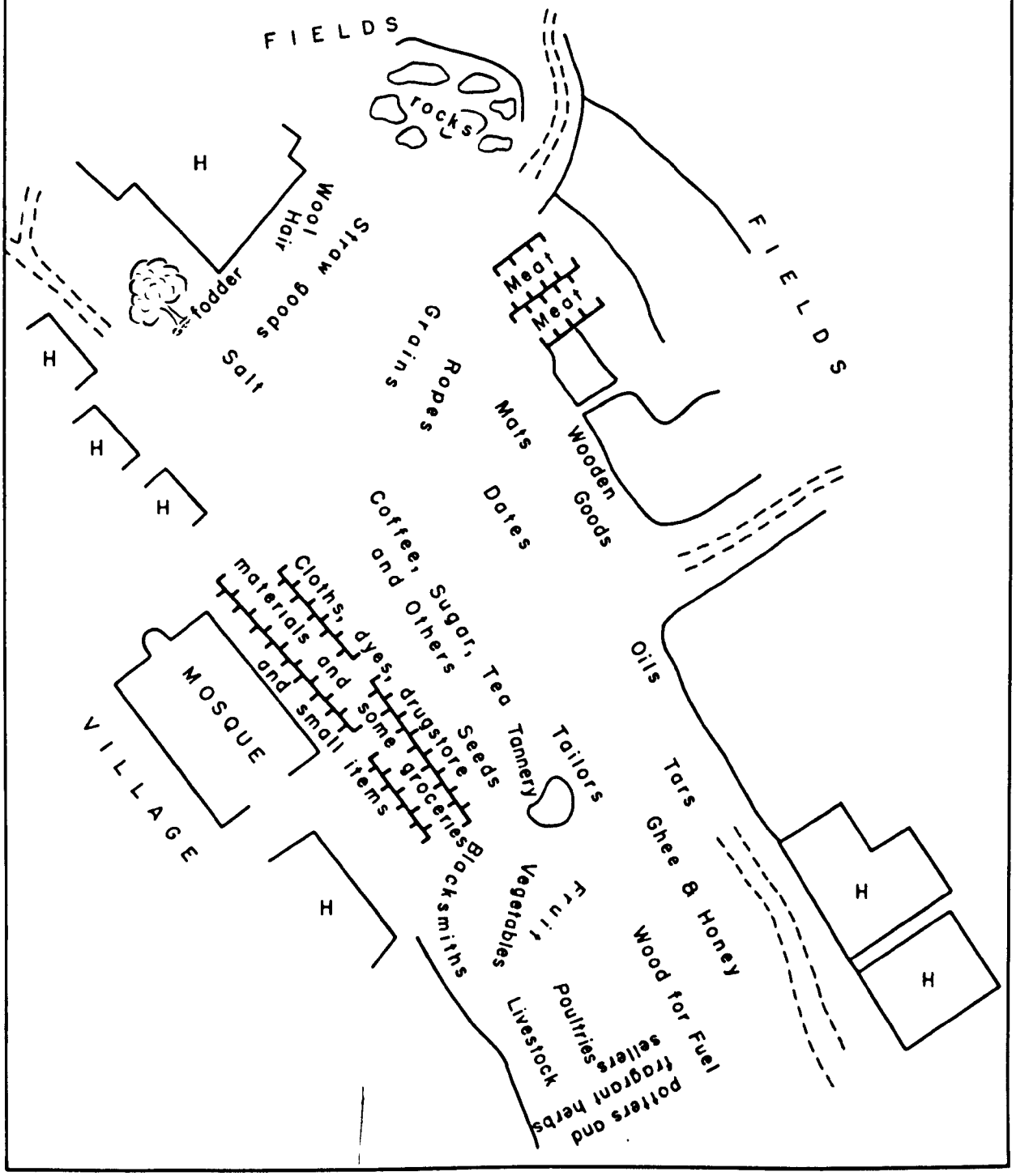
As there is no way by which one can measure the size or range of commercial exchange in that past period with which we are dealing in this chapter, I tried to reconstruct Baljorashy Saturday Market forty years ago by asking some of the local people of over fifty years of age about their recollections of that period (Figure 10.4).

The important outcome of such reconstruction was the determination of two things: first, it revealed the actual range of materials in commercial exchange which, to a certain degree, is indicative of the technological level of the community. It also showed the source of these commodities which is a reflection of the degree of seclusion of the community. (Compare Table 10.6 with the table of present-day shops in Baljorashy (Table 11.9)).

Secondly, it revealed the actual layout of Baljorashy Saturday Market ground and its allocation to different trades (see Figure 10.4).

Trading started early on Saturday morning and soon got underway. After mid-day the traffic gradually thinned out. By the late afternoon the whole market was virtually empty. The distant villagers had to start their journey to the market early in the day, even before dawn; a few may even have started their journey one or two days previous to the market day. The market place was characterized by intense traffic, noise and a great deal of bargaining. The top priority in a villager's shopping list was first, grain, this being the staple food that he could not do without. The prices of grains, wheat for instance, was the index of prosperity and hardship. Second, was whatever a peasant might need for his farming work, such as an animal, or a tool. Apart from salt, nearly everything else was of third priority. Rice, tea, coffee, sugar and many other items were luxuries. However,

Fig. 10.4
RECONSTRUCTION OF BALJARASHY SATURDAY MARKET AT THE BEGINNING OF THE TRANSITIONAL PERIOD (1920s)



beside the above necessities, an average peasant would usually buy a pound or two of meat, some coffee, half a pint of kerosene for lighting. He would also buy a few pounds of dates as a treat for the family and for guests.

Women would buy Henna and some scent herbs. With regard to other durable domestic goods such as household articles, these were bought only once in a while. Clothing was kept to two garments a year. Most of the families who attended the market had something to sell; farm produce or some craft speciality.

When people returned home after the market they conveyed news to those who did not attend. It is a part of the manners of speech that when one has just come back from the market to tell the others the market news, especially the prices of grains and animals and the major events which took place. If a villager returned from a distant important market most of the men in the village would turn up to greet him and to listen attentively to what he had to say.

What has been said in this chapter shows the norms of the traditional society of Assarah, its people and some aspects of the patterns of their activities and behaviour. In the following chapter a follow-up will be attempted to show how significant changes have started to affect this age old way of life.

CHAPTER ELEVEN

THE TRANSFORMATION

The reason why the 1920's have been chosen as the watershed between the traditional stagnant pattern of life and the on-going process of change is that in that period the Assarah region became for the first time part of a modern sovereign state. However, the new era was not felt immediately to be completely novel, nor did it immediately differ to any great extent from the past. The armies which conquered the region did not settle in the area, but departed. Even those individuals who stayed, being mostly bedouin, had very little to offer in the way of technological or cultural contribution to the indigenous culture. The few incoming officials who manned the few new administrative posts did not bring with them any significant new ideas. The people continued in general to go about their activities as before and the tribal structure remained more or less the same. However, the simple fact that Assarah and the country around was under new rule brought home to the people that things do change. In later years this same feeling developed into a tendency to equate the Saudi era with the liberation of people from customary habits most of which were thought to be bad. The new era began to imply, to many people, a slight freedom from age old tribal ties and obligations. The phrase "it is now Saudiah", which is still occasionally used, implies that 'you don't expect people to behave in the same old traditional fashion,' although the change may mean either freedom or restrictions.

The first and most significant outcome of the new regime was the

peaceful time that followed which enabled people to travel more safely. Such movements could not have been possible had not the new government dominated the whole country. A small number of people from Ghamid and Zahran emigrated looking for work, mostly in the Jedda, Mecca, and Taif areas. A few Ghamidi emigrants settled in the Sudan and Ethiopia prior to the Saudi rule and a few more followed just after.

The real impact of a new national government had to wait two or three decades, after the military conquest, to take full effect. This was due to the fact that the new regions of the new state were culturally and geographically separate, and the new government had not had the resources to push the country forwards. Besides, and perhaps more significant, the administration machine had to be developed from scratch. Some people still remember the time during the 1940's and even the early 1950's when they had to have visas in order to be able to travel from the western province to the central or eastern provinces. The transformation of the administration from mere extemporaneous tribal sheikhdoms to something similar to a statutory national administration needed some time to emerge and is still very much in the making.

When, however, national financial resources increased during the 1940's and 50's, thanks to the expanding oil production, the country received the economic boost which it very badly needed to break away from its traditional seclusion (although it is doubtful whether this could in any large extent hasten the maturation of administration).

Assarah at first had to survive on its own agricultural resources and on the spillover from the main economic growth further north. In other words, the relative improvement which the region felt in the 1940's and 50's was not due to direct development projects initiated

in the region itself, but rather a result of the remittance money sent to the villages from the immigrants, who found jobs in the towns or employment with the government.

The examination of the Ghamid and Zahran area's traditional characteristics made in Chapter X is followed here by a discussion of some of the changes which this area has undergone in recent years and which marks a departure towards a different and new style of life. The same sequence and the same headings adopted in Chapter X will be followed here to allow for comparisons except where new factors require special attention. The emphasis also is on agricultural and related aspects.

Here again we are confronted with difficulties over data and quantitative evidence of change. A standard questionaire survey was at first designed and applied in the sample areas. The difficulties, however, of obtaining statistically valid samples of response were extremely great. The scattered nature of settlements, the extremely difficult terrain and the virtual absence of motorable roads in many localities themselves made interviewing very slow. On the other hand, the number of variables in the first responses indicated that anything other than a much larger sample than could be surveyed in the available time would be required for any detailed statistical analysis. My fieldwork programme was therefore changed to ensure that adequate but general coverage was made of the whole of the sample areas as well as other areas in Assarah. It is also worth remembering that, as noted elsewhere, there is extremely little detailed data of any kind already available for Assarah. For this reason the data obtained is presented in a generalized form and the examples given are derived from the data in relative rather than absolute terms.

FARMING PRACTICE:

The same traditional methods of cultivation as described in the

previous chapter continued to dominate farming practice. In the late 1950's the tractor was introduced into Ghamid and Zahran district in the form of leveling bulldozers which were used in earth-moving and reclamation works. It was the individual farmers who first introduced the tractor to the district by hiring them from private firms in Taif. Among these first trials I came across an interesting example of a farmer who was too ambitious. He realized that the smallness of the land plots and terraces was a real handicap to farming and machinery application. So he hired two bulldozers at high cost and tried to increase the area of the plots by levelling the terraces to make two or three big terraces from several small ones, ignoring both terrain and soil capabilities. The area of his project has a general slope of 1:15 to 1:5 made into many terraces which were elevated one above the other by heights of up to 150 cm. The result was, naturally, an accumulation of soil up to three meters at the down slope end of the terrace, leaving a third or more of the width of the new wide terrace towards the upslope end with shallow soil or exposed bedrocks. Thus, the project failed. Part of the failure, however, is attributed by some people, including the owner himself, to lack of credit to carry it through to the very end. This particular project, an example of misplanning on the part of an individual farmer and a misconception of the capabilities of the modern machinery, is still deplorable. It needs at least twice as much money as has already been spent to make the land suitable for arable cultivation and even more to put it back to its original form. In more favourable conditions the bulldozer leveler was successfully utilized, especially after the Agricultural Unit brought in its own tractors and hired them at lower cost. Indeed, the opening of an agricultural extension service unit in

Baljorashy was in itself a sign of change for the better, although the people of Ghamid and Zahran did not readily appreciate its role and function. Even now, despite the existence of three agricultural extension offices at Al-Baha, Baljorashy, and Al-Mandaq, offices whose services are in demand by many farmers, there are still a few peasants who are not enthusiastic about asking for help or advice from the agricultural units and others who do not even know what they are or how they can help.

In the early 1960's the tractor plough was introduced to the district through the Agricultural Unit in Baljorashy. It did not meet with as much appreciation as the bulldozer. This was apparent in that while the bulldozers were booked months in advance, the ploughs were idle much of the time and it took years before the few ploughs at the Agricultural Unit became fully booked.[1] The farmers realized the advantages of the much deeper ploughing and the speed of the new plough, but that did not persuade them to buy such a tractor plough for themselves. The reason for this reluctance is not economic because few of the significant minority who could afford to do so are prepared to purchase; neither is it due to a local lack of mechanical skill, because, judging from experiences in other machinery (motor vehicles and water pumps), competent drivers and technicians can be trained fairly quickly. The reasons are to be found in the miniature size of field-plots and their irregular configuration, the dispersal of holdings, and the small size of the over-all area of the holdings. All these reasons raise many questions related to the economics of scale. Another equally significant reason is the inadequate between-field tracks which were

1. See Ministry of Agriculture and Water, Ministry of Agriculture and Water During One Year (1966) pp 56-58. This discrepancy is also due to the fact that the demand for the plough is more seasonal and specialized than the bulldozer.

originally only designed as foot paths and cannot take a tractor plough (see Plate 11.2).

These are the same reasons why the threshers and the combined harvesters which were introduced later did not meet much success. In fact they are more difficult to incorporate in the farming system, not only because they are more specialized machinery types than the plough, but also because they are bigger and require more maneuvering space.

A significant and very promising cultivation technique which was unknown in the region is furrow irrigation cultivation. This was first introduced in Baljorashy by farmers who had lived in Jordan, and simultaneously through the Agricultural Unit. The technique is superior from the point of view of plant growth to the traditional basin technique with regards to vegetable growing and it is being adopted for this purpose.

Nursery cultivation, though not entirely new, is gaining more importance as the shift towards tree and vegetable crops is increasing both for the purpose of in-the-farm transplantation and for sale. For the latter purpose the Agricultural Unit played a leading and significant role.

METHODS OF IRRIGATION:

The new gasoline and diesal water-pumps revolutionized the water-lifting technique, albeit the basin irrigation method remained dominant. The first water pump to be installed in Ghamid and Zahran district was privately introduced by a farmer in Bani Kabeer valley in 1955. Around that time engines were installed in more than one place almost simultaneously.

The advantages of the pump-engine were so convincing that everyone

Plate 11.1

The roads between fields are narrow and therefore unsuitable for heavy machinery.

Plate 11.2

who needed and could afford to bought or contemplated buying one. Unlike the tractor and harvester, the pump takes much less space, even less than the traditional water-lifting apparatus. The farmers needed no persuasion in this respect. The total number of water pumps in Ghamid and Zahran was 615 engines in 1964.[1] Although no recent census has been made, from my own observations I am in no doubt that the number now has at least doubled and the total horse power more than trebled, because the size of purchased engines has increased.

Apart from few places where furrow irrigation is applied, water application methods have remained the same i.e. conducting the water from the well head or from the pool in small open channels to the field's small basins where it is managed manually. Although it can be argued that the introduction of the pump engine has encouraged over-watering, this is not necessarily so (indeed the reverse may be the case), because the rapid application of water floods the basin and the excess which may spill over in less than a minute is more than offset by the slow flooding by traditional irrigation which takes more than five minutes for each basin, allowing for a considerable amount of percolation into the soil before the basin is actually filled. A rough means of testing this difference is by stepping over in the basin after it has just been filled - in the pump irrigated basin one can often feel the hardness of the ground a fraction of an inch beneath the surface, while in the traditionally irrigated basin feet will sink a couple of inches.

It is interesting to consider how such a piece of machinery as the water pump can affect the man-environment balance achieved in the traditional community. According to customary water rights (Chapter VII), where every shareholder has a specific time allocation, if one of the shareholders installs a high-powered pump, it means that he is getting

1. Agricultural Census, 1964.

more than his traditional share at the expense of his fellow co-owners. In view of the high density of wells there is also the danger of lowering the water table through such uncontrolled pumping to such a drastic degree that wells could run dry. Another danger lies in the variability of hydrological connection between wells. In some places when a down stream well is over-pumped that can easily dry out the up stream wells, while in other localities the reverse may happen depending on well lithology and the underground water flows.

However, no such disastrous consequences have occurred on a large scale owing to the following reasons. First, the uniform underground water tables as found in sedimentary regions do not exist in Assarah except in very minor localized basins. As a result great variations in the water table exist within a short distance (see Chapter VI), and over pumping of one well need not affect all its neighbours. Secondly, most of the pumps used so far are only small ones of under ten horse power on average; however, in recent years signs of increasing pump capacity are evident particularly in Ghamid area. Thirdly, whenever danger is threatening an individual's access to water he can still invoke traditional law by demanding that the water of the well in question should not be applied to fields or purposes other than those entitled to it. These are only reasons for partial optimism; there is nothing to prevent an all out over-pumping which can happen even under traditional laws. Indeed the main reason delaying such danger is the fact that the use of water pumps was preceeded and accompanied by a general acreage reduction and agricultural contraction, not only because young men have migrated to the towns but also because supplementary income has gradually become obtainable from non-agricultural activities, this having the influence on rendering

farming less essential to many a family. This has given a chance to those who are still totally or partially dependent on agriculture to go on drawing water with less competition.

CROP RANGES AND ACREAGES:

The first new grain crop to be introduced to the Ghamid and Zahran area was "American" Maize as a summer irrigated crop interplanted with other crops or cropped in very small patches. Maize has a significant advantage over the "Dhurah" sorghum in that its grains are wrapped in protective husks protecting it from bird attacks. However, the sorghum acreage has not been reduced as a result of maize introduction because the sorghum is still superior in other respects. It is softer and sweeter as a green fodder and has more palatable dry stalks. As a human food it is preferred to the maize; it is softer and easy to prepare and well established in the local eating habits.

In more recent years another variety of maize, the popcorn variety, was introduced and it seems that it is gaining ground as a luxury cash crop. The use of maize grain as animal feed is still not feasible in the economics of the Assarawi peasant. A new variety of "North American" wheat has been grown in recent years and yet another variety of awnless wheat imported from Australia has also been cropped.[1] Although both varieties have a high yield, they are less drought resistant than the local varieties and their grains seem to shed off more easily during harvest. A superior variety of barley was also introduced which did not show any drawbacks but the people do not favour barley and its development will have to depend on a more commercial basis in the future.

1. These two types of wheat were imported as food grain. Using them as seeds was on the initiatives of few pioneering farmers.

All these new varieties of grains were introduced by individual farmers in the course of their own experimentation. Although the advantages and disadvantages of these crops are generally recognized, this has not been followed by wide application of the superior varieties nor by increased acreage. This is because the grain crops, as a whole, are in general decline all over Assarah due to the competitiveness of the imported grains. Table 11.1 shows the 1964 acreages of the main grain crops in Ghamid and Zahran. The conclusion that the grain acreage is in decline, however, is not arrived at from such data but rather from the observed neglect of the marginal areas, holdings, and plots. Lentils and millets in particular are disappearing from the crop range. The rivalry of the imported grains is most evident in the first place in rice. Despite the fact that it has no good chance of being cultivated in the area, it represents a new versatile item in the diet.

TABLE 11.1

GRAIN CROPS ACREAGE (DUNUM) IN 1964

	Ghamid	Zahran	Total
WINTER:			
Wheat	11396	4889	16285
Barley	6842	9757	16599
Lentils	365	230	595
Funigreek	2	-	2
Onions	18	1	19
Garlic	2	-	2
Total	18625	14877	33502
SUMMER:			
Sorghum	5083	5230	10313
Millet	1	17	18
PERENNIAL:			
Alfalfa	610	160	770

Source: Agricultural Census 1964

In the past all grain foodstuffs were limited to the locally produced wheat, barley, sorghum and millet, but now rice accounts for a quarter to a third of all foodstuff grains consumed in the area.[1] North American and Australian wheat, which are imported in large quantities all over the country have had a detrimental effect on the development of the local wheat and have hindered its expansion by making its production no longer economic.

More significant are the new varieties of fruit and vegetables which were introduced into the region both by the private farmers and by the government extension service. Table 11.2 gives the approximate times at which such innovations were introduced and the times by which they became commonplace.

The adoptions of these varieties, however slow it may have been, signifies the start of the new shift in agricultural production not only from subsistence to commercial, but also from grain crops to vegetable and fruit. This is implied in the contemporaneous abandoning of marginal land which used to be cropped extensively and by concentration on the more favourable land, cultivating it intensively. Table 11.3 shows the vegetable acreage in Ghamid and Zahran in 1964. However, the table is a gross understatement of the actual acreage because many tiny patches are not included, because it was thought either by the farmer or by the enumerator to be unimportant, a not unusual situation in a first-ever census. This is shown by the fact that other vegetables which were known to have been cultivated in small quantities were not mentioned in the census; these include: egg-plant, okra, molokhia, spinach, white turnip, cabbage, carrot, beans, leek, radish and others. The acreages for 1967 and 1968 (Table 11.3) give good indications of the rate of increase in vegetable growing.

1. This is based on the estimation that most families in Ghamid area have five to six meals of rice in the week.

TABLE 11.2

THE APPROXIMATE DATE IN WHICH THE NEW CROPS WERE INTRODUCED AND THE TIME BY WHICH THEY BECAME COMMONPLACE (IN GHAMID AND ZAHRAN AREA)

	Approx. Date of Introduction	Became Common and wide-spread by:	Remarks
VEGETABLE CROPS:			
Tomatoes	1900s	1950	Now surplus crop
Potatoes	1940s	1960s	Potentially surplus crop
Pumpkins	1900	1940	2 or 3 varieties sufficient
Courgette & Marrow	1950s	1960	
Okra & Molokhia	1950s	1960	
Eggplant	1950	1970	Potentially surplus crop
Leek & Radish	1960s	1960s	Sufficient
Carrot	1950s	1960s	Potentially surplus crop
Beans, Horse beans & Peas	1960	not yet	Not significant
Beet-root	1970	not yet	
Spinach & Turnips	1960	1960	
Parsley, Coriander & Dill	1960s	late 1960s	
Cabbage	1950s	1970	
Green Pepper	1960s	1970	
FRUIT CROPS:			
Citrus fruits: orange, tangerine, lemons, & grapefruit	late1950s	1960s	Prospect is worth studying. Large quantities are now imported. Grapefruit is not commonly used nor imported.
New varieties of apples	1960s	1970	Beside the local variety
New Varieties of plums	1960	not yet	Beside the local variety
New Varieties of figs	1950s	not yet	Beside the local variety
Pears	1950s	not yet	
Guava	1950s	not yet	Highly sensitive to the slightest frost
Water Melons & Melons	1950s	not yet	Not promising
Walnuts	1960s	not yet	Rare, but very promising
Olive trees	1960s	not yet	Experimental

TABLE 11.3

VEGETABLE ACREAGE IN ASSARAH PART OF GHAMID AND ZAHRAN
(IN DUNUMS)

		Ghamid	Zahran	Total
Water melon		44	-	44
Melon		3	-	3
Cucumber		4	-	4
Tomatoes		47	31	78
Green Pepper		1	-	1
Pumpkins		6	1	7
Marrow		7	3	10
Cow-peas		-	30	30
Potatoes		4	-	4
Total		116	65	181
Onions		18	1	19
Garlic		2	-	2
Eggplant, ocra, Spinach, Beans Carrots, Cabbage Turnips Molokiah Lettuce Leak, Radish		-	-	-
TOTAL:	1964	136	66	202
	1967	1500	600	2100
	1968	2200	1000	3200

Source: Agricultural census (for 1964). For 1967 & 1968 see Stanford Research Institute 1971 Evaluation and Use of Area Resources Survey for Agricultural Development in Saudi Arabia p. 149.

It seems that the more easily a vegetable is to prepare and cook the more quickly it spreads; on the other hand, those vegetables that are difficult to prepare or which the people are not accustomed to, do not spread so quickly. The best example we have in this respect is the egg-plant; despite the suitable physical environment which is shown in its high yield, because of its special cooking requirements it did not meet its due appreciation until more people became accustomed to more sophisticated cooking techniques.

When a crop is new, especially when it is a fruit or vegetable, the tendency is that the farmer crops only a tiny patch, sometimes not more than ten square meters, for the sake of experimentation and diversification; this is mainly for home consumption. The acreage increases only when there is a sufficent market demand. At present a process of selection between the new vegetables is in progress in which some vegetables gain more ground according to their agronomic suitability, and some become less important as they prove unsuitable to the physical environment and/or the market. The tomato is decisively favourite because of the long suitable growing season, the suitable soil condition and also because of its high response to intensive farming techniques which the people are already used to. The melon and water melon proved unsuccessful in Ghamid and Zahran compared with other parts of the country, mainly because the soils are usually too heavy and the climate is too cold.

Unlike vegetables, tree culture is a well-established practice in the traditional agricultural system, especially grape vine, figs, peaches and almonds. This, among other things, accounts for the quick acceptance of a wide range of fruit trees. Experimentation in these crops has been even wider than that in vegetables. Farmers tried to grow every fruit or nut tree they could get to the extent that some of them blindly tried to grow trees which were physically impossible to

produce such as, bananas, mango, cardimum and black pepper. Table 11.4 shows the fruit trees in Ghamid and Zahran as in 1964.

TABLE 11.4

NUMBER OF FRUIT TREES IN GHAMID AND ZAHRAN IN 1964

Fruit	Ghamid	Zahran	Total
Grapes	3363	3393	6756
Pomegranates	9554	32809	42363
Apples	3568	973	4541
Peaches	2397	15609	18006
Apricots	2061	498	2559
Almonds	7487	16268	23755
Figs	3309	894	4203
Prickly Pears	10354	3937	14291
Guava	130	4	134
Oranges	1274	184	1458
Mandarine	524	34	558
Lemons	290	196	486
Olives (new)	26	42	68
Others (includes: plums, pears quince & walnuts)	852	100	952
	45189	74941	120,130

Source: Agricultural Census 1964

In this table the first eight fruits represent the traditional trees. It is clear from the table that apple, appricot, fig and prickly pears are more abundant in Ghamid area, while pomegranates, peaches and almonds are more abundant in Zahran area and grapes are equally common in both areas. There is no apparent reason to account for this difference except tradition, and perhaps because most of the pomegranates and peaches in Zahran are concentrated in Wadi Beedah - a narrow elongated wadi in a south to north direction where the flanking mountains provide a good protection against wind and where the general altitude is less than the rest of Zahran and where the soil is loam and loamy clay.

Success in later years of growing the same pomegranate in the rest of the district lessens the importance of these differences. The last five fruits in the table are the new introductions among which the citrus stand out clearly as a favourite. Citrus fruits are entirely new to the region and are showing promising signs of success. The innovations in tree culture also include improvement and selection among the traditionally grown fruits.

New varieties were cultivated with varying degrees of success. For example, beside the old fig trees which have a dark black fruit, a new variety with a very large grey-purple fruit is now grown. There was also a variety of plum, very black and very sour, which is now rivaled by the new plums of lighter colour, larger size and sweeter taste. The traditional small sour green apple is being replaced by Golden Delicious and Red Delicious. The local apricots and peaches are of good quality while the white grapes (Razigi) and the black grapes (Ramadi) and the pomegranates are so excellent that it is hard to improve on them. A new tree culture technique came along in the 1950's and sixties, namely, tree grafting. Farmers first grafted a good apricot variety on to peach trees, and pears on to quince. Later they learned to graft the desired orange branches on to the nursery plants which were originally seedlings.

The numbers given in Table 11.4 includes those trees below the productive age and the "other trees" mentioned at the bottom of the table include plums, pears, quince, and walnuts. Yet other trees which are not enumerated at all include carob and mullberries.

As with vegetables, there is a process of selection between all this wide range of fruits. Now that farmers know reasonably well the suitability of each tree to the local environment, and now that they grow for the market, they are concentrating more and more on

those fruits which have economic merits. This trend is already showing signs in the apparent increased growing of both black and white grapes, pomegranates and peaches. These are decisively favourites and there is no other place in the country outside Assarah that can rival this region in these products.

There is also an abandonment of many inferior varieties which survived hitherto because they were a part of a subsistence range, intended in the first place to be consumed by the family. However, now that the intention is to make them fetch as high a price as possible, the emphasis is shifting toward the better qualities. The best pomegranates which used to be restricted to Wadi Beeda are now grown all over the district especially in Ghamid area and more particularly around Baljorashy town where thousands of pomegranate trees were planted in the last two decades. On the other hand, among the newcomers of fruit trees the Guava is interesting. The tree thrives in the area and produces a good yield, but is very sensitive to the slightest frost which is almost an annual recurrence. The frost ruins it almost to the ground, but new shoots and regrowth spring up after the frost season is over. It is difficult to see how the Guava can survive on the basis of annual regrowth. It is most probable that this fruit will be displaced by other fruits specially when its production becomes more abundant in the warmer frost-free regions.

At the present time there is surplus production in the Ghamid and Zahran area of grapes, pomegranates, peaches, and to a lesser extent, of apricots and almonds which are marketed as far as Abha in the south, Bisha in the east and Jedda-Mecca-Taif in the north. The fruit imported to the district consists mainly of dates from Bisha, bananas and lemons from the west-facing slope of the escarpment (Assodor). Oranges, apples and bananas are imported from abroad in large quantities all over the

country, but the local produce of these fruits is steadily rising.

Assarah as represented by Ghamid and Zahran area is a tree culture region not only with regards to fruit trees but also with regards to timber and natural trees. Mr. Oedekoven's remarks that there is "a distinct tree-loving spirit of the peasants in the mountainous area" is as true of Assarah as it is of the highland of Yemen to which he was referring.[1]

With regards to the forage crops no significant change has taken place. Alfalfa is the main perennial fodder crop supplemented by green barley in winter and green sorghum in summer along with dry hay. Apart from barley which is sometimes given to animals, especially to donkeys and camels, and apart from some domestic bran which is usually given to cows, grain fodder has not as yet gained any significance and it is not likely to do so in the present state of decline in animal numbers (see below). Perhaps when the change from traditional to modern agriculture takes more distinctive shape and when land and labour productivity becomes higher, grain fodder (mainly maize and barley) will probably be more significant. The amount of green and dry grass which used to be cut from the Hema has dwindled to a small proportion as a result of the disappearance of the Hema reserves.

FARM ANIMALS:

The number of animals has significantly decreased. Although there is no census data to support this claim, it seems that nobody in Ghamid and Zahran is in any doubt about it. Several factors have contributed to this decline. First, migration reduced the family labour force with the result that a number of families can no longer keep large herds of animals and were obliged either to reduce the number or to give up live-

1. Oedekoven, K.H. 1970 "Yemen" in Kaul, R.N. 1970 (ed) Afforestation in Arid Zones (Junk: The Hague) p. 133.

stock altogether and concentrate on the more pressing arable cropping. Secondly, the general economic improvement in the lot of some families made the keeping of animals economically (and socially) less attractive; this goes with the general decline in agriculture, and the shift towards commercialization which raised the price of fodder. Thirdly, in the last two decades prolonged periods of drought were experienced in the area,which affected agricultural and animal production. The last and perhaps the worst of these droughts was that of 1965-66. It is estimated that the decrease in animal population as a result of the last drought was 26% in Asgarah and higher elsewhere.[1] Fourthly, the schooling of children took the youngsters from the family labour supply, and it was they who previously helped mind the animals, particularly sheep. Fifthly, the introduction of agricultural machinery reduced the need for draught animals like cattle, while the introduction of motor vehicles reduced the need for camels and donkeys.

Table 11.5 shows the number of animals in Ghamid and Zahran in 1964. Although the table does not show whether or which of these animals are increasing or decreasing it can be stated with confidence that the number of camels and donkeys is less than it was in 1964 by at least a quarter and the sheep and goats are probably now less than they were in 1964 by a quarter. The numbers of camels, sheep and goats are slightly exaggerated by the fact that a number of semi-nomad people with a relatively larger number of animals on the eastern fringes of the agricultural settlement are included.

That notwithstanding, Ghamid atill has a higher number of these three categories; similarly Zahran has a slightly higher number of cattle.

1. Italconsult 1969 Water and Agricultural Development Survey for Areas II & III Final Report p. 23.

TABLE 11.5

NUMBER OF ANIMALS IN GHAMID AND ZAHRAN IN 1964

	Cattle	Camels	Donkeys	Sheep	Goats	Poultry
Ghamid	5986	1603	3487	50306	21452	2772
Zahran	7102	536	3135	28319	14020	2411

Source: Agricultural Census 1964

Cattle in general and dairy cows in particular, are also declining but at a lesser rate than other animals, mainly because people still need them for milk and butter. Indeed clarified butter (or ghee) which was a surplus commodity twenty years ago has become dear and expensive despite the large imports of ghee from Sudan and butter and ghee substitute from Holland, along with a wide range of vegetable oils. At the present time there is no sign of a modern dairy farm emerging anywhere in Ghamid and Zahran although the physical environment is suitable for intensive dairy farming; something of this kind might develop in the future. However, foot and mouth disease which spread in 1970 in an epidemic proportion took a heavy toll of cattle. There is no data, but cattle deaths which were due to this disease were noticeable in every village.

Saudi Arabia as a whole used to be self-sufficient in meat production with a surplus for export. Nowadays a large and ever increasing number of live animals and meat are imported.[1] It is interesting to note that the meat production within Ghamid and Zahran still maintains a good surplus which is sent to Jedda-Mecca-Taif areas and that is true of all the Assarah region south of Taif. The small number of non-local

1. See the Statistical Yearbook Series

animals which are slaughtered are more than outweighted by the district surplus which flows to the towns.

A real important development took place in the field of poultry keeping. In the past the domestic fowl was the only small livestock, but in the last couple of decades a variety of poultry birds and animals came to be known in Ghamid and Zahran. Pigeons were the first to come and were very popular. Later came rabbits, ducks and turkeys. These were less popular and they still constitute very small numbers. In the 1960's a better and superior strain of foreign hens and chickens were brought, first as chicken for meat and later for eggs. However, when in the late 1960's frozen chicken became in high demand people began to think about adopting the battery farm technique, and in 1970 the first such farm was established in Baljorashy, encouraged by the high demand for chicken and by the tremendous success which these farms met with in other parts of the country.

The importance of animal manure as fertilizer has increased sharply, the reason being that the fruit and vegetable farming which is on the increase, raises the demand for manure and the decline in animal numbers has reduced the supply. Also the improvement in roads facilitated the hauling of such bulky loads within a wider radius. This was particularly significant in that it made the moving of manure from the nomads and semi-nomads' areas, which was in the past impossible, not only easy but also beneficial to both the farmer and the pastoralist.

SOCIAL ORGANIZATION:

The old tribal ties and tribal loyalities have weakened, but by no means disappeared. This weakness was concurrent with and in inverse proportion to the presence of the national government. The stronger the national government's presence, the more the authority of the tribal

chiefs and village heads is curbed. At the beginning of the 1930's the government had only a couple of employees stationed at Azzafir who were expected to run the whole district which included the whole tribal territories of Ghamid and Zahran in the three regions of Tehama, Assarah and Al-Badia. The early administrators did not have to delegate formally some of their executive power to the tribal chiefs in order to keep order because such power was already there prior to any government, or rather, to put it differently, the government had to accept the tribal order as it could not effectively at first replace it. When such capabilities were acquired in later years the new governors, with more numerous personnel, were able to check and finally eradicate the chief's power. Such change went on slowly and gradually. Some of the old chiefs have been assimilated into the new administrative machine, others have been left with only minimal nominal status whereby they only deliver the police and court summonses to the individuals in their villages.

As regards social classes, from the homogeneous peasant farmers appeared a somewhat literate class represented by a few people in each village. This class was first general and undifferentiated but later on branched into religious people and government employees. Relatively recently a class of business men is emerging. It seems that these three categories constitute what will, in the near future, develop into a middle class. Another differentiation which transcends the whole social structure is apparent in the division of people into two distinct groups: those who reside in town and depend for their living on non-agricultural activities and those who live in the villages and work mainly in farming. The overwhelming majority of the first group are those who work away in the towns as wage earners, private or govern-

ment employed or self-employed. The rest are engaged in similar jobs in the small new towns in the district itself. The non-agricultural group cannot be called a class because it includes a range from millionaires to the lowest daily wage earner, though collectively it is considered by the farmers as the fortunate group. Fortunately almost every family has some of its members in town and some in the village. The members in the town, though resident, often with their families, always keep in touch with their extended family and they send money regularly and pay visits from time to time. This tendency to lead an independent and separate life in town and at the same time keep physically and emotionally in touch with the old ties and values seems to confirm Smelser's theory of differentiation and integration.[1] The proportion of those who live in town to those who live in the village, though varying from village to village, is probably 1-1 for the whole area (see Table 8.3).

The status and importance of craftsmen as an institution and as a distinctive segment of the society has declined and gradually lost its prominence to the extent that it is no longer essential for the survival of the society. The reasons behind this decline are discussed below, suffice it here to say that people have become less categorized according to their crafts, because the social values attached to a craft, whether it is appreciated and considered prestigious or looked down upon and considered menial, no longer have the relevance and bearing they used to have and are no longer a means of value judgement. Instead new values became the criteria of differentiation such as money wealth which may be reflected in having a lorry, a shop in the market place, or a new house. Another criterion is influence in town

1. Smelser, N.J. 1963 "Towards a Theory of Modernization" reprinted in G. Dalton 1967 (ed) Tribal and Peasant Economies (The Natural History Press) pp 29-48.

such as having a relative in an important post.

The elders in the village and among the tribes have continued to enjoy a respectable position, but with a difference; in the past they drew real respect based on hope and fear, cemented by habitual familiarity because they were the ultimate authority, while at the present time they are respected only for their seniority and old age. Perhps sometimes this respect is mixed with pity. A real generation gap has developed because the young no longer draw their ideals and values from traditional sources i.e. their families, their elders and their local heroes. They instead draw these ideals from their teachers, often foreigners, from books, papers, radio and from what they see or hear in town which are all alien to the indigenous social values. Hence the young very often think of the old folks as a hindrance to their aspirations while the old people very often consider the young as getting soft, spoiled and negligent of the great old values.

Although slavery had been restricted by various measures since 1936, its final abolition did not come until 1962 when the government finally granted freedom to all slaves and paid compensation to their masters.[1] This had very little effect because the number of slaves was very small. Many of them chose to stay in their ex-masters' households rather than leave.

Women's status has been transformed or is in the process of being completely transformed. As has already been mentioned in Chapter VIII the women's traditional role was one of full participation in economic and social activities. At the beginning of the transformation period and as a result of the religious reform movement, the role was declared by the religious people to be permissive and non-religious, perhaps because the reform movement was sex conscious. That role was thought

1. Asfour, E.Y. 1971 "Saudi Arabia" in M. Adams 1971 (ed) The Middle East: A Handbook (A. Blond), pp 271-281, p. 280.

by others as over exploitation because women work as hard as men. As a result women retreated from their previous role and became separated from male strangers. Another factor was that urban social life in which women were veiled and separated from men, was looked upon as a high class example which the new rural elite blindly followed, hence came the veil and confinement to the house (see above). This type of social change is most evident in and near the new small towns like Baljorashy and Al-Bahta. However, in most of the less advanced villages women still work in the traditional pattern, but the society as a whole is not as mixed as it used to be, and the people are more sex conscious than they have even been. If one goes to Baljorashy or Al-Bahta one will not see any woman who is not veiled nor see many women. If one goes further afield one will be able to see women in the fields, but on approaching them, they draw their veils and try to get out of sight. Such a thing would not have happened twenty or thirty years ago.

CULTURE AND TECHNOLOGY:

The process of change and modernization which took place in Ghamid and Zahran in particular and in Assarah in general brought with it in the main an awareness of the backwardness and misery to which the population had been condemned for centuries. This awareness led to the recognition of the importance of education as a means of elevation from mere perpetual struggle for sustenance to more humane and enriched self-expression.

At the beginning of what has already been termed as the transitional period the average peasant's concept of education was the ability to read the Koran, the perfection of which was the celebrated graduation. Writing and arithmetic came in second place to meet the need for correspondence, transactions, and other documents. The opening of the

first state school in the district in 1935 at Azzafir and the second at Baljorashy in 1943 signaled the start of modern education. However, the real drive for fuller schooling did not get underway until the late 1950's. Since then the number of students has increased rapidly as Table 11.6 shows.

TABLE 11.6

THE INCREASE OF SCHOOLS IN GHAMID AND ZAHRAN

	Primary			Intermediate			Secondary		
	Schools	Teachers	Students	Schools	Teachers	Students	Schools	Teachers	Students
1934	-								
1935	1								
1943	3								
1961	85	521	6684	2	7	64			
1962	93	528	7185	2	10	94			
1963	93	528	8820	2	14	121			
1964	94	628	7637	2	14	128			
1965	94	645	7830	5	28	456			
1966	96	566	8548	7	69	900	1	1	21
1967	98	583	8906	8	75	1060	1	2	22
1968	98	631	9091	9	110	1674	1	11	46
1969	102	622	9190	10	132	1960	2	14	90
1970	103	633	9917	12	120	1847	2	14	202
1971	110	656	10125	15	125	2008	2	13	199
1972	118	661	10368				2	22	177

Source: Compiled from various sources including the Directorate of Education, Al-Bahah

Indeed the growth of the number of schools and students as shown in this table may be looked at as a realistic indicator of the whole modernization process. The table shows only those students enrolled in the schools which are run by the Ministry of Education which are all boys' schools. There is a significant number of girls' schools run by a special government department. However, due to the recency of official girls' education the number of schools and students is

markedly lower than that of the boys, but the rate of growth in the number of girls' schools are understandably higher. In the country as a whole the number of girl students in the state schools has doubled every two years over the last ten years growing from 11916 pupils in 1961-62 to 143,630 in 1970-71.[1] In Baljorashy there was an agricultural school which was open for six years from 1960-1965 and was transfered to another region in a programme of centralization. There is also a religious institute which puts more emphasis on the religion and classical subjects, and there is a teacher training institute.

The transformation brought with it, beside education, tools, equipment, machines, new techniques and all the material and non-material things that fall under the term 'technology' in its widest sense. These materials and items should be considered from two angles. First, they are innovations and novelties and as intruders on the traditional technology create a state of disequilibrium. The mechanism of acceptance and resistance varies greatly. (The scope of this research does not allow for deep study of the theories and behaviour of innovation spread.) Secondly, the new technology includes items which have their own technical association and cultural background from which they cannot be isolated. Thus when a tool is introduced it is inevitable that a host of other ideas and new techniques are introduced with it.

In the case of Ghamid and Zahran, as an example of an isolated region, the difficulty was not so much in convincing the people to accept a new machine or tool as in getting such items there. In other words, the physical barrier was an important obstacle to modernization. This lends support to the idea stipulated in the general model in

1. Statistical Yearbook VII

Chapter VII where the physical elements and the level of advancement or technological attainment in their reciprocal interaction determine the speed of the process of change. Thus it is only natural to consider the breaking of the physical barriers as the signal for a host of technological and social changes. Such breakage in the case of Ghamid and Zahran could have only been possible by the introduction of the motor vehicle which, due to the hostile terrain, was both the most challenging and the most rewarding single innovation. Apart from increasing population mobility and hastening the flow of ideas, the motor vehicle made possible the transportation of some heavy machinery and bulky materials which were essential to the new technology and without which other important changes could not have taken place. Such heavy machinery includes the engine-driven grain mill, the engine-driven water pump and the electricity generator. The bulky materials include cement and other construction materials and the various petroleum fuels.

Owing to the immense impact which the motor vehicle had on the process of change a more detailed discussion will be attempted in the hope that such a discussion will throw light on the process of technological change in general.

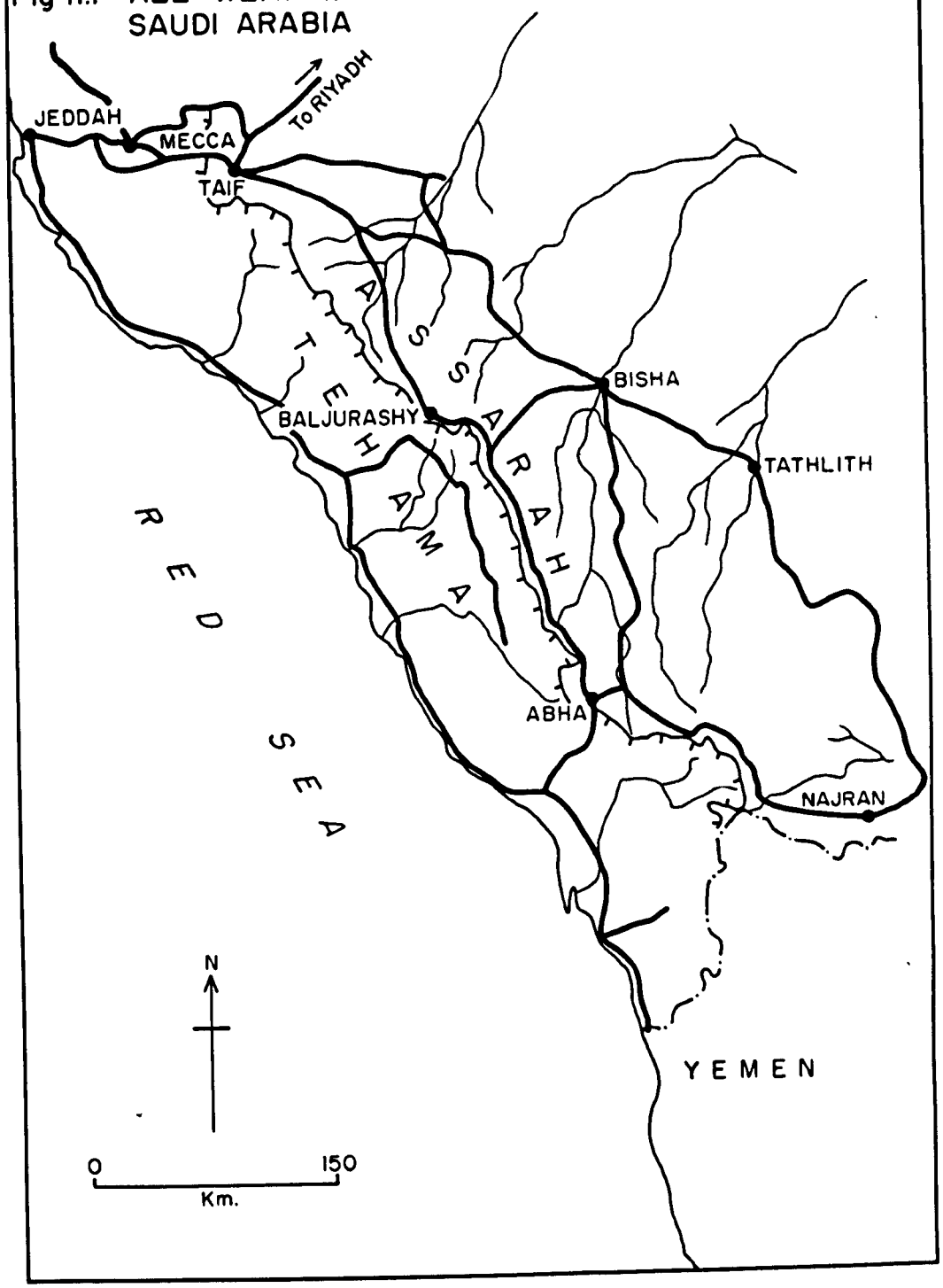
The motor vehicle proved to be the most effective means of breaking the age-old isolation of the region, hence it deserves to be considered as the pace maker and the pioneer of all technological and cultural innovations. With regard to Assarah as a whole, by the end of the Second World War the only motorable tracks were confined to Taif and its vicinity whence the southward road did not go through the mountainous area but skirted it along the eastern plateaus where the terrain is more subdued than in the mountains. The main road south used to go from Taif eastward to Tarabah and from there southwards to Bishah where it branched

southwards to Bir Ben Sarrar to Khamis Moshayt and Abha where the road enters the Assarah region, and southeasterly to Tathleeth and Najran (Figure 11.1). Apart from Taif and its vicinity, Abha was the first town within Assarah to receive motor vehicles. Later on in the late 1940's roads started to creep closer to the mountain range exemplified by the road from Taif south to Al-Jobob and Al-Aqeeq.

In Ghamid and Zahran district by 1946 the road reached only as far as Beeda at the nearest foothill ravine to the mountain range. Up to 1950 if anybody from the highland of Ghamid and Zahran wanted to travel to Mecca, for instance, he had to go on foot or by animals to Beeda and on lorries from there to Taif. Alternatively he could travel westwards down the escarpment and to Al-Makhawa on foot where he could get a lorry which would take him to Mecca. Apart from the on-foot travelling time to Beeda or Makhwa which would take up to a full day, from there to Mecca by vehicle would take as long as three days.

The first road to go over the mountain range in the district was the road from Al-Aqeeq to Al-Baha and Azzafir in 1950 which was called "Assonnah Road." A year later another route was opened to the southern part of the district to Bani Kabeer which was called "Al-Manazzal Road." The northern part of the district was served by yet another route called "Shomrokh Road" which comes directly from the north and which forks out from the main road at Al-Joboob. In the late 1950's a fourth route was opened connecting the old road of Beeda with its adjacent upland of Bani Sar, known as Irq Bani Sar road. In 1953 Baljorashy was connected to the Bani Kabeer route and later it was connected with the other routes further north. South of Baljorashy the road proceeded very slowly; Shora, for example, which is just outside the southern boundary of Ghamid had to wait until the early 1960's to enjoy the

Fig 11.1 ALL WEATHER ROADS IN SOUTH-WEST SAUDI ARABIA



benefits of the motor vehicle at its local market. The road connection between the district and its southern neighbouring district of Balgarn and Bani Imr where a similar road system has already developed had to wait until 1970 (Figure 11.2). Before that date the road contact between the northern and southern parts of Assarah was not through the mountain range itself, but via the old route of Bisha.

The development of so many routes in a northeast - southwest direction was a reflection of the fact that it was easier to negotiate a route from the eastern foothills towards the immediate upland settlement than to cut a route across the successive deep ravines along the top of the mountain range. However, the latter route came into being later on as a result of a piecemeal process of connecting each village with its neighbour, and when more advanced road building machinery was more readily available.

In map figure 11.2 an attempt is made to show this pattern of routes excluding the minor outlets and secondary routes. The names of the main four routes are after the points at which the elevation starts to rise steeply from the foothills to the range proper. It is always at this part that the road is steepest and most difficult. These points are shown in the map.

The important thing here is that the motor vehicle preceded the road building. The motor vehicle inched its way in an arbitrary unplanned way, attracted by the nearest settlement and by the next nearest. It was the villagers of a settlement who decided that they would extend the road to their village and they themselves would work a rough, barely passable track which improves as it becomes more frequented. As map figure 11.2 shows it took about twenty years for the road to get through the district from north to south. In late 1953 and 1954 the road-opening machinery of the Ministry of Transport passed

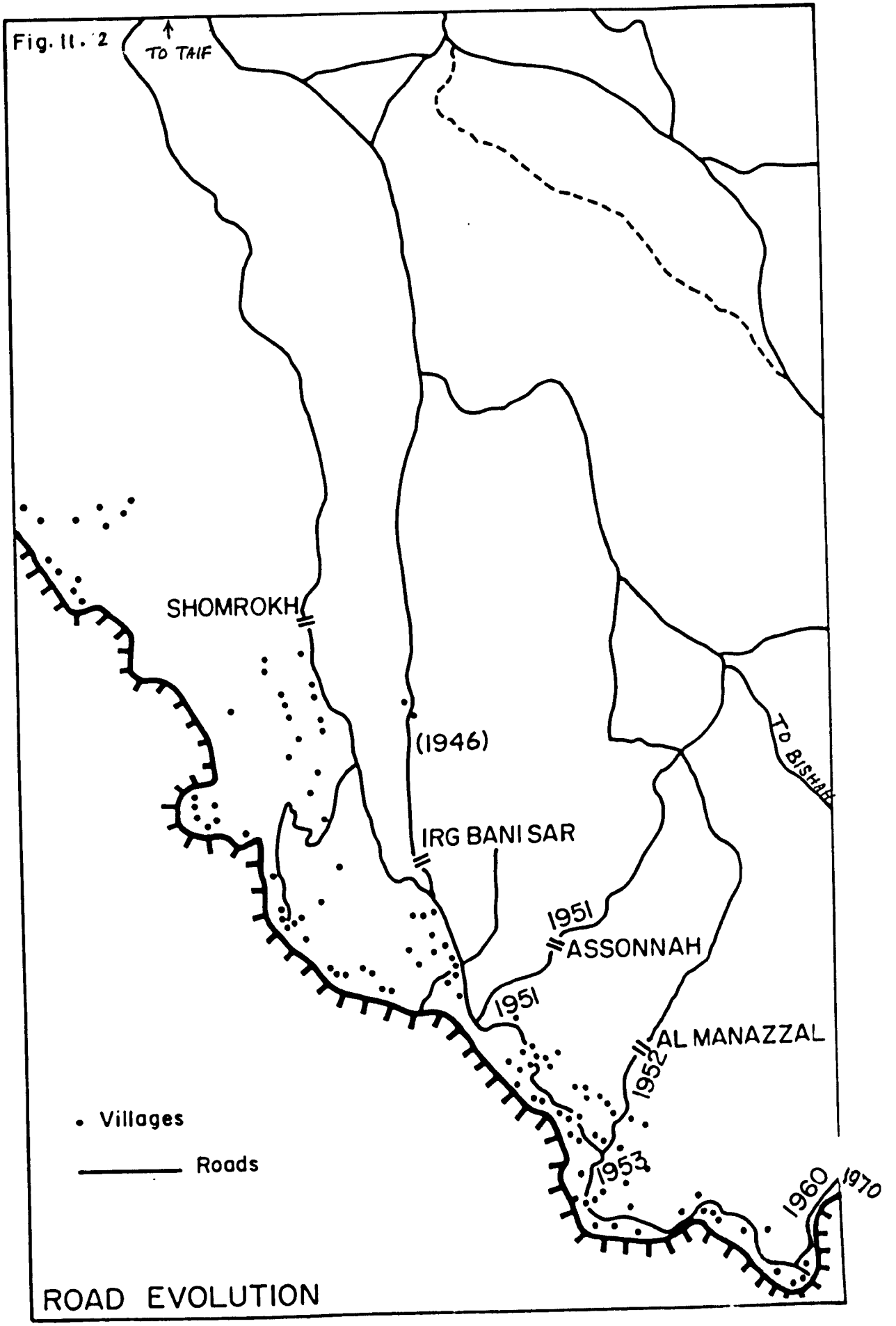


Fig. 11. 2
TO TAIF
SHOMROKH
(1946)
IRG BANI SAR
1951
ASSONNAH
1951
AL MANAZZAL
1952
1953
1960
1970
TO BISHAH
Villages
Roads
ROAD EVOLUTION

for the first time through what was then considered as the main Taif-Beeda-Azzafir-Baljorashy road. What these tractors did was to improve on the skeletal local efforts, widening the track, reducing the gradients and reopening the road in the event of being damaged by floods. However, full government attention has been given to the roads in this district in particular and in Assarah in general since the early 1960's. In 1963 the Ministry of Transport established the Road Authority Branch in Al-Baha with full permanent machinery and personnel with whose efforts the roads ramified to almost every village. Although all these roads are dust tracks, and hazardous in many places due to the dissected and very steep terrain, the Road Authority maintainance team managed to keep them usable. This road was busy with various lorries, tanks, tippers, pick-ups and jeeps, but it was not good enough for the small passenger car, although the odd one could be seen in Baljorashy or Al-Baha in the later half of the 1960's.[1]

The most outstanding achievement in transportation development is the new asphalted road which runs through the Assarah region from north to south and which is now under construction. The route of this new road coencides with the line shown on Figure 3.2 as the main road. On entering Ghamid and Zahran district at Shomrokh at the northeastern tip of Zahran, the road keeps within the mountain range till Abha where one branch forks down the escarpment towards Jizan and the other branch continues along Assarah to Dhahran of the South near the Yemeni borders. The construction of this major road which totals over 700 km was started in the early 1960's and was speeded up later on. Presently the work is at full speed with several teams simultaneously working at different sections of the road (Plates 11.3 & 11.4). A considerable part of it has been completed and passed over by the contractor to the government.

1. At the present time (1973) the asphalted road has reached Al-Bahah.

11.3

The main and only asphalted road in Assarah. Parts are finished while other parts are under construction. The rugged terrain presents a big challenge.

11.4

So far as Ghamid and Zahran is concerned a total distance of about 150km connecting the district with Taif has been completed except for two major bridges. The whole project ought to be completed in the next few years. It is hardly metaphoric to say that this road will be the life line for the whole region.

POPULATION MOBILITY:

The coming of the motor vehicle facilitated quick and efficient means of moving people, services and goods from place to place, thus increasing the interaction in the already stirred whole pattern of life and behavior. As there is no data on the flow of passengers and goods in the area of Ghamid and Zahran one has to detect such flows from the increase in roads open for traffic as briefly discussed above and shown on map figure 11.2. In the growth of the cumulative milaage of all types of roads in Ghamid and Zahran in the three years 1968-70 one might also find another indirect indication of such flow. (Shora has been added because of its proximity) (See Table 11.7). The annual increase of such roads prior to 1968 is not known but it is believed to be much slower. In Abha highland district the increase almost doubled over the same three years period from 550 to 1004 kilometers. Another indication is the daily average of vehicles going to Ghamid and Zahran district; alas, such average is available only for 1965 (Table 11.8).

TABLE 11.7

ACCUMULATIVE MILEAGE OF ROADS IN GHAMID AND ZAHRAN

	Up to 20 Nov 1968	Up to 15 June 1969	Up to 9 Dec 1969	Up to 29 Nov 1970
Ghamid	459	469	485	526
Zahran	279	279	293	329
Shora	-	-	-	46

Source: Statistical Yearbook

TABLE 11.8

DAILY TRAFFIC FLOW AT ASSAWASYAH JUNCTION

DESTINED TO AL-BAHA FROM 7-13/12/1965

Private	Pick-ups	Truck	Tank	Bus
2	7	56	14	2

Source: Statistical Yearbook

Although there is no recent data on traffic flow to compare with the above mentioned daily average of 1965, there is no doubt that such average has increased many times over, if only as a result of road improvement. Judging by personal observation and by asking people in close contact with this traffic, the present day average (1973) is probably around the five hundred mark.

With regard to the population mobility there is no data on the flow of passengers to or from the district nor there is any data on the number of emigrants; yet such mobility is directly and indirectly implied in the above mentioned increase in road length and the consequent growth of traffic. The number of people going to Mecca for pilgrimage has no doubt increased as a result of the easiness of travel. The rapid economic growth in the Eastern Province, Riyadh, and in the J-M-T zone and the expansion of government services, all attracted a substantial number of people to the urban communities. An indirect indication of the scale of such emigration from Ghamid and Zahran is discernable in Table 8.3. The number of town residents in that table are distributed among the above-mentioned urban centers. Also an indirect indication of population mobility in this district is discernable in the discussion on local markets and the range of new goods

within them. Another aspect of population movement is the presence of non-Saudis in the district who consist in the main of two groups; first, manual workers and unskilled labourers who come from the Yeman and whose number may amount to several hundreds in the whole district. Secondly, a group of teachers, mainly Palestinians, Syrians, Egyptians and Iraqis and whose number has been around the three hundred mark over the last ten years. Some of these teachers bring their families with them, but the majority are single males. A seasonal movement of the latter group is associated with the school terms, while the former group display no seasonal movement except in that such labourers seem to be slightly more abundant just before the pilgrimage time and just after it.

TRADE AND OUTSIDE CONTACT:

The most significant change in the trading pattern is the ever increasing flow of goods and commodities from outside the region, mainly from abroad. Such increase was activated and is still influenced by two main factors: First, the ease of access as a result among other things of the improvement in road conditions; secondly and equally important is the increased purchasing power of the average family as a result of finding a subsidiary income to add to the farming income. In other words, the peasant has broken away from the poverty trap. Now he can afford a few extras. This brings the argument back to the point in our general model (Z1) where the outside contact, which is here mainly economic, sets up a chain of changes in the whole traditional system. The range of goods beside food stuff commodities includes other less essential goods such as better quality clothes, fabric materials, small tools and various household utensils and items, most of which were previously thought of as luxury items.

Such flow of non-traditional commodities is clearly evident in the transformation which the weekly markets have undergone in the last few decades. If we look at Baljorashy Saturday Market which we have already examined in the traditional period, we find that the central square remains more or less the same, functioning as a Saturday stall market (Plate 11.5). Meantime, permanent modern shops were erected first around the square and later along the traffic routes. See Figure 11.3 and compare it with traditional periodic Saturday Market (Figure 10.4). The range of goods nowadays includes all kinds of goods, manufactured and non-manufactured, imported from all over the world, from Japan to Canada. During the field work it was impossible to inventory all the goods in circulation at Baljorashy Saturday Market. Instead a list of shops in the main shopping centre in and around the old market square is provided in Table 11.9 below.[1]

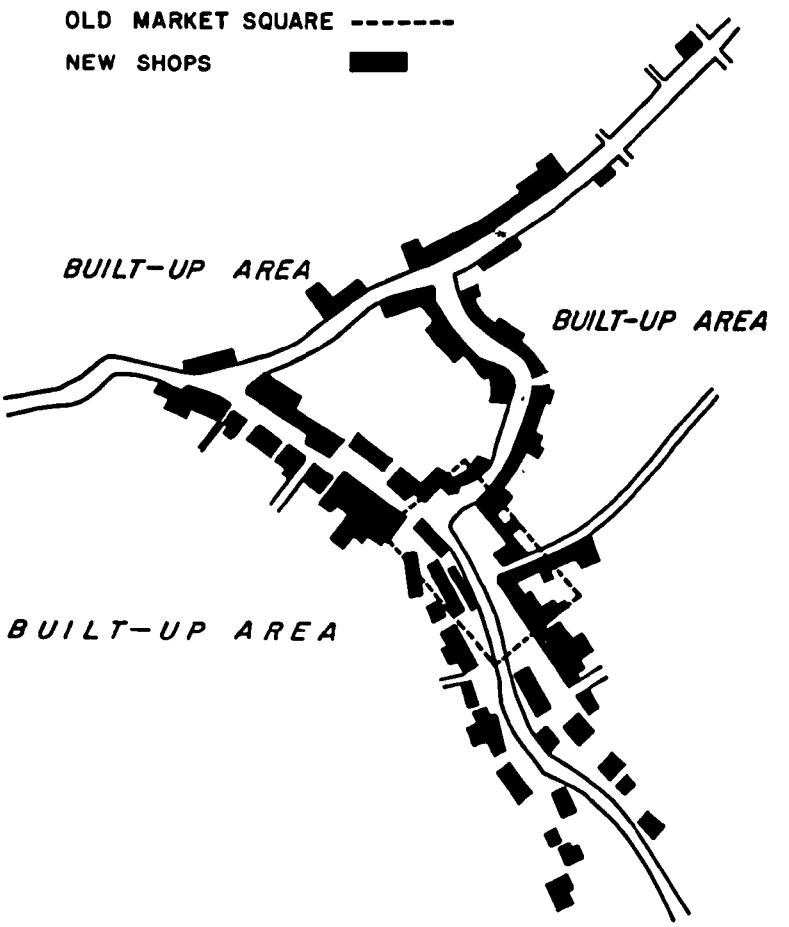
TABLE 11.9

NUMBER OF SHOPS IN BALJORASHY TOWN
(OTHER THAN THE WEEKLY MARKET STALLS)

Type	Number	Remarks
General	98	Non-specialized mixed goods including fabric, footwear, groceries, etc.
Modern groceries	4	
Green Grocers	12	
Butcher	25	
Bakeries	8	
Cafes and resturants	7	
Wholesalers	10	
Construction materials	12	
Book shops	3	
Chemists	3	
Banks	1	A branch of the biggest in the country
Petrol stations	2	
Garages, spare parts & accessories	10	
Jeweller	3	
Blacksmiths	3	
estate agents	2	
Cars & vehicle sale agents	1	
Agricultural machinery	2	
Motor bicycles sale agents	3	

1. Compare this table with Table 10.3

BALJORASHY SHOPPING CENTRE FIG. 11.3



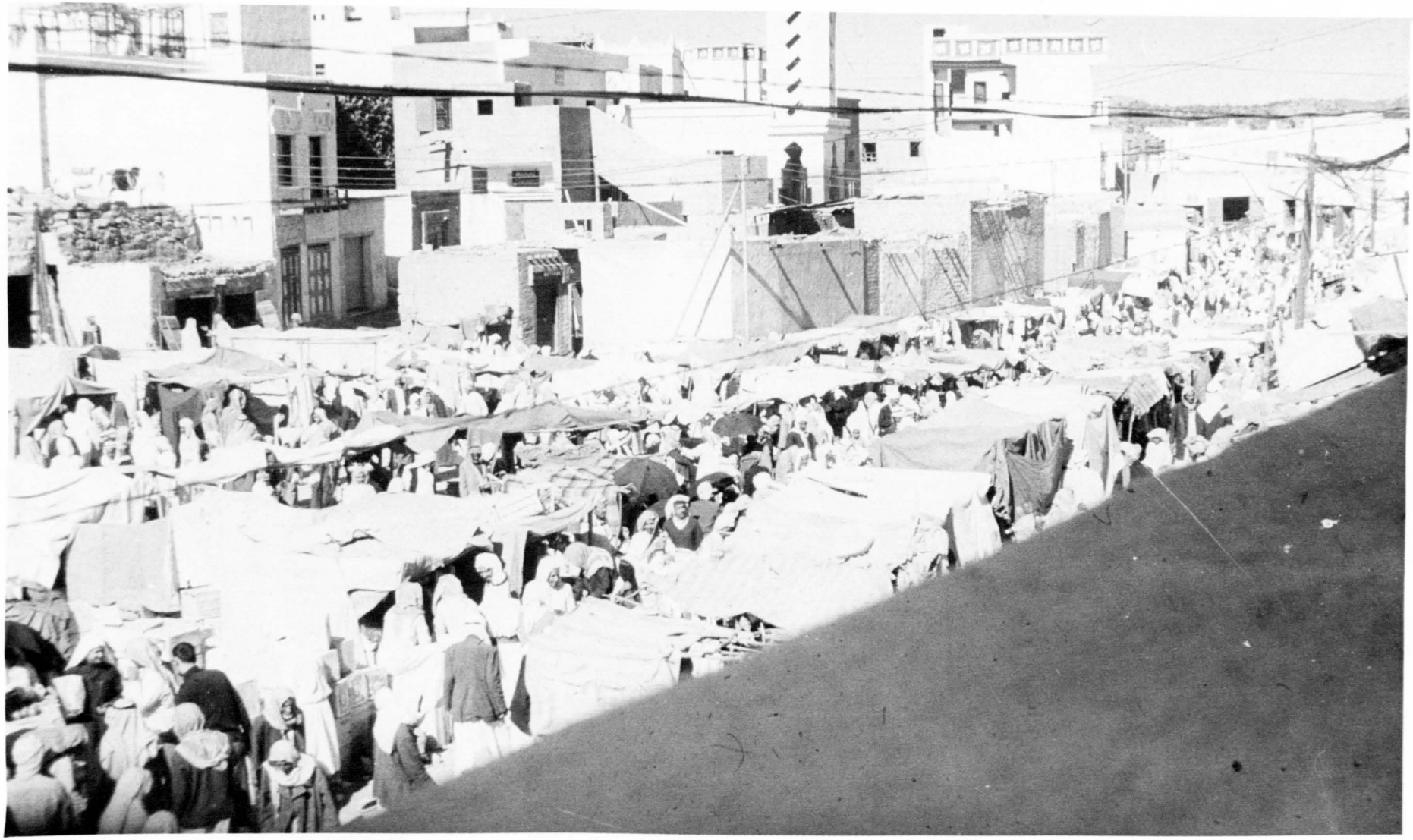


Plate 11.5 Baljorashy Saturday Market

INSTITUTIONALIZATION:

The changes in and development of institutions are one of the most valid indicators of structural changes in society because it is only after the experimental stages are passed that the adopted norms become incorporated in the fabric of the society. The institutional changes which took place in Ghamid and Zahran area can be viewed from different angles. Historically, some institutions have disappeared almost completely, such as the old revenge practice and the "qubola" arrangement by which a particular family from a particular village has mutual family friends in another village; they are obliged to host each other whenever they are at each other's village. Other institutions are in the process of disappearing or being assimilated in new institutions such as the extended family. Totally new institutions are appearing, such as the school, the club, the co-operatives, and the cafe. When examining the functions of these institutions both old and new one can see that a realocation of functions has taken place and in the process many an old function was no longer needed and new functions emerged in response to new situations. Analytically the old institutions fall under three categories: first, the ethnic institutions such as the extended family, the village bond and the tribal obligations. Second, customary and traditional institutions such as revenge and hospitality and many other customary practices. Third, institutions which may, albeit sometimes only partly, qualify for the name economic institutions, such as the Hema and the local market (see the social synthesis model Figure 7.3).

The new institutions on the other hand are of three kinds: 1/ the government administrative agencies, such as court, police and municipality; 2/ the government-run public services such as hospitals,

schools and postal services; 3/ the other public services run by the private sector such as banks and cafes.

The mosque as an embodiment of the religious institution remains as it has always been, an important locus of worship and contemplation. However, religion in general underwent a reform movement which helped cleanse it from superstitions and as a result a new religious institution has appeared in the form of a paid board of trustees who are supposed to guard the religious principles. A summary of the main new institutions in the main townships and administrative centres in Ghamid and Zahran District is given in Table 11.10. Schools and mosques, although important, are excluded because mosques are too numerous, each village having one, and the number of schools has been already given in Table 11.6. As clearly indicated above, most of these institutional changes originate from or are encouraged by the government. The locally initiated and collectively inspired type of institutions or institution-like organizations still lag behind. By this is meant the various kinds of co-operatives, the recreational or cultural clubs and the like. Added to this one can report that there has been an upsurge of several company-like firms which handle various businesses. The outstanding examples of such firms are evident in the field of electricity generation and water supply. Some of these firms are run on private lines and some are co-operatives. In the field of electricity there are at least fifteen generating firms in the main towns and large villages of Ghamid and Zahran - four of them are companies, seven are one-owner firms and four are co-operatives.

Sometimes the water supply and electricity are run as one concern. Although the electricity firms are almost equally spread over the district, there seems to be a concentration of piped water supply firms around Baljorashy. This is perhaps due to the leading role which Baljorashy assumed since the early 1950's in adopting modern factors.

TABLE 11.10

DISTRIBUTION OF GOVERNMENT AND PRIVATE SERVICES

IN THE CENTRES OF GHAMID AND ZAHRAN

	Al-Baha	Baljorashy	Al-Mandak	Beeda	Atawela	El Naama	Assaghra	Al-Aqeeq
GOVERNMENT AGENCIES:								
Court	X	X	X	X	X			X
Police	X	X	X	X	X	X		X
Municipality	X	X						
Registration office	X	X						
GOVERNMENT PUBLIC SERVICES:								
Education office	X	X			X			
Agricultural unit	X	X	X					
Agricultural C. Bank	X							
Fire Brigade	X							
Hospital		X						
Dispensaries	X	X	X	X	X			
Health centres						X	X	X
Social Security		X	X					
Telephone	X	X						
Telegraph	X	X	X					
Post Office	X	X	X					
PRIVATELY-OWNED PUBLIC SERVICES:								
Bank		X						
Electricity	X	X	X		X	X		
Piped water supply		X						

In the field of social security there are two offices at Al-Mondak and Baljorashy where old people and the incapacitated are paid an allowance in a pension-like scheme (see Table 11.11).

TABLE 11.11

SOCIAL SECURITY BENEFITS

		1964	1965	1966	1967	1968	1969	1970
Baljorashy	No. of families	73	446			942		623
		271	1309			2878		1885
	Amount of pension	46000	270,000			600,000		407,300
Al-Mandaq	No. of families		116			595		383
			476			1953		1351
	Amount of pension		65000			391,300		61700

Source: Statistical Yearbook Series

EXOGENOUS FACTORS:

Nearly all the factors which stimulated changes and modernization originated outside Assarah, thus having an exogenous character in one sense or another. Considering the age-old isolation and in relation to what we have established in the preceeding chapter and with reference to what the general model implies, the stimuli have to come from outside the region. Indeed the source of the money which made a general transformation of the whole country at all possible, i.e. the oil, is more than 1500 kilometers away in a different region. However, apart from the modern materials and modern technology which were imported to the region, Assarah did not rapidly come in direct contact with foreign people and foreign culture. Not in any measure comparable to the rest of the Middle East where economic and strategic interests brought

colonial powers and colonization and brought the local population into direct contact with different people and different cultures. The exogenous factors, in terms of direct contact with other people, are limited in Assarah to the non-Saudi teachers and other professionals who came from different parts of the Arab world, especially from Jordan, Egypt, Iraq, Syria and the Sudan. The number of these foreigners in the whole of Assarah may have averaged around 1300 in the last few years. In Ghamid and Zahran district alone there are about 500 in the teaching profession, add to that 300 to 400 in other professions. The influence of this foreign element on the local population was not great because of their small number, their varied background and because whatever social or cultural background they had was not sufficently different from the local norms as to polarize any significant reaction.

It is incontestable that the above mentioned changes which took place over this transitional period and which are still occurring at the present time, could not have taken place without an injection of capital from outside Assarah. The mechanism by which such capital, whether cash or materials, found its way into Assarah can be summarized as follows: First, a modest amount of such capital was first received in the form of cash sent from the early migrants back to their families, and articles and materials which they sent or took with them when holidaying in their villages. This usually included some food stuffs - rice, sugar, tea and coffee and later wheat and some clothing and furniture. Such a practice is still evident at the present time. Secondly, from the 1950's onwards direct government spending started to be increasingly felt. The major avenue of spending is the salaries given to various government employees in different departments. It also comes in the form of rent and small local contracts. Thirdly,

Government investment on infrastructural development stimulated further flow of capital from outside. Road building, improvements in medical and educational services, beside providing cash directly,have encouraged private business. The opening of a branch of the National Commercial Bank in Baljorashy is only one example.

Needless to say, all this capital originated in the increasing oil revenues which enabled the government to embark on large scale spending, first in the main towns and later in Assarah itself.

CHAPTER TWELVE

THE TRENDS OF CHANGE

GENERAL TRENDS:

Now that the physical and social background of Assarah past and present have been examined and now that it has been established that the wind of change is gathering momentum, one might ask what kind of future can be envisaged for this region. Indeed this question is merely a rephrasing of the last of the three questions raised at the beginning of the case study (Chapter X). From what has already been said regarding the general model and its subsections and in the case study, conclusions will be drawn on the trends of change in Assarah in general in an attempt to answer that question. But before embarking on that task a few points need to be restated. There is a homogenity in the backdrop of physical and social conditions; nevertheless there are variations in the degree of change and level of modernization from one place to another within the region. As a result there is a degree of similarity in the pattern of behavior of these changes once a particular factor has prevailed. This is particularly significant because it lends itself to a wide range of purposes, not the least of which is development planning, because this helps predict what may happen in one locality by studying what has already happened in another locality. Another point is that the type, course and intensity of any change is very much affected by the process of development itself, both at the decision-making level and at the feedback level.

From the previous discussion in Chapter XI it is clear that the

factors of change have reached far and wide in Assarah community, stirring and affecting cultural, technological, social, and economic spheres of life. Before discussing the trends in each one of these spheres here is a brief review of the main features of change and the general characteristics of transformation which are not limited to one of the above mentioned spheres but rather transcend them all:

1. The communication barriers have been largely overcome and flows of people, materials and ideas have been established. With the appearance of new social classes, a relatively freer mobility within and across the social, cultural and economic strata is showing signs of yet more interactions.

2. Mechanization and automation, after reluctant reception, became accepted and indeed have developed to be taken for granted as indispensible.

3. A think-big attitude has evolved concomitant with impressive innovations and is reflected in people's approach to their problems. However, this can only be described as an upscaling of thinking when measured against the pettiness of the traditional limited scope of thinking, and indeed this up-scaling is reflected more in the abandoning of the petty margins than in actually adopting large scale activities. This is perhaps a logical sequence because it takes time for large scale activities to take place. However, there are signs of large scale enterprises taking place in Assarah at this time.

4. Commercialization became the accepted norm of economic activities and the role of money became more important. As a result less emphasis is put on subsistence activities. Such commercialization affected some social values in that people came to respect the man with a regular cash income more than the man with a large agricultural holding. Also people became more responsive to a probable material gain than to

the traditional prestigious values.

5. Institutionalization: new institutions have evolved as viable entities separate from the traditional ones. Concomitantly a process of differentiation and realocation of functions between the old and new has taken place (see Chapter XI).

6. The presence and influence of the national government has come to be increasingly important in all aspects of life. This is particularly so because most of the vital public services are government run. The government of Saudi Arabia considers itself the guardian of progress. If it were not for the government investment in this region, Assarah could not have attained the degree of progress it has.

The trends of change in Assarah can be looked at from different perspectives. One might consider the positive or negative effect which any particular change might have on the present norm taken as it is; also one might consider these changes as they affect different fields of community activities whether farming, social, technological or others. Below a combination of both approaches is adopted.

FARMING TRENDS:

In farming practice a host of changes is taking place; some are basically agricultural and others are emanating from the all-embracing factors which have just been mentioned. However, the positive changes can be summarised as follows:

a) The commercialization of agricultural products is increasing. The number of farmers who consciously grow crops for the market is rising. There is also an evident increase in capital input in these farms which are committed to the market. (See economic and technological trends below).

b) Concurrent with commercialization is the mechanization of agricultural activities. This trend is substantiated by the rising use of various farm machinery as already mentioned in previous chapters and by the availability of commercial agents who specialize in selling such machinery. The two shops in Baljorashy which sell agricultural machinery are only examples of other agencies in other towns. Table 12.1 which shows the number of water pumping engines sold through the Agricultural Credit Bank in Abha district from 1966 to 1970 is another indication of this trend. The application of fertilizers, the adoption of new factors of production and the use of government services are all indications of such a trend toward more technologically oriented and commercially motivated farming, (see Table 12.2)

TABLE 12.1

NUMBER AND VALUES OF WATER PUMPS PURCHASED WITH A CREDIT FROM THE AGRICULTURAL BANK IN ABHA

	1966	1967	1968	1969	1970
No. engines	286	492	669	579	543
Value	639,553	1,104,375	1,440,332	1,387,752	1,258,025
Pumps	39	62	148	181	189
Values	(777,864)	82,066	148,984	211,527	184,394
Total Engine H.P.	2016	3579.5	4844	4318	3920
Average Engine H.P.	7.04	7.27	7.24	7.45	7.21

Source: Saudi Arabian Agricultural Bank, Sixth Annual Report 1969-1970, p. 54, and appendix 37.

The above two factors can be considered as the initiaters of change and once they have been accepted in the community a host of other innovations, both technical and institutional, follow. Such consequential innovations are slowly and steadily gaining importance.

Intensive farming becomes more apparent in that the extensively

TABLE 12.2
AGRICULTURAL SERVICES IN ASSARAH
PROVIDED BY THE MINISTRY OF AGRICULTURE AND WATER

	Services / Agricultural Units		Taif	Abha	Khamis Moshayt	Baljorashy	Al-Baha	An-Nemas	Al-Mandak	Balgarn	Rejal Alma	Bani Malik	Belasmer & Belahmer
Bulldozer & Tractor-plough services	Tractor-plough	Number	12	11		7	2		6	2	2	2	4
		Hours work	21554	7381		17391	918		4972	328	244	25	2218
	Bulldozer	Number	12	7		7	2		5	2	2	2	3
		hours work	6019	877		807	110		559	2	111	23	385
Veterinary Services	No. of treatment Cases		33128	9270		39148			13573				7929
	No. of immunization cases		4864	38		5175							280
	Total		37992	9308		44323			13573				8209
Plant Protection	Pesticides used	Liquid (lit)	2133	91		122				10	11	4	7
		Solid (kg)	2874	1382		2775			276	195	85	581	247
	Crops Treated	Area (donum)	1678	1168		2220			381	1075	5	608	206
		Trees (no)	37461	2807		40644				222		436	467
MOA Nursery Farms	Cropped area (donum)		401	22									
	Transplants	Produced (no)	106525	522094		401754							
		Sold (no)	53704	176361		167624							
		Beneficiaries (no.)	59	497		769					23		
Extension Service	No. of extension Meetings		55	322		131			214	28	67	28	43
	No. of selected extensional farms		45	277		40	5		30	10	71	9	44
	No. of beneficiary farms		327	831		761	375		233	478	123	140	992
Seeds	Quantity sold (kg)					26792							
	Beneficiaries (no.)					227							

farmed area is becoming less important and because more and more families gave up traditional farming as their source of living. The remaining farmed holdings, or at least a proportion of them, are cropped intensively. Many plots of land, particularly near the more important local markets, are so intensively cropped that two and sometimes three crops have harvested from the same plot every year.

Another trend is the specialization in fruit and vegetables, not only because the physical conditions here suit horticulture but also because of the rise in demand which is a result of the rise in per capita income and expenditure.

There appear also what may be described as agricultural enterprises on a small scale. The departure from the family-operated holding to the firm-like farm can be seen only in a few places, but taking into account all other factors it is safe to assume that it is a growing trend. It is also associated with other trends such as the increases in hired farm labour and increased specialization and mechanization. To give one example only, a group of five people from a village near Baljorashy rented a whole farm with all its assets in another village for a period of ten years. They themselves provided the needed labour. The products were exclusively sold in Baljorashy. In the context of Assarah when talking about scale of enterprise, things must be kept in proportion for if, for example, a peasant grows half an acre of tomatoes with the intention of selling them in a distant market instead of cropping only a few square yards for his own domestic consumption, this means a big change by local standards.

Beside these positive changes there are other changes which may be described as negative, at least in so far as the traditional system is concerned. In the fore of these changes is the decreasing acreage of grain crops such as wheat, barley and sorghum. This is

related and due in part to the abandonment of the higher terraces. There is what seems to be a contracting margin in all agricultural activities, caused by the availability of more income coming from outside the agricultural sector. This decline of agriculture led to a corresponding decline in its value and importance as an occupation. The prestigous value which was previously attached to it is moving away to the cash-producing professions. Consequently traditional husbandry, skills and agricultural craftsmanship have declined. Now the average man or woman no longer masters the traditional skills which their predecessors used to master. This is important because it reflects the shift in dependency from internal self-sufficiency to the external sources of income and factors of production. For example, the ability to make, assemble, and operate the water-raising apparatus is no easy matter.[1] As the people become more dependent on the water pump and its engine, they gradually lose their previous skills. However this may be more than compensated for by newly-acquired mechanical skills.

As to the reasons why such a decline in the traditional agriculture sets in, it appears that the awareness which accompanied and followed the recent changes has exposed the irrelevance of the traditional farming practices to the new economically-geared market mechanism. This has had the effect of making people prefer relatively easy and guaranteed non-agricultural income to laborious and hazardous agricultural work. As a result a wide-spread slackness had developed in the agricultural sector. This is not necessarily a type of unemployment or underemployment, although they may well be a part of the problem. There are two important factors which operate against the continuation or the development of the traditional agriculture. First the need for working the land on a traditional basis has substantially declined, but

1. See Plates 10.5 & 10.6 and footnote on p. 190.

during this decline no agricultural development programme was implemented to start a modern and more viable alternative agricultural practice. The farmers, lacking the capacity to foresee the trends, could not generally make rapid adjustments on their own. For example if a family knows that it could make a living on a remittance sent from a member working in the town, their agricultural zeal and seriousness will decline proportionately. Therefore their efforts will be limited to keeping the balance , although logically they can increase their income if they went on farming with the same old purposefulness. The extra income however no longer justifies the effort needed to realize it, and their new standard of living, however poor it may be in absolute terms, is relatively better than the past when they were totally dependent on agriculture, - or at lease they believed it to be so. The second factor which is related to the above is the general retreat of margins. The abandonment of marginal land, marginal holdings, and the retirement of the marginal working units have affected the economically viable and non-marginal units. To give one example only, a family with a viable holding will dislike having their land surrounded by plots which have reverted to waste, because this will expose their fields to such hazards as stray animals, birds and the like, to say nothing of the loss of the co-operation which usually took place between neighbours during cultivation and harvest. Such a situation discourages continued farming even of many viable units. This factor, however weak it may seem at first glance, is highly operative in such a marginal system.

CULTURAL AND TECHNOLOGICAL TRENDS:

The most obvious trends of change in Assarah are those of a rising education and increasing material wealth and material technology,

not in absolute terms but only in relation to the past. Increased literacy and the growth of the numbers of schools and students are sufficiently illustrated in the previous chapter. The drive toward full schooling is at high speed now and the discrepancy between male and female education is narrowing. However, this last trend is a nationwide feature and it will be some years before girls catch up with boys as far as schooling is concerned.

A reciprocal cause-effect relationship is evident between the rising literacy and the growth of mass media and general literature, a feature which is related in a similar reciprocal cause-effect relationship, will most probably continue in the same positive direction and when the road along Assarah from north to south is completed it will add a tremendous impetus to these trends.

Despite the fact that Assarah was the last region of the country to become motorable, the improvement in the means of transportation is considered a very important prerequisite to development. The rates of road building and traffic build-up will continue to increase, bringing with them more material wealth and more technological changes. Another technological trend is evident in the increasing use of machines and mechanical tools and gadgets. This is made easier by the low price of all petroleum fuels.

These innovations tend to be fragmentary and in small units. Consolidations and mergers will take place in the near future not only in response to the economies of scale, but also because these units are growing bigger and closer to each other and sometimes highly overlapping. Thus instead of having two electricity generating companies in two or three clusters of villages only a few kilometers apart, they will consolidate and become one concern. In fact, when in the field work, I was told that there is an arrangement by which one of the major

electricity generating companies in the country will take over the local small electricity firms. Another illustrative example is that there are two separate telephone networks in Baljorashy and Al-Baha, and although they are only about twenty-five kilometers apart, the two networks are not connected with each other nor with other networks. Obviously the first thing that is going to happen in this case is that they will be connected to each other and later to other regions.

In short there is a positive and speedy change-over from "Paleotechnic to neotechnic" to use Eric Wolf's terms.[1]

THE SOCIAL TRENDS:

First, on the positive side; tribal loyality is being substituted to a large extent by a district loyalty which more often than not incorporates residuals of tribal loyalty and also by a feeling of a wider national affinity. Secondly, the small or nuclear family as opposed to the extended family is increasingly gaining importance. The development of this trend has been helped by two factors, first, the change over to an urban style of living, whether by migration to the urban centres or by adopting the urban way of life in the village itself. But why did the urban way of life not favour the continuation of the extended family? There is no convincing answer although one could argue that in the urban setting the individual becomes geared to a type of occupation which requires no more than an individual effort to provide a fixed and regular cash income. From all studies made of social change one is left with a basic simple fact: the extended family is more internally stable and, both communally and individually more necessary, in low technology subsistence conditions i.e. undeveloped rural areas, than in urban situations. Further, the partial

1. Wolf, E.R. 1966 Peasants (Prentice-Hall) pp 19-36.

mechanization of agricultural activities and also the partial abandonment of farming as an occupation reduces the need for a large labour force to operate the farm.

Thirdly, appearance of small but many centres with urban functions within Assarah is itself creating urban nucleii. Such urban communities grew from mere market place villages in convenient locations for government administration and services which, in turn, help to make the market more permanent and less periodical until the place becomes an urban nucleus. The good thing about these urban nucleii is that they are more or less evenly dispersed along the linear zone which is Assarah in such a way that none of them is likely to gain major primacy and become the only important town in the region. From a development planning point of view this pattern of small dispersed towns is not only desirable but also the best way to help an even and equal dissemination of new techniques and innovations (see Chapter XIV).

Fourthly, we can observe that the administrative and organizational functions are shifting from extended-family heads, village elders and tribal chiefs to the government agencies and new urban institutions.

As ~~the~~ an outcome of all these trends, a new generation of people with more adaptive capacity is appearing. The generation who witnessed most of the forementioned changes and came through it with much gain is more apt to try out novel ideas and to accept experimentation. These are the people of between 20-40 years old. These are the people who managed to acquire some education and/or those who migrated to towns at the beginning of the general economic boom.

Another important trend is discernable in woman's social status and role in the new society of Assarah. It is difficult to describe this trend as positive or negative because, on the one hand, women lost some of their individual freedom which they used to enjoy in the traditional period (see Chapter X) while, on the other hand, they have

gained more comfort and more education opportunities and are relieved of some responsibilities. One cannot be sure whether that was what they wanted or what was needed.

On the negative side one can deduce from what has already been said that the tribal bond, authority and loyalty is weakening and disappearing. So is the village communal character.

ECONOMIC TRENDS:

The first trend in economic changes that is obvious is the rise in income coming mainly from outside the region and from outside agriculture. This was followed by a corresponding rise in consumption which activated a chain of events all leading to an active economic life (see below).

The uncertainty which was associated with the traditional income has been greatly reduced through having alternative and more stable exogenous income. The contribution of this exogenous income is ever-increasing through remittances and even more through the government investment in the public services. The government pays over ten million Saudi Reyals per annum in the field of education in a small district like Ghamid and Zahran, as salaries, rent and other expenditure; one can imagine then how important is the government investment to the general development of the area.

The evolution of semi-urban shopping centres along the lines on which Baljorashy Saturday Market evolved is continuing in the major villages which have strong local markets, some government agencies and a favourable location. In Ghamid and Zahran, for example, there are three such semi-urban shopping centres serving the district; these are, from north to south, Al-Atawelah, Al-Bahah, and Baljorashy (see Figure 10.1). Al-Alaya, An-Nemas and Dhahran of the South are three

other examples outside Ghamid and Zahran. The trend is for such towns as Baljorashy to continue to grow in size and importance. Their goods and shopping traffic will increase as the average income increases, their status will be enhanced as more of the centralized services are allocated to them such as intermediate and secondary schools, clinics and commercial agencies. The economic significance of these centres is that they will serve as centres for spreading technology. They will also serve as a link between urban and rural life, to help facilitate economic activities and exchange between them. (see Chapter XIV).

The share of imported goods is significantly increasing. This is evident in the mere fact that the above mentioned semi-urban centres are growing; the list of Baljorashy shops (Table 11.9) locally indicates this trend. The importation figures for the whole country give a valid indication of the increased importation in any region in Saudi Arabia.[1]

This trend is related among other things to two other important factors i.e. the increased average income which raises the purchasing power of the average family, and to the improved road network. In other words there is more cash in circulation and there are more goods and services to be bought.

There is some indication that some economic activities in Assarah are becoming institutionalized. This is evident in that some of the big entrepreneurs have become organised as institutions rather than individuals. The Commercial Bank, a pure economic institution, has branches in Taif, Baljorashy and Abha. The Agricultural Credit Bank has more widespread branches although it has only been augmented in 1964.

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1. See the Statistical Yearbook series.

Related to this latter trend is the appearance of small, but in increasing numbers, companies and co-operatives in Assarah. There are two reasons behind the evolution of these economic arrangements. First, the economies of scale can be considered a major stimulant, because the introduction of machines coming from large scale economies necessitate the consolidation of effort to make the new technology viable. This explains why most of these companies and co-operatives appeared in electricity generation, the mechanization of agriculture and in the field of transportation and marketing. In all these fields the machine unit involved is too big for an individual to buy and keep economically operative. The other factor is the inbuilt inclination to co-operate within the traditional social structure as far as possible (see Chapter VII) Table 12.3 shows the registered co-operatives in Assarah.

TABLE 12.3

REGISTERED CO-OPERATIVES IN ASSARAH EXCLUDING TAIF UNTIL 1970

Name of Co-operative	No. of members	Capital ('000RS)	Value of transactions ('000 RS)	Social services	Annual government subsidy (RS)
Khamis Moshayt	247	57	140.4	1583	7200
An-Nemas	833	232.1	195.1	2204	9600
Rabeah & Rafiedah	157	34.4	109.2	754	8400
Abha	55	67.9	84.0		7200
Ahad Rafiedah	331	120.7	184.9	860	9600
Shaaf Alharith	124	49.6	108.9		7200
Ballasmer & Ballahmer	282	106.2	45.9		7200
	2029	667.9	868.4	5401	56400

Source: Compiled from the Statistical Yearbook

On the negative side there is a declining utilization of margins. People are no longer as thrifty and scrupulous as they used to be in utilizing their traditional natural resources. This may be attributed in part to the decline in opportunity-cost not only in monetary terms but also in terms of human effort. This trend, however, cannot be described as negative except in as far as it indicates a particular recession from a previous trend. The best example of this trend is the decreasing farming of the high terraces (see above). In the past the extra harvest that could be had from these small terraces was essential for the household no matter how much it cost to raise that crop. Nowadays the reward if the labour is employed elsewhere is higher and the cost if these terraces are not worked is so low that it is almost negligible.

The overall effect of all the above-mentioned trends is the transformation of the Assarah community from a traditional, subsistent, isolated and stagnant community to a modern society interacting with the outside world. The final shape and nature which Assarah will be transformed into is not absolutely clear. But there are enough signs indicating that it is heading toward commercial farming based on fruit and vegetable production and some forage and animal production. What is clear is that the region is becoming closely geared to modern technology.

The continuation of this process of transformation i.e. the continuation of the above mentioned trends is conditional on the assumption that the present rate of economic growth and the present rate of develop ment investment will continue at or near the present level, and I can see no reason why it should not do so.

SECTION FIVE

THE DEVELOPMENT OF ASSARAH

CHAPTER THIRTEEN

THE DILEMMA OF DEVELOPMENT

In this section an attempt will be made to discuss how the physical and human environments which have been exposed in the first four sections interact to influence development. Or to put it the other way around, the development potentials and problems of Assarah will be discussed in the lights of the already-given physical and human situation. In order to do that a quick glance at the economic development and general development theories would serve as a logical starting point from which the discussion will proceed to evaluating the Saudi Arabian case; then the scope of discussion will be narrowed to the problems and prospects of development in Assarah region where two major problems will be selected and discussed in detail. Such selection will be based on their comprehensivity and their interdisciplinary character i.e. where geography, agriculture, development and economic and regional planning meet.

DEVELOPMENT: THE ILLUSIVE TARGET

The magnitude of the challenge of the underdevelopment problems, the stark need for their solution and the wide profusion of their manifestations and above all the awareness of their inhibiting effects are only too alarmingly obvious. This is evidenced in the vast literature on the subject, the proliferation of many national and international bodies dealing with the underdeveloped countries and their problems, and the ramifications of research in almost all social sciences resulting in specialization in every sub-subject and inter-

disciplinary subject. The result of all this was a copious flow of books, periodicals and time series.[1] Despite all that the problem still seems as complex and insuperable as ever. All these advances have certainly enhanced our understanding of the problems and their complexity, but have done very little in the way of solving them. To one's dismay what all these writings have been able to do so far is to make us realize that the problem is more difficult than one first thought. This is of course not to belittle some isolated and partial advances in the research dealing with the underdeveloped world, but to show how after all these years we still lack an applicable general development theory.

In reviewing development literature one can say that all writers have been dealing with one or more of the following themes either from the theoretical point of view or in a historical context and/or with regard to one special country or region:

1. The definition and meaning of development
2. describing the need for development
3. diagnosing development problems and prospects
4. prescribing the solutions
5. planning the change programme
6. guidelines and manuals on implementing the programme
7. assessment, feedback and readjustment

In each and every one of these themes there are probably as many opinions and differences in emphasis as there are writers. Such lack of consensus is due to two main reasons and several secondary attributes. The main reasons being: a) the discipline specialization bias, which came about as a result of having each social scientist looking at the

1. The literature on economics and development and their ramification is so vast that they are giving way to a new generation of periodicals specialised in monitoring such literature. To cite only one example see The Journal of Economic Literature.

development problems from his own discipline standpoint and ignoring or just not knowing how other disciplines are entangled in the same web. b) The effect of the cultural background of the writers. Seers quotes E.H. Carr as saying,

> "Before you study economics, study the economist; before you study the economist, study his historical and social environment."[1]

Despite some agreement on some points between writers from advanced and underdeveloped countries there are still some differences which can be attributed to the differences in their cultural background.[2]

The secondary attributes can be summed up as follows:

1. Over-correction of emphasis which was based on theories and assumptions that at too late a stage proved to be wrong. The most apparent example of this is the shifting of emphasis between agricultural and industrial development. After World War II many an underdeveloped country gave priority to industrialization because it was thought of as the only way to transform the backward areas. Even this industrialization fever may have been, in some instances at least, an over-correction to a previous trend which was favouring an agricultural-oriented production in most of the colonized world; with the advent of independence movements an over-correction of what was thought, rightly or wrongly, as the colonizing power policy could not have been helped.

As development programmes which asserted industrial development and neglected agricultural development failed to fulfill the expectations

1. Seers, D 1963 "The limitations of the special case", in Bulletin of the Oxford Institute of Economics and Statistics, Vol 25, No 2 (May 1963), p. 79.

2. This fact has been stressed in many works, see for example: Seers,D. 1963, Ibid; Blaut, J.M. 1967 "Geography and the Development of Peasant Agriculture" in S.B. Cohen (ed) Problems and Trends in American Geography (Basic Books) pp 200-220; Hetzler, S.A. 1969 Technological Growth and Social Change; Achieving Modernization (London: Routledge & Kegan) pp 24, 61.

of the planners and to meet the highly aroused desires of the masses to break away from their inferior status, a new swing and over-reaction of that frustration appeared in many underdeveloped countries in the sixties and at this present time. This latter swing comprises two different trends- one is re-emphasising the agriculture - first approach, or the industrial - first approach with some policy changes depending largely on what was in the previous policy which causes the failure. The other trend is an attempt to combine both agricultural and industrial emphasis. Most of the writings on this latter trend reflect a disenchantment with the previous policies rather than a result of a strong conviction in the new policy. Strangely, or perhaps not, each trend seems to look attractive and to gain popularity at the initial stages hence given support and resources only to prove unsuccessful and to be rejected a decade or two later. It is true that politics and politicians were deeply responsible for such failure, however, this can hardly excuse the academicians who, to say the least, misled the politicians, although unknowingly.[1]

2. Another reason for the wide differences in opinion is found in the political biases. It seems possible that development research may have been consciously or unconsciously biased by the capitalism - versus - communism conflict. Having each block so pre-occupied with gaining as much an ideological influence in the third world as possible it is hard to believe that development research had not been biased in the process. Similar, but much less significant, biases may be traced in patriotic, racial and religious motives.

1. The literature on development policy is vast and easy to find. However a summary of the argument for and against agriculture and industry can be found in: Livingstone, I. "Agriculture versus Industry in Economic Development" in I. Livingstone (ed) 1971 Economic Policy for Development (Penguin) pp 235-249 and indeed in the rest of the readings in the same chapter.

3. Other causes may be due to a persistent adherence to some erroneous conceptions such as the belief that the experience of the developed countries could be repeated in the underdeveloped countries,[1] and the concept that since the underdeveloped countries exhibit certain similar characteristics then they must call for the same approach and the same treatment. Cooper rejects such generalization and stresses the uniqueness of each country in this manner:

> "The problem is, of course, that there is no such thing as a typical underdeveloped economy. The concept of traditional agriculture must be applied to a highly disparate sample. It risks being so general as to be useless or to entail a high probability of being wrong in any particular case. Not only is each country unique, but also within a given country regional and local differences may be so great as to vitiate the usefulness of even a national model."[2]

The general tendency in this respect is to generalize from the poverty stricken over-populated areas of the world. Indeed the Indian case has been stereotyped as <u>the</u> typical underdeveloped country;[3] indeed most of Africa and Latin America can hardly be considered as over-populated.

Another basic difference between the developed and underdeveloped countries which makes it impossible for the latter to copy the former is that the industrially advanced countries had acquired an initial advantage in the field of development and had gained what is by now almost a self-generating stock of experiences which was built up in an evolutionary manner. All this tends to militate against the underdeveloped countries by limiting their manoeuvering capacity in such unbalanced competition. Whether this is correct or, to any extent,

1. This fallacy is refuted by many development experts. One of the outstanding works in this field is: Seers, D (1963) <u>op. cit.</u> pp 77-78.
2. Cooper, C.A. 1972 <u>op. cit.</u>, p 8.
3. Myint, H. 1971 <u>Economic Theory and the Underdeveloped Countries</u> (Oxford University Press) pp 21-26.

compensated for by the fact that manufactured goods and advanced technology from the advanced countries are available for the underdeveloped is highly problematic. I. Illich, for example, doubts and indeed disputes the relevance of much of the western technology, institutions and ideals to the underdeveloped countries and even explicitly describes much of the imported development programmes and technology as an imposed "straight-jacket."[1]

Going back to the biases caused by specialization in discipline one cannot fail to notice that the subject of development studies has been dominated by economists; this is so because it was held that the problems of underdevelopment are mainly economic problems and therefore left to the economist to solve. Thus research was judiciously concentrated on finding and manipulating the mechanisms which generate growth in its restricted monetary sense. It is only in recent years that a clear distinction between economic growth and development has been made.[2]

As the economic approach failed to alleviate the underdevelopment problems, other writers from other disciplines tried to explain the failure and attempt new approaches. Since this is not a place for reviewing the development of development theory, I will try to go quickly over the main approaches by different social scientists.[3]

From an economist's point of view the development problem is one of capital formation - hence the emphasis is focused on creating means

1. Illich, I 1969 "Outwitting the 'Developed' countries" in Henry Bernstein (ed) 1973 Underdevelopment and Development: The Third World Today (Penguin) pp 357-368.

2. There are many works on the subject, one of the more recent and serious attempts to bring up a theory on the difference between economic growth and development is: Robinson, S. "Theories of Economic Growth and Development: Methodology and Content," in Economic Development and Cultural Change Vol 21, No 1 (Oct 1972) pp 54-67.

3. See Hetzler, S.A. 1969 op. cit. Chapters 4 & 5, pp 57-113; also Singh, V.B. 1971 Theories of Economic Development (Bombay: Somaiya)

and ways of stimulating growth in and through saving and investment. Or to use Hetzler's phrase "they describe indirect methods by which the society's financial glands may be massaged somehow to obtain development funds."[1] Sociologists see the problem as one of establishing the preconditions for growth by stressing the need for changes in the value systems of the people in the underdeveloped countries,[2] and sometimes changes in the social class structure, or cultural base.[3] Anthropologists along with some sociologists see the problem as one of getting the people at communal level to feel the need and capabilities for improvement. Psychologists stress changes in the behaviour of individuals,[4] and affecting changes in the motivational pattern of the individual.[5]

The political scientists see the problem as one of first determining the political ideology and consequently the type of government that is suitable for initiating and carrying out development programmes and secondly determining the political and administrative structure which is most condusive to development.[6] Geographers "do not believe in blanket solutions to development problems; instead they feel that policy should be carefully tuned to the spatial variety..."[7] Some of them however see it as a matter of localization and connectivity.[8]

Ecologists and conservationists approach development most cautiously. They see development as "the rational use of earth resources to achieve

1. Hetzler, S.A. 1969 op. cit. p 76.
2. Ibid., p. 86.
3. Osborn, W.F. 1964 Social Change pp. 200-213
4. Dobb, L.W. 1968 "Psychological aspects of planned developmental Change" in Gallaher, Art, Jr. (Ed) 1968 Perspectives in Developmental Change (University of Kentucky Press) pp 36-70.
5. D.C. McClelland is famous for his work in this field. His major works being The Achieving Society 1961 (D. Van Nostrand Co) and more recently, Motivating Economic Achievement 1969 (Free Press).
6. Hetzler, S.A. 1969 op. cit., p 110; Deutsch, K.W. 1971 op. cit. pp 27-50; Frey, F.W. 1971 Developmental Aspects of Administration"in Leagans, J.P. op. cit., pp 219-272; Riggs, F.W. 1968 "Political Aspects of Development Change "in Gallaher, A. (ed) op. cit.
7. Haggett, P. 1972 op. cit. p 452.
8. Cox, K.R. 1972 Man, Location and Behaviour: An Introduction to Human Geography (Wiley) pp 311-326.

the highest quality of living for mankind."[1] They believe that long term and future's quality must be taken into consideration, they also express deep worries about the environment's carrying capacity.

As for the reason behind all these different approaches, it may be proper to quote Bowen-Jones:

> "Each self-isolated approach tends to look for its own universalist truths and, since until very recently each one of them has originated in the developed world, each has tended to seek and then to find those phenomena familiar to its own experience; what each discipline does in fact is to find what it is looking for usually in terms of economically advanced society."[2]

Since most of these differences stem from discipline emphasis, and since each discipline has cogently proved its relevance to the underdevelopment problems, this helped create a realization among many writers in recent years that the problems are too vast and complex to be encompassed in one or two disciplines. Hence underdevelopment is being considered a theme that transcends all behavioral and social sciences. Such interdisciplinary transcendance is being reflected nowadays in many comments by leading experts in this field; to quote only one sample Schultz says:

> "The term 'agricultural development' has good connotations which no doubt account for the popularity of this phrase, although it is very elusive analytically. It is a big tent which shelters all manners of activities and many bits and pieces of knowledge, including some economics."[3]

1. Dasmann, R.F. et. all 1973 Ecological Principles for Economic Development (Wiley) p 1.
2. Bowen-Jones, H. 1972 "Urbanization and Economic Development" in W.D.C. Wright & D.H. Stewart The Exploding City (Edinburgh University Press) pp 94-105, p. 95.
3. Schultz, T.W. 1968 Economic Growth and Agriculture (McGraw-Hill) p 289.

This new realistic way of looking at the problems of the underdeveloped countries contributed to the emergence of a group of scholars whose interest is mainly the study of underdevelopment problems within the new holistic perspective.[1] This in turn stimulated the establishment of international academic centres to deal with these problems from its various facets, apart from being a major specialization of many national and international banks, funds and organizations.

THE ESSENCE OF DEVELOPMENT

So much for the evolution of development as an academic subject. A closer look at the contents of this subject reveals that despite the above mentioned widely differing opinions, there is sufficient ground for agreement among writers on some general but basic points. They agree that a general development, sometimes referred to as economic development, modernization, and transformation means, by and large, an "upward movement of the entire social system."[2]

> "A type of social change in which new ideas are introduced into a social system in order to produce higher per capita incomes and levels of living through more production methods and improved social organization."[3]

> "The process where by the real per capita income of a country increases over a long period of time."[4]

1. See for example: Myrdal, G. 1970 The Challenge of World Poverty (Penguin); Myint, H. 1971 op. cit.; Meir, G.M. 1970 Leading Issues in Economic Development (Oxford University Press); Weiner, M. (ed) 1966 Modernization: The Dynamics of Growth (Basic Books, Inc); Bernstein, H. (ed) 1973 op. cit ; Seers, D. and Jay, L (eds) 1971 Development in a Divided World (Penguin).
2. Myrdal, G. 1968 Asian Drama p 1869.
3. Rogers, E.M. 1969 Modernization among Peasants: The Impact Of Communication (Holt, Rinehart and Winston, Inc) pp 8-9; Also Lewis, W.A. 1955 Theory of Economic Growth (Irwin) is a good example of this approach.
4. Meir, G.M. 1970 op. cit.

> "Economic development is a process by which a population increases the efficiency with which it provides desired goods and services, thereby increasing per capita level of living and general well-being. The process is a dynamic one, involving constant change in the structure and procedures of the economy."[1]

They also agree on making a distinction between economic or general development as defined above and economic growth which is,

> "the increases in aggregate products, either total or per capita, without reference to changes in the structure of the economy or in the social and cultural value system."[2]

There is also a consensus that the symptoms of underdevelopment are, by and large, low per capita real income, manual (unmechanized) production techniques, low labour yield, low health standard, isolation, rigid social structure, and either "feudal" or unstable and nearly always corrupt political frameworks.

They also agree that the objective of development is to affect positive changes in all these fields. Yet when it comes to pinpointing the causes behind these symptoms or consequently to prescribing the best and most effective treatment, they differ widely. Evident also is a general recognition of the failure so far of all development researchers to produce a general valid theory to explain and provide guidelines for the solution of the problems of the underdeveloped countries. This recognition is coupled by disenchantment with the previous theories and approaches and sometimes bitterness which is understandable in the lights of the urgency of the problem and the fact that every day that passes without solving the problem makes it all the more difficult.

Clawson explains this urgency and complexity in the field of

1. Mellor, J.W. 1966 The economics of Agricultural Development (Cornell University Press) p 3.
2. Robinson, S 1972 op. cit., p 54.

agriculture development which can be regarded as the shell and kernel of the problem:

> "The question of priorities and timing in agricultural development naturally arises. With so much needing to be done, more or less at once, and with a shortage of trained manpower, limited capital and limited overall capacity to mount an agricultural revolution everywhere at once, and yet with the great importance of imploying all elements of the package of improved measures more or less at the same time, where does a country turn and where does it start? Faced with this situation our conclusion is that a country would be well advised to apply a reasonably complete package of improved measures all at once for the development of a limited number of areas, rather than to apply one measure everywhere, or worse of all, to apply one measure in one locality and another elsewhere and so on."[1]

As for the reasons behind research failure Rogers lists five reasons abridged as follows: 1. imbalance of emphasis: emphasising economics and ignoring socio-psychological variables and cultural aspects. 2. The lack of co-operation among the many disciplines which are concerned with the underdevelopment problems. 3. Inadequate resources for behavioural research in less developed countries. 4. The Western researchers' preoccupation with data mining in less developed areas rather than with institution building. 5. The culture-bound research methodology of social sciences from more developed countries which is not necessarily suitable a methodological mold for use elsewhere.[2] At this juncture I must add that it is time we abandoned looking for a general theory of development which applies universally to all underdeveloped countries, not only because our ceaseless search has failed but also because the difference among the underdeveloped countries so strongly prejudge such applicability that it is impossible to find such universal theory. A totally different approach which I believe would prove more productive is to break the

1. Clawson, M. 1971
In W G McGinnies et al (eds.) 1971, Food, Fiber, and the ~~and the~~ arid lands. (Arizona University Press). P 12
2. Rogers, E.M. 1969 op. cit. pp 360-362.

underdeveloped countries down to a number of groups based on certain geographic, social, and economic similarities. This may be accomplished in a regional or intra-regional grouping which would lead to the formulation of a number of development theories each of which may be easier to come by and more applicable and realistic to the group of countries it is intended for. Who knows, perhaps when such theories are available they may lead to the formulation of that general development model.

THE ROLE AND PLACE OF AGRICULTURAL DEVELOPMENT:

The urge for agricultural development stems from the simple fact that people must eat, but beyond this subsistence concept agricultural development is pressed for by a desire to eat better and live better. At a higher level still agriculture is looked upon as a source of pecuniary income the deployment of which furthers one's desires; hence agricultural development is geared to a bigger and more complex economic system.

It is only natural that agricultural development gets, by far, the largest share of attention in the economic development literature on underdeveloped countries. Not only because agriculture is the occupation of the vast majority of the people, but also because in most underdeveloped areas the agricultural sector is looked upon as the main source of capital that is needed to power the various development programmes.

In most underdeveloped countries where nearly all the people are engaged in farming and its associate crafts the problem seems to be as much to get the people to adopt what a planner thinks is good for them as it is to provide alternative employment, both in a wide array of various production pursuits which are considered to be prerequisite to

the development of agriculture and which is conducive to sectoral differentiation. It is simply the economic concepts of scale and indivisibilities that make such differentiation necessary. It is easy in a developed country to distinguish between manufacturing, service, and agricultural sectors, but the task is much more difficult in an underdeveloped country. What one usually finds is that the bulk of the population is living in the rural areas engaged in various subsistence occupations with a strong terrestrial bond, hence one cannot escape the temptation of labelling them all as "agricultural". Like Floyd I strongly believe that there is a real danger in classifying this mass of population as the agricultural sector.[1] It is true that they are engaged in one way or another in crop or animal production, but they are equally engaged to an important part of their time and number in various industries and services which are equally necessary for their survival. Primitive and archaic these industries and services may be, but so is their farming. As has already been seen in this thesis (Chapter X) the traditional peasant of Assarah is a jack of all trades; he farms, but he always has something else to do. On market day he is a merchant and news broadcaster, during ceremonies he is entertainer and on other occasions he could be part time or full time builder, physician, or blacksmith. Had this agricultural and non-agricultural dichotomy not been adopted at the start, and had the development studies been all along oriented towards elevating and promoting the primitive industrial and services sectors in an integrated manner with as much zeal as it has been oriented towards improving the primitive agriculture, we might have had by now a totally different and maybe better developing

1. Floyd, B. Some Spatial Aspects of Rural Land Use in Tropical Affrica: Typologies, Models and Case Studies (Occasional Publication No. 9, Department of Geography, University of the West Indies) p 15.

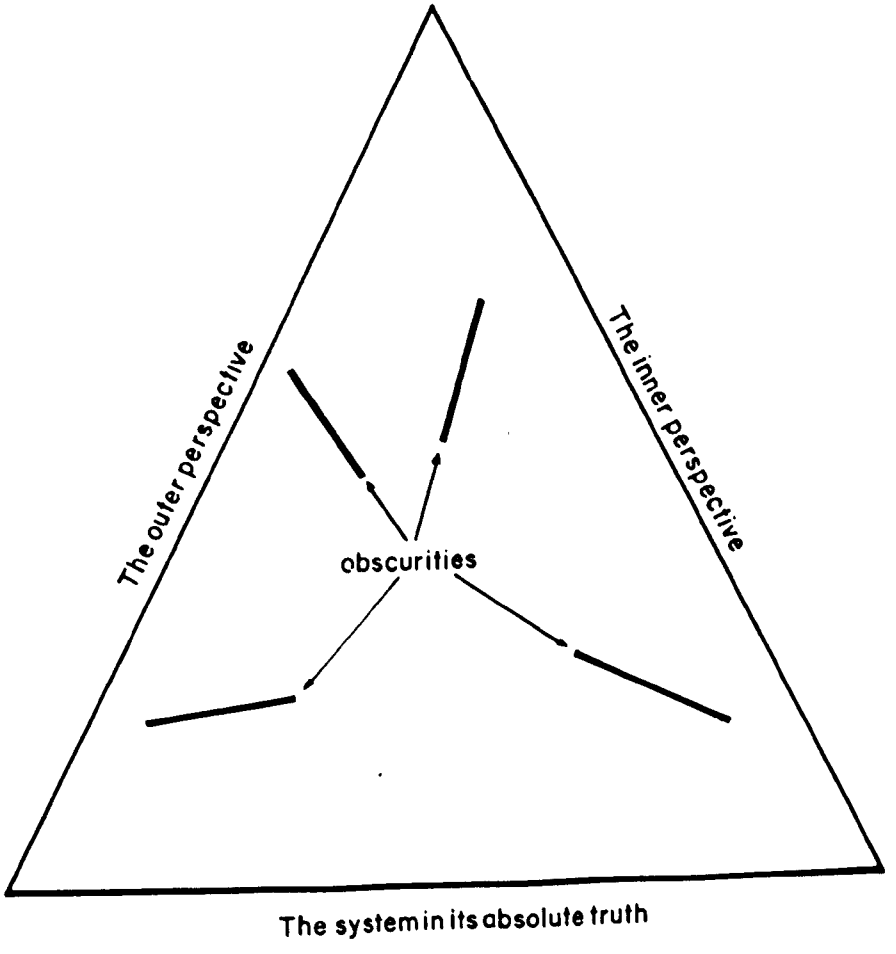
world. As to why such approach, which seems more logical, was not adopted is due to various national and international political and economic factors and misconceptions the discussion of which is not within the scope of this paper. Some writers do however recognize that these non-farming activities are, in a way, the primitive forms of what is now called the secondary and terriary sectors,[1] yet they are often dismissed as incidental specializations. However incidental they may be for the individual, they are certainly not incidental for the community.

The aim of development in its simplest form is to affect positive change, but the process of development itself - from the formulation of objectives to the implementation of plans - depends on one's conception of what is to be change, i.e. the subject of change, usually a system of relationships and behaviours. There are always many facets to the subject of change as seen from different angles and by different people. However these conceptions form two clearly defined stands: the system as seen by the "intellectual" or the "Specialist" whether he is an economist, planner, sociologist, or politician, or even an extension worker. This can be called the outer perspective. Also there is the system as seen by the individual in the system - the peasant in our case - who is part of the subject of change and to whom the benefits are intended. This can be called the inner perspective. This model stipulates one constant and two variables; the constant is the system in its absolute truth and the variables are the above mentioned perspectives, each point of the triangle being differently dynamic, (Figure 13.1).

The success of development depends to a large extent on the

1. Bowen-Jones, H. 1972 op. cit., p 98.

Fig. 13.1


The outer perspective
The inner perspective
obscurities
The system in its absolute truth

accurate understanding of the system as a whole remembering that the two variable viewpoints by definition do not comprehend the absolute. In other words the base of the triangle is always partly obscured to the variable standpoints of the "change agent", i.e. the outer perspective viewer and the "change target" , i.e. the inner perspective viewer. It is therefore vital that a dialogue between the two variables takes place and is reciprocating and mutually illuminating. It is regrettable that such dialogue has not had its proper place in development research. A great deal of the success or failure of development programmes is a measure of the gaps in this triangle. It is little use trying to make people change their crop if they think that what they need is more water, and more difficult if they think that they are quite happy as they are, and worst of all if they think that the change agent is there to trap them in some sort of exploitation or another. The people of the underdeveloped areas and the peasant in particular have been accused by many writers of a lack of empathy, yet I wonder how much empathy the accusers themselves have got for the peasant.

From the foregoing discussion it is clear that agricultural development represents a large and perhaps the most debated theme in the general development in the underdeveloped countries. A major theme in general development is the question of getting capital to initiate development specially at the early stages when such financial source is scarce and badly needed. This question influences the formulation of development objectives, policies, and their implimentation. In this respect there is an old-held belief that agriculture provides and did provide in the past such initial capital.[1] However, such doctrine is being now challenged and even a frequently quoted example of its truth such as Japan is being questioned.[2] One thing only seems

1. Mellor, J.W. 1966 op. cit. p. 26.
2. Hetzler, S.A. 1969 op. cit., pp 118-120

to be certain about the role of agriculture in the economy, and that is, the more advanced the country the less the contribution of its agricultural sector, or to be more precise the primary part of it, in the gross national product,. However since the case of Saudi Arabia as will be seen below, is basically different in this respect I will not dwell on the subject.

THE SAUDI ARABIAN CASE:

Having reviewed some of the major issues in development theories and how the different social scientists view the problems of under-developed countries and how they conceive of their solution, an attempt will be made in this part to consider the Saudi Arabian case. The development problems of Assarah, the study area of this thesis, cannot be isolated from the general development of the whole country and cannot be properly understood without comprehending the Saudi economy at large, this latter being the instrument by which development is augmented and the medium within which it operates.

The Saudi economic outlook is conservative in character and free in orientation (by freedom here is meant laissez faire). The conservatism cannot be more clearly illustrated than by noting that one of the objectives of development, as they are stated in the 1971-75 development plan is to maintain the "religious and moral values" of the country. What is more is that this objective comes before raising the standard of living.[1] However such ultruistic objectives usually fall short of expectations. The free enterprise orientation is based on a respect for private ownership but it is also blended with its own brand of socialism which is reflected in the fact that nearly all the essential public services are government run. Education, health,

1. The Kingdom of Saudi Arabia 1970 Development Plan, Central Planning Organization. p 23.

postal services, a part of the means of transport, and social security agencies are all in the public sector. Another aspect of the free economy is seen in the open trade policy where essential goods are imported free of custom duties and the non-essential goods are lightly taxed.[1]

By far the most important characteristic of the Saudi economy, which lies behind the country's economic behavioural pattern and which explain the just-mentioned open policies is the fact that the economy has maintained a substantial surplus in its balance of trade. Not only that but also the rate of growth of this surplus has kept rising steadily. (Figure 13.2). Consequently the rapid growth of the economy and a rise in the standard of living has been almost inevitable. With such high surplus and such easy access to foreign exchange the government can afford to be easy handed with importation and confident in the face of foreign investment.

A direct result of this growth was a gap that developed between the rate of economic growth and the machine-technology that goes with it on the one hand and, on the other, the rate by which the country's human resources can absorb and assimilate the high standard of technology associated with this growth. In other words the country's human capabilities is falling short of meeting its technical requirements (Figure 13.3). This discrepancy is well recognized by the authorities and indeed the allocation in the plan of 18.6, 17.8, and 18.1 per cent of all funds to administration, education, and transport and communication respectively is a reflection of such recognition.

Another equally significant characteristic is that the economy is so narrowly based that more than 55% on average of the GNP comes from oil revenues.[2] However the magnitude of this discrepancy is more

1. Industrial Studies and Development Centre 1972 Guide for Industrial Investment in Saudi Arabia pp 97-99.

2. See the Saudi Arabian Monetary Agency, Annual Report 1971, 1972.

Fig. 13.2 BALANCE of TRADE

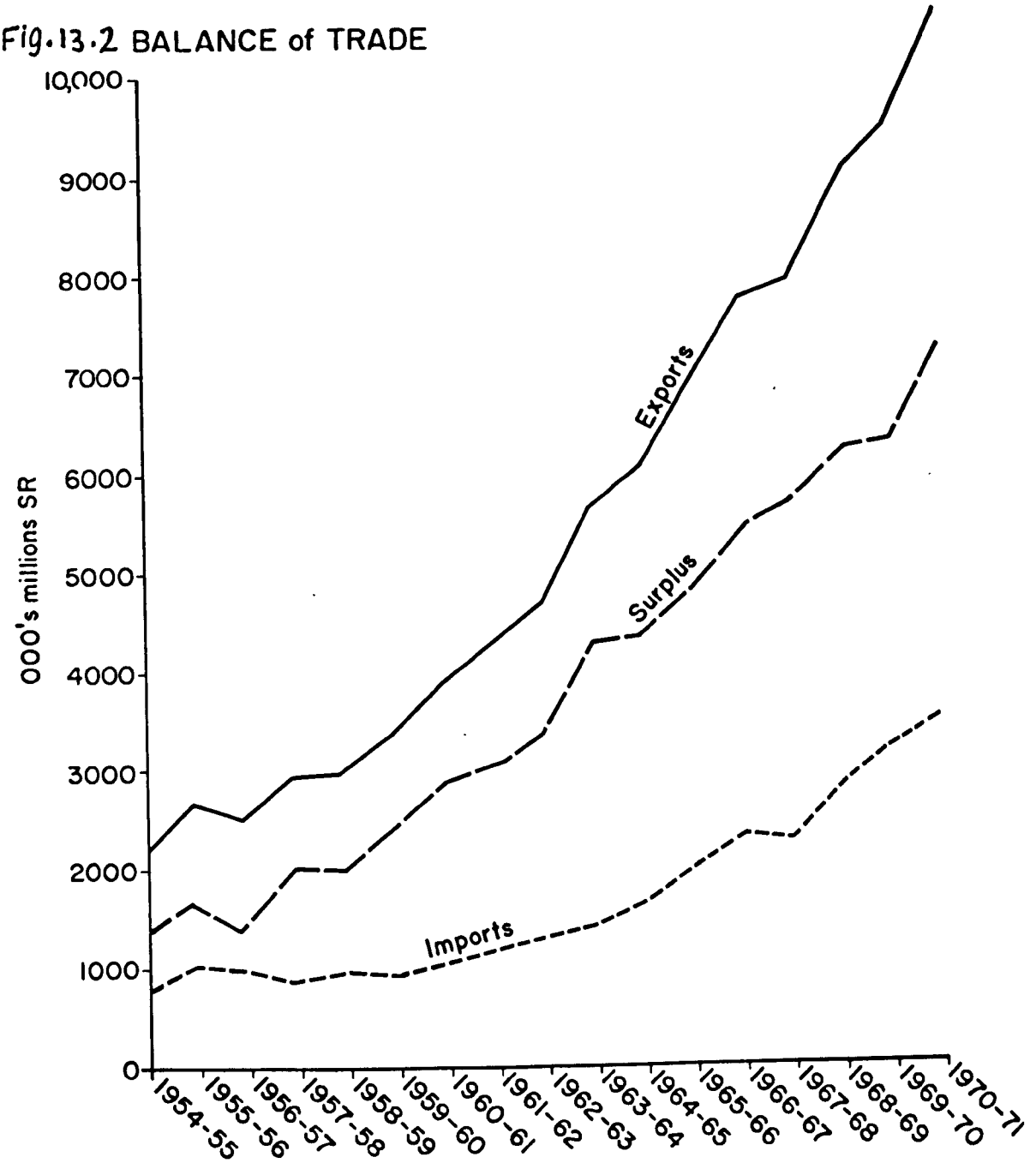
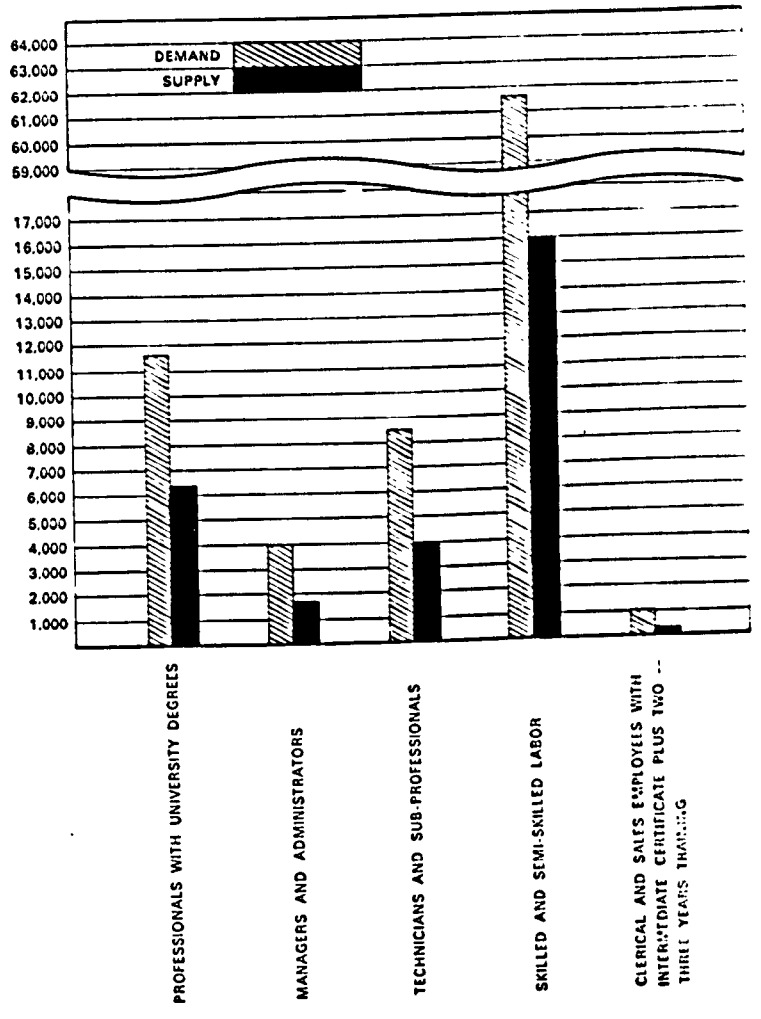


Fig. 13.3

MANPOWER SUPPLY AND DEMAND BY SELECTED OCCUPATION GROUP IN SAUDI ARABIA.



SOURCE: CENTRAL PLANNING ORGANISATION

strikingly apparent in the fact that in 1972-73 budget estimate 92 percent of the budget comes from oil revenues. The government is well aware of the danger of this situation as this is explicitly stated in the objectives of the development plan which aim at "diversifying sources of national income and reducing dependence on oil through increasing the share of other productive sectors in gross domestic product."[1]

For the lack of any other adequate term I will use the word dualism to describe another feature of the economy. Such dualism displays itself in many forms. On one side we have the technically advanced and capital intensive oil sector, and on the other side we have the backward, highly subsistence agricultural and pastural sector. The oil sector although providing about 90% of the government budget is employing only 1.4% of the labour force,[2] and only about 0.7% of the whole potential labour force.[3] The agricultural sector including the nomads is believed to employ about 50% of the labour force while providing only about 6.5% of the GNP according to an estimation for 1970-71. The discrepency is also apparent in the rate of growth of these two sectors- while the annual growth rate of crude oil and natural gas is 8.2% the growth rate in the agricultural sector is only 1.7%.[4]

In the investment field there is also dualism apparent in the dependence of investors either on government employment, works, and projects or on landed property and importation.

A new industrial sector is just starting to emerge with a new

1. Development Plan op. cit. pp 23.
2. The 1.4% figure is for 1970 derived from data appearing in the Development Plan, Ibid., p 75.
3. This figure is arrived at by making allowances for able bodies people not appearing in the labour force data.
4. For the dualism of and contrast between the oil sector and traditional agriculture see: Walpole, N.C. et al 1971 Area Handbook for Saudi Arabia (Washington, D.C. The American University) p 208; Asfour, E.Y. 1972 "Prospects and Problems of Economic Development of Saudi Arabia, Kuwait, and the Gulf Principalities" in Cooper, C.A. & Alexander, S.S. (1972) (eds) op. cit. pp 371 & 373.

commercial - industrial outlook emanating from the development of some basic industries such as cement, iron, fertilizers, mineral exploration, oil refining and construction. This main stream of the new sector is accompanied by two side streams emerging from the commercial sector such as light industries, transportation, repair, etc. and from the agricultural sector such as intensive poultry production, dairy products manufacturing and other food products packing and processing. This industrial orientation - not just a manufacturing sector but rather in its widest implication as modern technology - is hoped to replace the subsistence and craft sector.

From what has been said above it is clear that the Saudi economy is much less similar to other underdeveloped economies than economists would imply. True it is underdeveloped, but with a difference and it is this difference as outlined in the peculiarities above that should be taken into account when considering the question of development planning.

In a capital surplus economy like that of Saudi Arabia one might argue that the development task is made easier by the fact that the capital needed for various essential outlays is no longer as severe a limiting factor. This particularly is so in the oil-based economies where the formation of the country's wealth does not involve much physical participation in terms of labour employment on the part of the population at large. The fact that such source is exhaustible, and that there is a crying need for further resources of wealth for the future, is not sufficiently grasped and appreciated by the general public.

Reviewing nearly all the development stages models propounded by as famous theorists as Karl Marx, Rostow, and List none of them seem to be suitable to describe the case of Saudi Arabia nor to provide

a positive insight into means of speeding up its development.[1] Even less famous stages theories such as Hetzler's four production stages do not provide a satisfactory explanation.[2] However, although the Saudi case may fit some of these stages at varying points it certainly differs with any of them at other points. At certain points it seems that the Saudi case is jumping some of these stages.

AGRICULTURAL DEVELOPMENT IN SAUDI ARABIA:

In the past the country was self sufficient in agricultural commodities, except perhaps for a small amount of wheat which used to come to Mecca as revenues from Waqf land in Egypt and Syria, and some export was even possible. However such self sufficiency is misleading for it was only possible at a very low subsistence level. In the traditional period most of the factors of production were highly marginal (see Chapter X); when the producer found alternative income, in the advent of the economic expansion following World War II, he began to drop the outlying margins. Hence a reduction in the total output was inevitable. This trend of decline in the traditional production continued and is still evident at the present time in many places.

However, it was followed equally slowly by an increase in non-traditional agricultural production. The important point here is that the domestic consumption did not remain dependent on the domestic production nor was the country burdened by international aid or loans, but the oil revenues were quite enough to pay for the rising importations of agricultural produce. In other words the traditional sector was severely undercut by a vigorous oil sector while the modern farming

1. Rostow, W.W. 1960 The Stages of Economic Growth (Cambridge University Press) pp 17-58.
2. Hetzler, S.A. 1969 op. cit., p 118.

sector, although rising steadily is far from satisfying the domestic needs even at a subsistence level. These relationships are schematically illustrated in Figure 13.4.

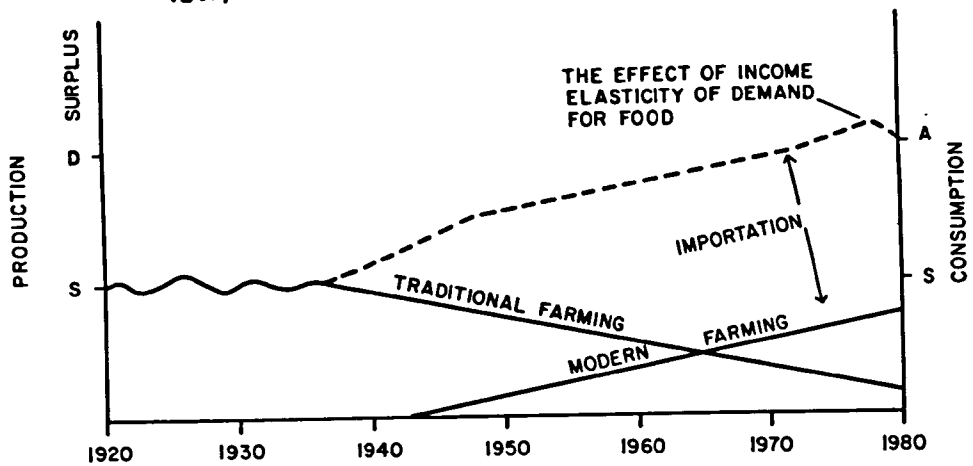
It is in such perspective that the role of agriculture in future development can best be understood. It is true that the country does not very badly need the agricultural commodities to be produced internally, because such commodities can be imported. Yet there are grave dangers in adopting such policies and bypassing the agricultural sector simply because needs could be satisfied elsewhere; these dangers can be summed up in the following: a) Traditional agriculture will continue to deteriorate until we reach a stage where we lose the mastery of the traditional system while not acquiring an alternative system to turn to when the oil tap runs dry. Although this may be a long way off compared with other oil producing countries, long term investment in modern agriculture takes a long time to establish and to be productive. b) The agricultural assets in terms of soil, fields, trees, wells, ditches, dams, terraces will all go to waste if not in use; they are real wealth which has to be maintained. The ecosystem which took millenia to develop will break down in a decade or so if some sort of balance is not kept. No one can find a more striking example than the terraces in our study area.[1] c) The agricultural sector is not merely an economic abstract, it is people whose welfare and quality promotion is beyond quantification, and herding them into cities has not always proved to be to their or the country's advantage.

In short, the agricultural development policy of Saudi Arabia does not need to be preoccupied with short term objectives and should aim at long term objectives which imply making efforts in order to transform agricultural production pattern to a more up to date standard

1. Draz, O.A. 1965 Agricultural Development in Saudi Arabia, (in Arabic) Ministry of Agriculture and Water, Saudi Arabia, p 17.

CHANGES IN TRADITIONAL AND MODERN PRODUCTION

FIG.13.4



S SUBSISTENCE LEVEL
A ADEQUATE LEVEL
——— PRODUCTION
- - - - CONSUMPTION

SIMPLIFIED TREND OF CHANGES IN PRODUCTION BETWEEN MODERN AND TRADITIONAL FARMING AND CONSUMPTION IN RELATION TO DOMESTIC NEEDS AT SUBSISTENCE AND ADEQUATE LEVEL

with a minimum waste in physical resources as possible.[1] The cost of such efforts ought to be judged and justified not merely against short term economic returns, but rather against long term social and economic costs and benefits. On the other hand there is no need to assume that the short term objectives cannot be maintained and integrated with the long term objectives on a viable economic basis. In a situation like that of Saudi Arabia the most suitable agricultural development policy, given the above mentioned circumstances, would be: a) to allow importation to a level where a good standard of health and nutrition is maintained and where the basic needs for other agricultural produce is satisfied. b) The gradual substitution of as much of the imported produce as possible. The main difficulty here is that once the people are used to the imported goods it becomes difficult to make them shift to the home products; also the home producer will have to face strong competition from the foreign producers.[2] However difficult this may be, it is not impossible; for example a policy including a reasonable measure of import quota and/or production subsidies may be needed at the early stages of development. c) Another objective is to develop the national agricultural resources to their best potential. This may end up in building some comparative advantage in a few commodities which would be produced on such a large scale that they may reach surplus quantities and be exported. Dates and ~~its~~ their by-products is an obvious example and oil crops and intensive livestock rearing is another feasible proposition.

Such long term policies imply a heavy investment in human resources

1. The agricultural sector will not be pressed to provide capital neither for its own development nor the rest of the economy.
2. Alsheikh, A.A.H. 1970 Agricultural and Economic Development with Special Emphasis on a Strategy for Saudi Arabia's Economic Development Ph.D. Thesis, University of Edinburgh, p 85, p. 88.

and in speedy and efficient technological change. Given the capital surplus and assuming that a farsighted, responsible and stable political leadership continued to pursue such policies, there is a good chance that they might succeed.

THE ROLE OF ASSARAH AS A DEVELOPMENT REGION:

In the foregoing discussion I tried to touch briefly on the development problems in a universal context and in the context of Saudi Arabia in order to be able to see Assarah as a development region in its proper context. Going further back to ~~the~~ Section Two of this thesis in which the physical environment was described and recapturing what characteris~~tics~~es the human environment as described in Section Three, it seems that Assarah has a definite and particular role to play in the overall national development, a role which cannot be taken over by any other region. Before stating what that role is, a brief glance at development limitations and potentials in this region might help us formulate that statement.

LIMITATIONS:

The nature of the terrain, slope and geomorphology limit the availability of any sizeable flat expanse of land. This presents a constraint on the possibility of any large scale cropping practice and imposes a danger of soil erosion. The irregularity of water resources can be considered as limitation, but having a rainfall that is relatively more regular in this region than in any other part of the country, it may be considered as an asset.

On the human side the most restrictive factors are: a) the declining desire to take up farming as an occupation specially as it is becoming a low status occupation, consequently it is left to the

failures, to those who could not achieve an urban type of work or government job. This is bound to make the development of the agricultural sector all the more difficult, because the residual farmer will be the less enterprising and less responsive. b) Coupled with the upper-mentioned factor is the general lack of incentive which can be attributed to a wide range of reasons from an unawareness of the opportunities due to illiteracy and lack of communication to strong competition from the imported agricultural produce. c) The transfer of land is still hampered by traditional and prestigous values. This restricts the free flow of resources in terms of both money and land; had it not been for this, such resources might be employed more productively.

A further general limitation which has its roots in both physical and human factors is the small size of holdings and their fragmentation. Due to the multiplicity of this problem and more particularly due to its geographical nature it will be dealt with separately in more detail.

ASSETS:

The favourable climate is certainly outstanding (see Chapter V). The relatively abundant rainfall makes some rainfed farming possible and enables a natural vegetation cover to grow. The cool summer weather will influence the future of Assarah most favourably. As the per capita income rises, more and more people from all over the country will be able to afford either a permanent summer residence or a temporary stay (holiday) in Assarah.[1] In other words, the function of Taif, as, up to recently, the only summer resort in the kingdom will be spread over the rest of Assarah with even more favourable conditions. One centre which

1. Such holiday activity is already taking place

has already started to attract summer holiday makers is Abha. There are no data on this matter, but it is well evident to the eye in Abha itself; indeed a large proportion of the increase in air travel passengers on which we have data is attributed to this factor. In 1965 the fugure was 8,097 and in 1970 rose to 18,285 passengers. The potentiality of Assarah as a summer resort cannot be quantified at this stage; however an indication may be found in the fact that it is estimated that the Saudi nationals do spend more than $144 million a year on holidays abroad.[1]

Another invaluable asset is the capital cost embodied in the structural lay out of the traditional farms. The most significant form of this accumulated capital is the millions of terraces which hold the key for most of the future agricultural development. In an ad hoc estimation of the cost of building these terraces, Draz estimated that it would cost about SR 1,500 million or approximately £150 million.[2] Although the validity of such estimation depends on what criteria one is applying, my own impression is that it is too low to be realistic. The other structural capital is the tens of thousands of hand dug wells and other structures.

In recent years various mineral-prospecting investigations have been carried out in many parts of the country. In Assarah there are many mining sites which have been exploited in the past, and new mineralized areas have been found.[3] Gold, silver, copper and iron are the main metals found. The economic feasibility for reworking the old mines and exploiting the new ones though not great at the present time could be vital in the future.

1. Graham, R 1973 "From Slumber to Riches: An Arabian Dream" in The New Middle East (Jan-Feb 1973) pp 16-18.
2. Draz, D.A. 1965 op. cit. p. 17.
3. Directorate General of Mineral Resources 1969 Mineral Resources Research 1967-68 (Jiddah, Saudi Arabia) pp 8-10, 40-41, 55-57,66-67.

Balancing the assets of Assarah against its limitations and taking into account what has been said hitherto, especially in regard to the changing economy, the development of agriculture in this region depends, apart from the above mentioned limitations, on the overall national demand for those agricultural commodities which can best be provided from this region on the one hand and the local and domestic needs of the region itself on the other hand. In regard to the national demand for agricultural commodities, there is no doubt that such demand is steadily rising. Indeed it seems that the demand for and import of some agricultural products has outstripped the highest projections which have been put forward by experts only eight years ago.[1] Assarah can no longer claim to be the best region for the production of cereals, but it can certainly claim to be the only region within the country where fruit such as apples, pears, soft fruit like peaches, apricots and plums can be efficiently produced.[2] Other fruit such as grapes, figs, pomegranates are already established and renowned in Assarah. Nut trees are very successful in some areas of Assarah, the almond tree for example is part of the landscape. Experiments with other nut trees especially walnuts have proved successful. Such crops seem to have the highest potentials in Assarah. In the second place dairy farming may prove to be more advantageous here than elsewhere. With regard to vegetable and forage crops Assarah may be as good as any other agricultural region in the country. The advantage of more rainfall in this respect is partly cancelled out by the rugged terrain.

The demand for agricultural produce in the region itself can only be determined on the basis of the aggregate number of population and the level of per capita consumption of the commodities which will be

1. Asfour, E.Y. 1965 Saudi Arabia: Long-term Projection of Supply of and Demand for Agricultural Products Economic Research Institute, American University of Beirut.

2. ILACO, Informal Discussion paper on crop production in S.W. Saudi Arabia, p.15.

possible to produce locally. As it is impossible to measure with accuracy any of these variables at this stage, one can only speculate from the main trends already outlined (Chapter XII). However, the prospect that the region will be depopulated is very remote indeed; on the contrary if the present indications are of any value, Assarah can capitalize on one half to one million people at the turn of the century. On the other hand the per capita income in Assarah is undoubtedly rising and there is every reason to believe that it will continue to rise in the foreseeable future. As a result the local consumption of and demand for agricultural produce is actually rising; arithmetic apart this is evident in the fact that all major village markets throughout Assarah are stockpiled with all kinds of imported foodstuff which one cannot fail to notice at the first sight.

The question that poses itself is whether Assarah can meet the bulk of its demand for agricultural commodities or not. However, the question and its answer, whatever that may be, are partly irrelevant because the region is already committed to the rest of the country and its economy is geared to the national economy. The question then becomes, will the country's potentials be able to meet the bulk of its demand for agricultural commodities? The answer to this question is in no way easy, but I believe that a long term and integrated agricultural development strategy at a national level, and perhaps an international level, would certainly be a significant stride towards that end. In such an interdependent and shrinking world, a developing country should not be preoccupied with a complete self-sufficiency not only because the economic logic which controls a great deal of our destiny dictates that it is in the interest of all countries to exchange commodities, as it is in the interest of individuals. What a country should aim at is to work towards maintaining a reasonable domestic

production as an insurance against bad times and in case of emergency; beyond that the policy should aim at exploiting and at the same time developing its total resources to the best advantages taking into account both the short and long term.

In the case of Assarah, or for that matter the rest of the country, where physical production factors, especially those related to climate, are most irregular and where domestic demand will be reasonably regular and fairly predictable, a provision will have to be made in any development programme against the fluctuation in the domestic supply of agricultural commodities. It is taken for granted that the major aim of development programmes is to reduce the risk and uncertainty involved in all production stages, yet even then there will still be some fluctuations caused by distinct periodic and seasonal factors.

In conclusion one can say that the role of Assarah will depend to a large extend on its particular physical attributes as have been outlined in this thesis. Thus its role will be to provide within the country the products and services which otherwise would only be obtainable abroad. It will most certainly be a summer resort for an increasingly growing number of middle and working class people who cannot or do not want to go abroad. Its agricultural future will have to depend on horticulture and some kind of intensive livestock husbandry if such future is to be practical. It will certainly cease to be a granary for itself or for the rest of the country although cereal production will continue to be sizeable.

CHAPTER FOURTEEN

THE GEOGRAPHICAL DIMENSION IN THE DEVELOPMENT OF ASSARAH

THE SPATIAL DIMENSION:

In the previous chapter it was clear that man's general well-being is the ultimate objective of development. It was also concluded that development is, in essence, a conscious hastening of certain desired processes in order to satisfy human needs as soon as possible. Hence development has its temporal dimension. It is also self evident that the two foci of these processes, resources and man, are, in the last analysis, place specific, hence development gets its spatial dimension. The success or failure of any development effort is an expression of the accuracy of the perception of the interrelations and interactions that goes on between these four components: Man, Resource, Time, and Space which are highly sensitive and dynamic.

The paramount relevance and significance of the spatial dimension to development is equalled only by the neglect and lack of serious attention paid to it. This may be partly due to the relative recency of spatial studies as such in the first place,[1] and due to the fact that it is even more recent that spatial studies has been linked to the study of the problems of the underdeveloped countries.[2]

1. Perhaps the most significant start of spatial studies was made by Johann Heinrich von Thunen in his pioneering work Der Isolierte State in Bezichung auf Landwirtschaft and Nationalokonomie(Hamburg:Perthes, 1826) It took more than a century for a further significant contribution in spatial studies to emerge such as Walter Christaller, 1965 Central Places in Southern Germany (Prentice-Hall). The original German version was published in Jena 1933; August Losch 1954 The Economics of Location English ed; W. Isard 1956 Location and Space Economy; See also: Chisholm, M. 1968 Rural Settlement and Land Use (Hutchinson Univ. Library); Gregor, H.F.1970 Geography of Agriculture themes in research (Prentice-Hall) pp 57-71.
2. A good and comprehensive work in this field is the book by E.A.J.Johnson The Organization of Space in Developing Countries(Harvard') 1970. Another relevant collection of contributions can be found in N.M.Hansen (ed) 1972 The Growth Centers in Regional Economic Development (Free Press).

However, this spatial dimension and its organization is increasingly coming to the fore in development planning as both a favouring or limiting physical factor and as a vehicle on which changes are carried and as an instrument by which development is activated.

Simple this may seem, but it must be emphasized that time and space are not tangible physical inputs, nor are they abstracts, they are ultraphysical media and containers which envelop all physical objects and configurate their dimensions. They are the "Black Box" in which all inputs physical and otherwise interact. This interpretation reminds us of Clawson's vivid argument, quoted in the previous chapter, where he explicitly indicated that the crux of the matter in development is the problem of doing so many things everywhere all at once.

The spatial phenomenon presents itself in five forms:

1. As an area of certain surfaces or space with both its horizontal and vertical dimensions and as an expanse or plane.
2. As a border area, transitional area, and centre and periphery.
3. As a border line and as an enclosure or exclosure line.
4. As a location which refers to the place or a certain phenomenon in relation to the place of other phenomena.
5. Finally as a distance between points.

This last manifestation is the distance as measured by the length of the expanse that lies between the two points in area units. Two types of distances can be considered here, the linear and the specific terrestrial-bound non-linear distance. The former is only used for academic purposes when theorizing or abstracting distance concepts and relationships, whereas the latter is the actual and solid manifestation of the distance. Other valid criteria for measuring distance are, the time needed to cover it, the energy required to overcome the physical resistance and finally consequences to human comfort. This concept of spatial norms is only one facet of the above mentioned interaction

between Man, Time, and Space in which the geographer has a professional interest.[1]

Distance and its implication assume great importance in underdeveloped countries because of the bearing it has on the flow of resources. It becomes even more significant in mountainous rugged terrain, desertic environment, marshy or archipelago areas, and in areas with some climatological difficulties such as the arctic zones. The reason why distance is particularly relevant to Assarah and its development lies in the fact that its rugged terrain has kept it isolated from more advanced regions, (see Chapters IV, VII & X) and has restricted its development. To illustrate this in practical terms we have an excellent example which reveals the distance influence most dramatically. If we take Baljorashy at 2335 meters above sea level and only a few kilometers east of the escarpment ridge, and Al-Makhwa at 364 meters above sea level at the foothills of Tehama and about 13 kilometers west of the foot of the escarpment we find the following:

a) The theoretical straight-line linear distance between them is about 18 kilometers, whereas the terrestrial straight-line distance is at least 3 kilometers longer; the difference being the vertical anomaly from the imaginary theoretiaal straight-line.

b) The actual terrestrial distance i.e. the distance along the most frequented route is about 26 kilometers which is the total of the above plus the difference of the horizontal anomalies.

c) In terms of time scale the distance is about six hours from Baljorashy to Al-Makhwa and about eight hours back for average travel which is on foot and pack animals. Along the face of the escarpment the going is

1. Haggett, P. & Chorley, R.J. 1967 "Models, Paradigms and the New Geography" in R.J. Chorley & P. Haggett Models in Geography (Methuen), pp 33-34; Haggett, P. 1972 Geography, a Modern Synthesis (Harper & Row) pp 452-453; Cox, K.R. 1972 Man, Location and Behaviour: An Introduction to Human Geography (Wiley) pp 3-10; Morrill, R.L. 1970 The Spatial Organization of Society (Wadsworth, Belmont, Calif).

always on foot because the path which winds on rough steps is too precipitous for riding.

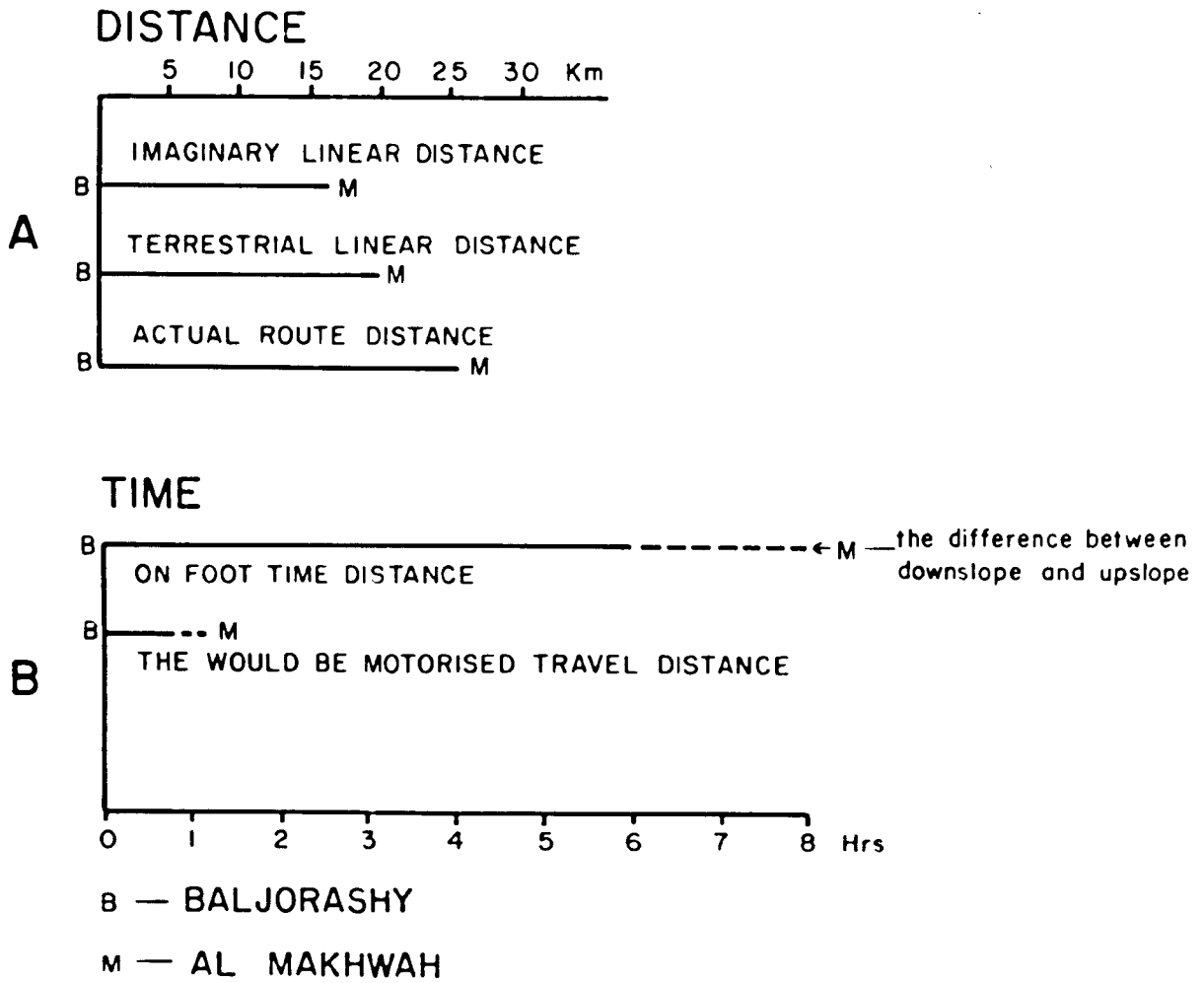
d) In terms of human comfort, due to the absence of any motorable alternative road, the travel is most exhausting and tiring. Having passed through it once, and only in the down slope direction, I had aching feet and leg fatigue. Only the people who frequent it regularly can traverse this distance without risking being fatigued to the degree of immobility for two or three days. Figure 14.1 schematically shows the differences between these forms of distances.

This situation is by no means peculiar to Baljorashy and Al-Makhwa, it is the norm of travel between Tehama and Assarah and indeed through its continuation inside the Yemen. Everywhere across the scarp, which extends north-south for some 1200 kilometers, there is at least one crossing point at every five kilometers (see Figure 10.4). In places where the scarp has been open to motorised traffic such as at Al-Hada in the north and Abha in the south (see Figure 3.2), a totally new concept of distance specially in terms of time and comfort is operating. To illustrate the difference introduced by the building of roads, consider the above example, if we assume that there would be a road between Baljorashy and Al-Makhwa at a standard near that of the two existing roads, then the distance would diminish to less than an hour which could be covered most comfortably (Figure 14.1). The same effect applies more or less equally to any movement along or across Assarah in any direction. The effect of road building and improvement in breaking the region isolation has already been mentioned (See Chapter XI).

The importance of distance as a limiting factor in the flow of resources, which is a basic to any development, cannot be over emphasized especially in a region as rugged and dissected as Assarah. Also the fact that the rest of the country is sparsely populated and dotted with

DISTANCE DIFFERENCES BETWEEN TWO TOWNS IN ASSARAH AND TEHAMAH

Fig. 14.1



settlements at long intervals makes the accurate understanding of the role and function of distance in all its forms essential. Indeed, the accurate understanding of all spatial implications and relationships is a prerequisite to any valid visualization or projection of the future outcomes of alternative policies and their effect on the pattern of such relationships.

MICRO-GEOGRAPHIC DIMENSIONS

The spatial or geographical dimension is visualized here as a scale at the lower end of which lies the field, the farm, the house, the street and the relationships between such small units. At the higher end of this scale lie the countries, regions, continents and eventually the whole globe. These two ends of the geographical spectrum are sometimes referred to as micro-geography and macro-geography.[1] With this in mind and in the light of what has been said above about spatial forms the problem of fragmentation and small size of holdings in Assarah will be considered more closely.

Fragmentation and Holding Size:

The agricultural development of Assarah has many problems, most of which have been mentioned directly or indirectly in the course of this thesis. While it is true that the defining of any problem and isolating it from other problems is the first step towards arriving at a solution, yet another approach to the same problem which is equally valid may be in looking at it in its holistic context and in considering all the factors that influence it. This is the approach that will be followed below. The reason why I chose the problem of fragmentation and small-size holdings particularly is not only because it exemplifies the spatial context in its micro-scale, but also because it represents a conflux

1. Blaut, J.M. 1967 op. cit., p 211.

where many other problems of physical and human origin converge, and because it is a major link in a long chain of cause and effect which hinders a great deal of development effort. It thus follows that its exposure will illuminate some other problems, and a successful tackling of it will certainly help towards solving, even if only partially, some of the other related problems.

By fragmentation is meant here the process by which a sizeable piece of land gets divided and subdivided to a below optimum size; it also means the norm of having an agricultural holding consisting of several non-contiguous plots. The factor of size is difficult to define because it is a measure of land-man ratio and of socio-cultural standards and values which vary tremendously not only from country to country but also from region to region within a single country.[1] What is small for a type of production may be big for another type, and what is small for an Austrialian wheat farmer or Russian Sovokhoz is incomprehensibly big for a Japanese paddy farmer.[2] However if a definition is to be made it has to be sufficiently flexible so as to compass all these differences. In this sense a small farm would be defined as that which does not meet the farmer's needs substantially above the subsistence level, and that which falls far short of what would be the optimum farm size in the particular farming system. There are several criteria by which the size of farms is measured; area, quality, some factors of input, or size of monetary turnover or gross value of production. Nevertheless area is by far the most wide and common criterion used, simply because data on area of farm holdings is the most easily available or obtainable. It is certainly the only criterion I can use in the context of Assarah. Fragmentation, on the other hand is measured by the size, number and

1. Morgan, W.B. & Munton, R.J.C. 1971 Agricultural Geography (Methuen) pp 62-63; Mellor, J.W. 1966 op. cit., p 364.

2. On the variations in farm size in a world wide context see Grigg, D. 1966 "The Geography of Farm Size: A Preliminary Survey" in Economic Geography Vol 42, pp 205-235.

dispersal of the non-contiguous plots which form a single holding.

From the above definitions it is quite clear that the fragmentation and the smallness of agricultural land holdings are two separate things. However there seems to be a correlation that cannot be denied between them, in that wherever the small size farm is dominant there is also fragmentation present, and fragmentation is less evident in regions dominated by large farm holdings. Naturally there is always a threshold below which further subdivision of a plot diminishes and another threshold below which the overall arable farm holding ceases to be viable. Consequently any unit that falls below anyone of these two thresholds will have to be incorporated wholly or partly into other holdings. The minimum size of a plot is presumably smaller than the minimum farm size in one and the same locality. However there is a wide range of these two minima from region to region and this seems to depend first and foremost on one or the combined effect of both the land-man ratio and land productivity, although other factors are involved to a varying degree in different places. The regional variations in farm size are so wide that almost all ranges of size exist in every farming system. In this repsect Kanel says that "The differences among farms (with respect to size) can be explained as adjustments to the economic situation in which different kinds of farmers find themselves."[1]

In order to know the degree of fragmentation and the scale of smallness of farmland holdings in Assarah, we should first consider the available information and data. In doing this our attention will be focused on Ghamid and Zahran area of Assarah, not only because it is a representative example but also to compliment the case study we already made in Section Four of this thesis.

1. Kanel, Don 1967 "Size of Farm and Economic Development" in Indian Journal of Agricultural Economics Vol 22, No 2 pp 26-44, p. 26.

In the agricultural census we only have data on the size of holding and no data at all in respect of fragmentation. Table 10.4 shows the distribution of the number and percentage of holdings in size groups. From this table it is clear that more than 92% of the holdings are below one hectare size and almost 98% are below 1.5 hectare. In Zahran there are only five holdings over 3.5 hectare, two of which are less than 4 hectare and two of which are less than 5 hectare and only one holding reaching the size group 8-8.5 hectare. In Ghamid six holdings are more than 5 hectares two of them less than 5.5 hectares, one less than 6 hectares, one less than 7 hectares and two are in the size group 8-8.5 hectares (see also Figure 14.2). In Abha and An-Nemas areas there seem to be more holdings in the larger size groups, but the difference is small; indeed in the whole of Assarah there are less than 100 holdings in the size group 10 hectares or above and much of this is even biased by a very small number of relatively large holdings held by large extended families or on less valuable land of up-slope terraces or found on the periphery of the eastern limit of Assarah as defined in this thesis. Such smallness of holdings can hardly be found anywhere else in the world; the nearest equivalent is the average farm size in Malta and Nepal where in both cases more than 90% of farms are less than one hectare.[1]

Fragmentation on the other hand is difficult to assess not only because of the absence of any data whatsoever, but also because it varies more widely than farm size. Another difficulty lies in the

1. For Malta see H. Bowen-Jones, et all Malta: Background for Development. Department of Geography, Durham University, p 290.; and for Nepal see D. Grigg 1966, op. cit., p 212. Despite the fact that we are here comparing a region of a country with two countries, the comparison is still valid on the account that Malta is even smaller than Assarah and Nepal has a similar or even harsher terrain; in all three regions the cultivable land ratio to man is small. This however does not exclude other regions in the world of having similar or even smaller farm size.

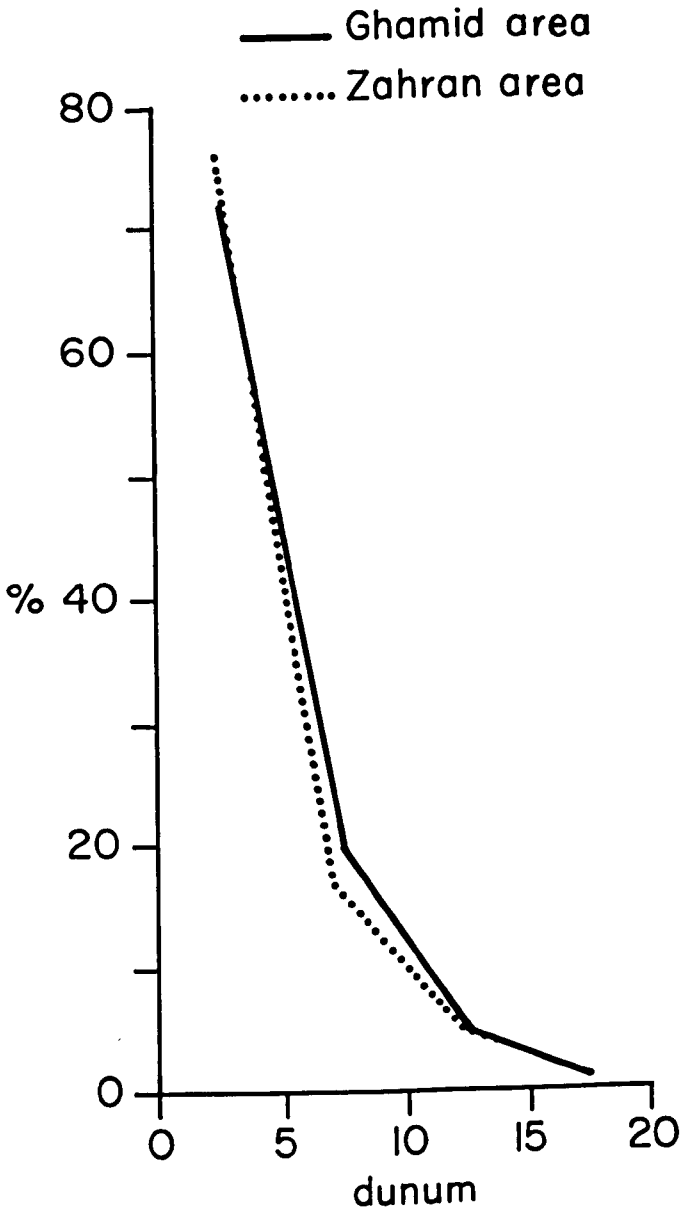


Fig.14.2 Percentage of holdings in each size group

measurement techniques. A rough tool of measurement would be the number of noncontiguous plots in the holding and the degree of dispersal of these plots around the house. Yet the value judgement which is implied in making such measurement will inevitably be biased by many factors which, though not direct, are important, such as the varying land quality, the accessibility factor and the degree of validity in taking the house as the center of dispersal.

In Ghamid and Zahran area of Assarah I found very few holdings, about 1%, consisting of only one piece of land; on the other side of the scale very few holdings exceed a hundred plots, certainly less than 1%.[1] The vast majority of holdings range between 10 to 30 parcels. Nearly always the number of rainfed plots is more than the irrigated plots; this is expected because the dry plots are located at the upper terraces where they thin out to tiny pieces. Although it is not quantitatively proven yet, there seems to be a positive correlation between the number of plots, the size of farm, the degree of dispersal or fragmentation and the extended family. Most of the plots in any one holding lie within a distance of an hour's walk or a couple of kilometers from the house in the village. Also relevant is the size and configuration of a single parcel as well as the clustering of a few parcels near each other. In Figure 14.3, for example, the three adjacent irrigated and regularly shaped parcels, although the farthest from the house, tip the statistical balance. Figure 14.3 along with Figure 14.5A & B represent three separate family holdings in three separate villages which can be taken as an indication of the parcelment and scatteredness of the agricultural holding in Assarah. Figure 14.4 shows the distance between the family house and each cluster of parcels.

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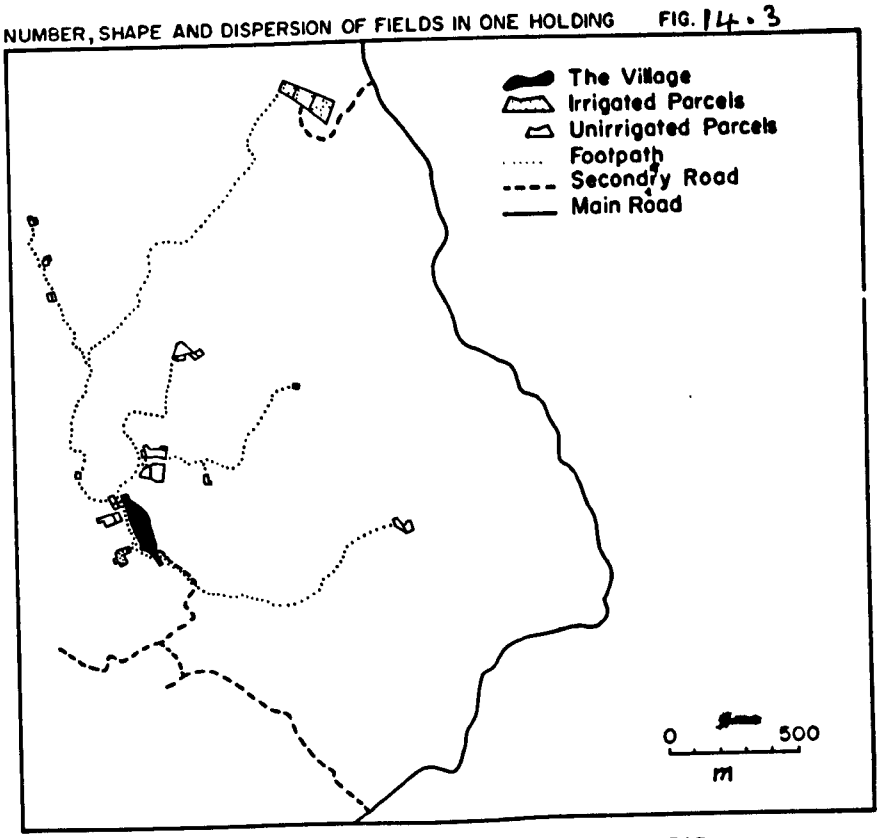
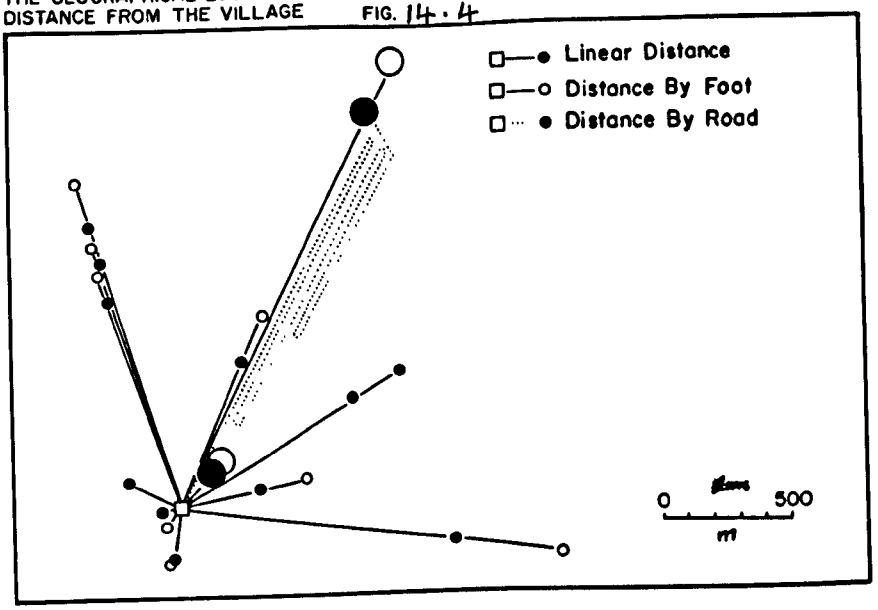
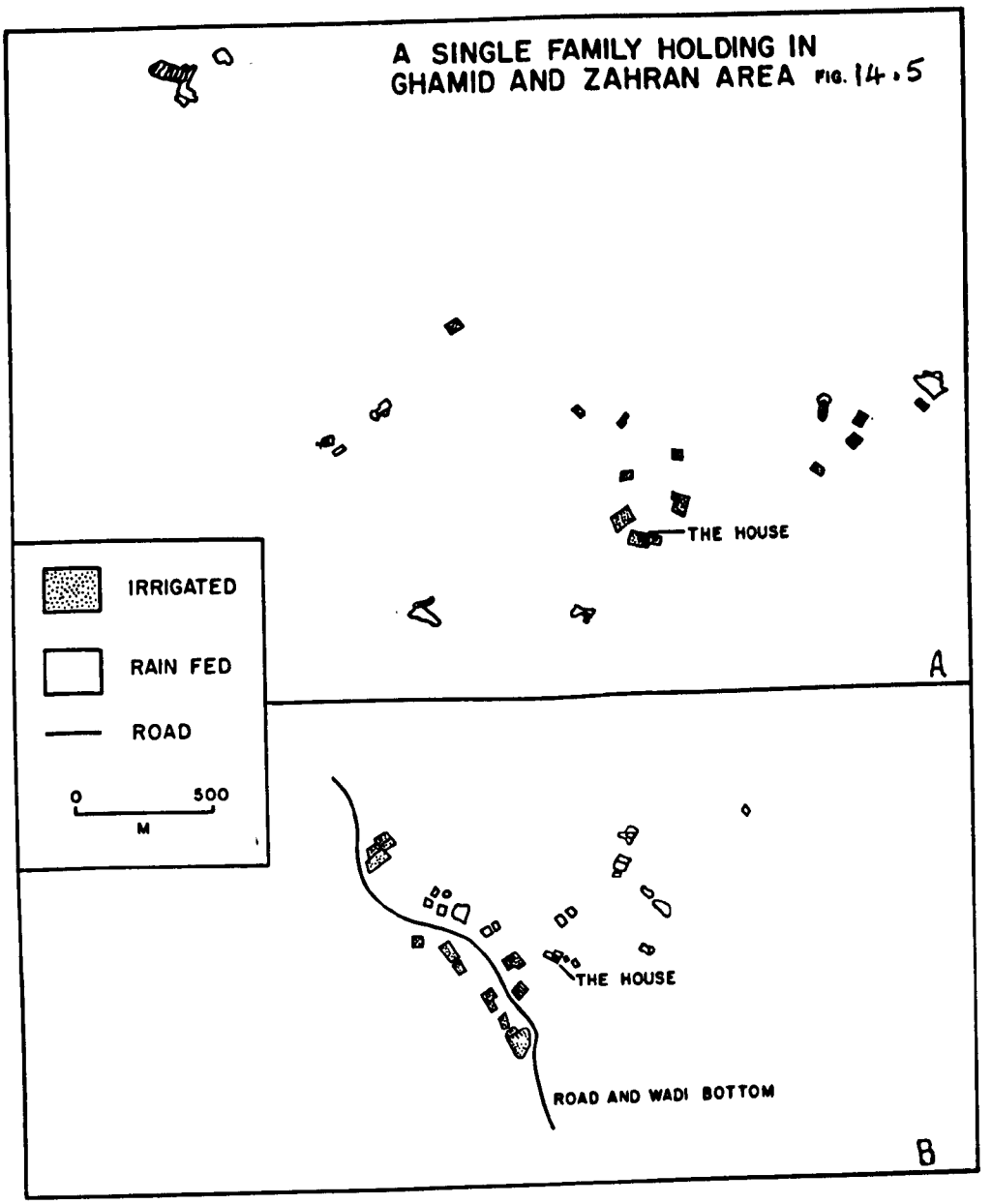
1. This is based on a sample questionnaire.

NUMBER, SHAPE AND DISPERSION OF FIELDS IN ONE HOLDING FIG. 14.3



THE GEOGRAPHICAL LOCATION OF THE FIELDS AND THEIR LINEAR DISTANCE FROM THE VILLAGE FIG. 14.4




A SINGLE FAMILY HOLDING IN
GHAMID AND ZAHRAN AREA FIG. 14.5
THE HOUSE
A
IRRIGATED
RAIN FED
ROAD
0
500
M
THE HOUSE
ROAD AND WADI BOTTOM
B

THE CAUSES OF FRAGMENTATION AND SMALLNESS OF HOLDINGS

The factors that exert influence on the final spatial shape of any agricultural holding and particularly those factors that lie behind this problem of fragmentation and smallness of holdings can be grouped into three categories; physical, socio-cultural and operational.[1] Under these headings we will attempt to isolate the real causes of the fragmentation and small size of holdings in the context of Assarah.

Physical Factors:

a) Landform: As it has been seen in Chapter II, Assarah is a rugged mountainous area dissected by successive ravines which break up any continuity in the landform. This of course works against farming a vast expanse of level land which might conceivably be tilled as one large parcel. In other words if we remove all other fragmenting factors, we will still be left with the problem of scattered patches of land separated by hills and mountains.

b) Slope: The arable land in all arid and semi-arid areas of the world are more sensitive to the steepness of slope factor than are the cold temperate regions. Fields must be nearly level or only gently sloping, otherwise the soil will be eroded away. The absence of moisture and the very thin vegetation cover, and the strong raindrops and rainstroms all would wash the soil off any steep slope; hence the terraces.[2] At least one quarter to one third of the fragmentation would disappear if the effect of slope could be removed, at the same time the average size of parcels would increase proportionately. Note that in Figures 14.3 and 14.5A & B there are many adjacent plots, but they cannot be merged into

1. Igozurike, M.U. 1970 "Fragmentation in Tropical Agriculture: An Over-rated Phenomenon" in The Professional Geographer Vol XXII, No 6 pp 321-325. See also a FAO study prepared by Sir Bernard O. Binns 1950 "The Consolidation of Fragmented Agricultural Holdings" FAO p 9-15.
2. Symons, L 1967 Agricultural Geography (G. Bell & Sons, Ltd.) pp 54-57.

each other and as a result cannot be tilled as one field because they are terraces at different altitudes.

c) Land physical properties: The differences in soil fertility, irrigation water availability, peripheral watershed areas, and other physical structures such as wells, trees, and inclosures, as assets all do cause fragmentation, because each family wants to have some of each of these and obviously they cannot have them all in one plot. Thus they will have to make do with a few parcels in the irrigated wadi-bottom land and few terraces at the upslope rainfed terraces and perhaps few other plots in between.

Socio-Cultural Factors:

a) The principles of succession: Since the ownership here is predominately private and since land tenure is overwhelmingly owner-occupier, there are only three ways of acquiring land as a property; through inheritance, purchase or for than matter gift, and property exchange. The Islamic laws of inheritance set very elaborate conditions by which the relatives of the deceased person get specific shares in the legacy. These shares vary according to the priorities and postulates contained in the laws (See Chapter VII). It is becoming customary for many writers to attribute the extreme fragmentation and the small size of farms to the Islamic law of inheritance.[1] This is a gross oversimplification for

1. Grigg, D. 1966 op. cit. p 220; Speiser, E.A. 1955 "Cultural Factors in Social Dynamics in the Near East" in S.N. Fisher (ed) Social Forces in the Middle East (Cornell Univ. Press) p 11; Crary, D.D. 1955 "The Villager" in S.N. Fisher Ibid. pp 49-50; Gregor, H.F. 1970 Op. cit. p. 78. Such criticism of Islamic laws is self contradictory, because on the one hand they say by dividing the land among heirs the holding gets smaller and more fragmented, at the same time and on the other hand they say that this widens the inequality in land ownership. Speiser says in this respect, "The Muslim laws of succession and the institution of Waqf, or Pious Foundations, have jointly contributed to the progressive fragmentation of land holdings and the critical inequality of land ownership." Grigg, however, indicates that the importance of inheritance system has been over-estimated. Grigg, D. 1966 op. cit p. 30.

although Islamic law may have an effect on the problem, certainly it is not by itself a primary cause. The primary and universal causes of the problem lie in the low land-man ratio and in the lack of alternative sources of livelihood, beside the other physical and operational factors mentioned above and below. To do away with the just distribution of wealth is to give licence to an ever widening social inequality and injustice, the consequences of which are even worse than the consequences of fragmentation. To explain the role of Islamic laws in this problem and the provisions within it which could be activated to treat the problem if the society desired so, would take us out of the scope of this thesis; suffice it here to say that the parts of the world where the Islamic law of inheritance is observed do not show any difference that can be attributed solely to the Islamic law neither in the size of holding nor in the degree of its scatteredness from other areas where different laws are applied. Indeed in Tehama which is still in Saudi Arabia and the nearest agricultural region to Assarah where only the physical factors are different, i.e. where land is more level being partly pediplain area, the average land holding is more than ten times that in Assarah.[1]

b) Social customs and values: Due to the strong attachment of man to the land which has already been discussed (see Chapter VII), a high prestigous value for acquiring land developed among the people to the extend that there is almost a taboo attitude towards selling land. This has restricted the free flow of resources leading to the situation where a farmer may be craving for more land to crop while his neighbour's land is idle because he can't or does not need to crop it and does not dare sell it.

Operational Factors:

The fact that in the subsistence system the peasant needs to grow

1. "Summary of the skeletal statistical data of the agricultural survey." Division of Statistics and Economics, Ministry of Agriculture and Water, Saudi Arabia.

several crops means that even if he has a big contiguous parcel he is going to break it down to smaller plots for the convenience of his limited operational capacity. Every crop would need different preparation and services in different seasons.

Access routes are also a significant factor both in the smallness of farm size because they are space consuming and in the fragmentation because they separate parcels. Country lanes, footpaths, and wells and their drafting tracks are all important factors, so are boundaries, dykes, and hedges. The important point which must be emphasized here is that the pressure of all the above mentioned operational factors are positively correlated to the severity of the problem of fragmentation and smallness of holdings. In other words the smaller and the more fragmented the farms get, the higher the toll which will be exacted on the land by these factors will become and vice-versa.

The Implications

The combined effect of all the above mentioned factors has resulted in the following:

a) Waste of land: All the operational factors which are in many ways consequents of both physical and socio-cultural factors are space consuming thus adding to the already acute scarcity of land. It is self-evident that roads, paths, and hedges all take up a significant portion of the agricultural land. However, one would not think that wells for example would occupy any significant area, but unfortunately here in Assarah they do. To pick only one example to illustrate this point, consider the square kilometer shown in Figure 6.2; less than three quarters of it is an irrigated area which gets its water from about seventy wells. If we suppose that each well would occupy at least 6

square meters for the pit and its head and 24 square meters for its hauling track, then in that area alone this would account for about 2100 square meters - over 3% of the irrigated area and about the size of one average holding.

Another type of wastage of land associated with small fields is that incurred through the need for manoeuvering space. It is a fact that the ratio of the space needed for manoeuvering to the actual cultivated area gets bigger as the size of field gets smaller. Added to this is the wastage that results from disconfiguration parcels with too many corners and sharp angles.

b) Waste of time: In a fragmented holding considerable time and efforts are being spent on indirect and non-productive but essential activities such as the movement from one plot to the other, the preparational works, the assembling and dismantling of implements. The farmer has to exert an additional effort carrying seeds, tools, harvest, and manure between the village and the fields and from field to field. These two aspects of wasting land and time, while frequently necessary and justifiable, reflects an inefficient spatial organization at the micro-geographical level.

c) Mechanization: As far as the availability of land is concerned machines and for that matter most of the modern farm capital inputs can be space consuming, space saving or neutral. The first type is exemplified by the combined harvester; a large proportion of the fields in Assarah are even too small for a harvester to turn around. In the space saving type of water pump is a good example because it can help reduce the need for many wells and all hauling tracks could be saved. Although the water pump has gone a long way towards replacing the Sania, the traditional water lifting technique, the hauling track is still kept

even in the newly dug wells as a measure of precaution. Sprayers and dusters are examples of the neutral machines.

d) Economics: From the economic standpoint fragmentation and small holdings raise a number of questions related to the economies of scale, the efficiency, or rather the lack of it, in the use of resources as it implied in the wastages mentioned above, and to what extent does the farm size and its contiguity facilitate or hinder the process of development and transformation. A decade or two ago a large number of economists were of the opinion that an enlargement of farm size in the underdeveloped countries is a prerequisite to raising the productivity and the efficiency in the usage of resources in the agricultural sector. However, such an approach was less fashionable among politicians in the Third World. More recently, a more cautious and rational evaluation of the role of farm size in economic growth is being adopted. Inter alia Kanel indicates that there are many alternatives for raising farm efficiency and productivity.[1] On the other hand the problem of indivisibility and the line at which diseconomies begin to be operative vary in different farming systems to the extent that it would be impossible to formulate a general law of scale economy in agriculture valid to all systems. This is perhaps why it is sometimes stated that

> "...in less developed countries, economies of size usually are exhausted when farms become large enough to fully employ farm operator and family labour and, at the most, one or two hired workers."[2]

In Assarah, however, the economic implications of fragmentation and small farms are assuming new forms especially in recent years; everyone has land, but not everyone farms or leases his land. Those who do farm their holdings do not seem to consider the smallness of holding as a

1. Kanel, D. 1967 op. cit, p. 26; Morgan, W.B. & Munton, RJC 1971, op. cit., p. 62.
2. Bachman, K.L. & Christensen, R.P. 1967 "The Economics of Farm Size" in H.M. Southworth & B.F. Johnson, Agricultural Development and Economic Growth (Cornell Univ. Press) pp 234-235. Similar conclusion is also found in D. Kanel op. cit., p. 38.

major economic restraint. Indeed the whole system is in a transitional turmoil (relatively speaking) so that it is difficult to attribute economic constraints to one factor alone. It is obvious, even to most people in Assarah, that the traditional system of production is no longer economically justifiable. The reason for this lies in the difference between the overall cost of all factors of inputs, as seen from new social values, and the gross value of all outputs. In regards to fragmentation, the problem has more serious implications. In view of the distance function as illustrated in the beginning of this chapter, any dispersal of holding is bound to add to the production cost. Although the total area of a holding may justify the use of some capital input or the adoption of some farming practice, the scatteredness of plots may hinder such change. An example of such difficulty which is already evident in Assarah is the water pump. By and large, unless the farmer has a sizable contiguous piece of land or a cluster of plots big enough to justify the installation of a water pump, he will not be able to benefit from such innovation, although financially he is able to buy one. However, exceptions to this general statement are mentioned below.

The Solutions:

With regard to the physical factors there is hardly anything that c ould be done to ameliorate its effect. In some localities a lateral expansion of terraces may be possible to elongate the terrace on the expense of the surrounding rough land. In other there may be a possibility of levelling more terraces or reclaiming delapidated ones. Such measures may help increase the size of holdings, but it could not help reduce fragmentations to any large extent.

Unlike the physical factors, the socio-cultural and operational

factors can be influenced in a positive direction because they are concerned with a deliberate human choice. The principles of succession, which are held to be the most difficult to change, are immune neither to significant changes nor to new interpretation. Indeed, when one considers how all religious institutions had been modified through the ages, and how in some instances they have been instrumental to change, the argument against them became less valid. It is social awareness that builds new institutions and develops old ones rather than the old institutions that stultified the society. Timmons states that "Land tenure institutions are not sacred or foreordained. Man made them and man may alter them in seeking and in achieving his goals of development."[1] Islam in particular offers ample provision for change and development if only exploited. One example is the right of pre-emption (Shofaah) which is provided for in the law and which could be used in any desired way to raise the size of holding and to reduce fragmentation.[2]

In regard to the customs related to the prestigious value of land ownership, this will decline in importance as people become educated, more business-minded, and as more alternative sources of income become available. As a matter of fact there are already some indications that such change is taking place. All agencies concerned with development and affecting change in the country (and I see that as including nearly everybody) should do their best to encourage agricultural land transfer short of producing any serious problem landlordism. This might perhaps ease at least some of the urban land speculation from which the country is suffering too much.

1. Timmons, J.F. 1966 "Agricultural Development Through Modifying Land Tenure Arrangement" Iowa State University Center for Agriculture and Economic Development Economic Development of Agriculture, p 98.

2. The Shofaah gives the immediate neighbour a preferential right to buy the land when offered for sale.

On the operational side the land wastage resulting from access roads will undergo significant changes in that as the fields and holdings get bigger due to the other measures mentioned here many of these lanes and footpaths will not be needed. But the introduction of four-wheeled vehicles will require wider roads cancelling out the overall land saved by this reduction in access network.

With respect to economics and incentives it seems from the above discussion that farm size will rise above the present day average as the development march proceeds. But large farms on the scale found in other regions in the country seem most unlikely. Consequently the small and fragmented farm will remain with us, albeit as less acute as a development problem than it is now, and it will continue to be a distinctive feature of the Assarah landscape. We had better recognise that and plan accordingly. In view of this, what seems to be needed is effort directed toward upgrading the value of the output of these small farms so that farmers will be left with sufficient margins to give them incentive to continue to work. This of course implies a wider range of measures which would include the creation of various institutions (see Chapters XI & XII), and require efficient marketing facilities and would entail some price control or even subsidization. However, this is no place for discussing these measures in detail. It is nevertheless true that the development of efficient and integrated rural town centres, which will be discussed below, will facilitate, hasten and improve the implementation of these measures. There is ample indication in the available literature that small farms can be as productive as large farms provided they are run efficiently and more emphasis put on the land saving techniques and inputs. In this respect many examples could be cited from Japan, Taiwan and even from the Soviet Union. Kanel

concludes that

> "Changes in size of farm do not seem to be a major prerequisite in the adoption of yield increasing technology; size of farm does not create cost barriers nor are increases in land-man ratio required for such technological changes."[1]

It seems that the small farm lag is due more to the fact that the small-holder peasant is a residual in the process of change than to the smallness of his holding. Thus he becomes disadvantaged both in the availability of all farm supporting facilities and in his intellectual capacity to do anything about it.

As to the problem of machine indivisibility as it is affected by both the small size of farm and by fragmentation, the farmers of Assarah have adapted, on their own initiative, to this problem in different ways which might give us useful hints as to the solutions that may be taken. If we take water pumps as an example we find that some farmers chose to buy small water pumps often less than 6 h.p. so that they would be able to move them on donkey back from one well-head to another. This practice is more likely to succeed in areas where the water table is higher than the drawing distance from the surface i.e. less than 6 m. because this will reduce the need for piping and will not require the lowering of the engine in the well. In another group we find that the farmer buys one water pump and fixes it into one well where he has the best cluster of his holding. In this group one farmer may have two pumps in two places. A third group adapted to this problem in the most efficient and promising way; they formed miniature companies and co-operative like arrangements to share the cost and benefit from a big water pump. The big here means anything from 26 h.p. or over. This latter arrangement is significant and promising because it is conducive to co-operation spirit and because it has bearings on the other

1. Kanel, D. 1967 op. cit., p. 42.

more indivisible items and on the off-farm activities. Indeed I came across several examples where such arrangement grew to include beside the water pump, a grain mill, piped domestic water supply and electricity generation. In the village of Al-Makarima where all villagers practice carpentry this small company included, besides the above, an electric powered carpentry workshop. Indeed, most of the co-operatives and companies mentioned earlier (Chapter XII) are expressions of this adaptation to indivisibilities.

Other solutions may be found in furthering the already evident co-operative spirit to include an arrangement by which a partial pooling of land and resources are achieved on a voluntary basis, where the owner will be given equivalent shares according to the area and quality of his land and may be hired by the co-operative according to his skill.

Another approach is certainly possible in developing or introducing a new type of machinery that would suit a small size farm. If a large tractor plough or a large combined harvester is too big to be economical why not find or develop a small hand driven one, and it may be even more useful if a separate small harvester and a big stationary thresher is adopted. In other words if we cannot tailor our farms to suit the machines why not try to design machines that suit the farms. If, however, we pursue both lines i.e. enlarging farms and modifying machines a useful and practicable compromise is bound to come by.

MACRO-GEOGRAPHIC DIMENSION:

Up the scale of spatial relationships after the single field which we treated above, lies the village, its structure, domain and periphery, as a type of settlement and as a socio-economic plane of interaction. The traditional Assarah seems to have known no other type of settlement higher than the village hierarchy. True there were small villages and

large villages, chiefdom villages and market villages, but they were all villages. The tribal context cannot be considered as a higher hierarchy because it lacks the nodal pedestal and consequently lacks the centripitality which characterizes all types of settlement. Unlike the village or town the tribe is more like a political domain than a socio-economic field. The effect of the town of Taif in the north is too small, weak, and remote to affect the village of Assarah as self-contained residential and economic unit.

Since it is assumed that the final form that any settlement takes is a function of the socio-economic relationships on the one hand and distance on the other (see above), it follows that any change in these two variables would lead to a change in the settlement pattern. The theme of this thesis is that such changes are taking place. It is evident from Chapter IX and Chapter XII that a new type of urban-like settlement is emerging in Assarah presenting a higher element in the hierarchy than the village. These new settlements are results and outcomes of an already progressing development, but more important still, their location, and rate of growth are determinants of future development. Once such settlements are encouraged or established, they partly determine what happens in the surrounding area. These settlements have been given different names implying their function, growth centers, growth poles, agro-urban centers and rural urban-centers. An increasing volume of literature dealing with various aspects of these towns is coming out of the press. In the last three years two works are particularly worth mentioning, "The organization of space in developing countries" written by E.A.J. Johnson, and "Growth centers in regional

economic development" edited by N.M. Hansen.[1] The relevance of these towns or growth centers to development is stated by Friedmann in his General Theory of Polarized Development as follows:

> "Development, viewed as occurring through a discontinuous but cumulative process of innovation will tend to have its origin in a relatively small number of centers of change located at the points of highest potential interaction within a communication field, innovations will tend to spread downward and outward from these centers to areas where the probability of potential interaction is lower."[2]

Growth centers theories are by no means restricted to agricultural or rural areas, yet it is only natural that rural areas take up the major share of attention, because rural areas by definition have the more dispersed people and resources and are the more difficult to develope evenly.

The degree of clustering or dispersal of any agricultural settlement must depend on two basic principles; first, agriculture is a "Space-using production operation" and as such requires a dispersed and extensive settlement; ideally it would require each operating unit, which is usually the family, to reside at the centre of its estate. Second, because Man is a societal animal he needs a minimal community of people beyond his spouse and off-spring to live and reciprocate with. The village, it seems to me, is the natural compromise between these contrasting demands. Instead of a widely dispersed houses as the economic principles require we have dispersed clusters of houses. The final location of these clusters depends on the effective man-land ratio and the distance function. Although these facts are, as first principles,

1. Johnson, E.A.J. 1970 op. cit. ; Hansen, N.M. (ed) 1972 op. cit.; see also Logan, M.I. 1972 "The Spatial System and planning Strategies in Developing Countries" in The Geographical Review Vol 62, No 2 (April 1972) pp 229-244.

2. Friedman, J. 1972 "A General Theory of Polarized Development" in N.H. Hansen (ed) op. cit. pp 82-107, p. 84.

fairly obvious they are impressively true of and valid in the Assarah region. But, since even the basic features of settlement are undergoing fast changes, the question then becomes do we or do we not interfere to influence the course of events. In a sense we are already interfering and we cannot help it; that aside, we should interfere more consciously and more positively. In the developed countries the gradual growth of technologies and institutions made it possible for much of the spatial network to develop more or less without much interference or only with a little interference at a time. In the underdeveloped countries it would be impossible to let things take their own course, for technology is introduced so fast that the country which does not interfere to affect positive changes will simply be out moded and fall into oblivion. This is reminiscent of the Arab fable of the child who attended a dinner party with his father among others; the child complained to his father that the food was so hot that it was burning his mouth, the father said: wait until the food cools off; the child replied bitterly: but others do not and there will be nothing left for me. The critical point here is that the wrong type of interference could be worse than non-interference which makes all the more important to take care in assessing the potentialities and in projecting future changes, because spacial planning depends on the accurate understanding of these two variables.

Theoretically what we are concerned with here is an imposition of a new type of settlement different in structure and function from the traditional village. Structurally it is envisaged as being bigger and more dispersed, functionally it is expected to serve as an injection which will transfuse life into the traditional community, as a propellant which would suck in and pump out various in-coming and out-going material

and non-material flows, as a nodal nerve which would receive and transmit signals and informations as efficiently as possible, and finally as a jig-saw piece which will fit in a wider meaningful picture. On the other hand we do not want it to be just another copy of the existing cities nor do we want it to be a concrete village where old values and institutions dwell. On the function of such rural towns (or more correctly network of rural towns) Johnson writes

> "...in countries which for historical reasons have inherited village-structured economic landscapes, a transition to a modern economy will require the creation of a network of intermediate agro-urban centers to provide incentives capable of tempting producers to raise more and better farm crops to induce them to sell relatively more products, so that they can spend more yet save more, invest more and thereby raise their productivity."[1]

This model of a network of a rural town has three features: they imply a specific location, a specific hinterland zone and specific spatial and communication network within and without. The question which poses itself to the planners is in the last analysis a geographic one; where to put allocations, where roads should be built, where among the already existing town nucleii a further growth or expansion to be encouraged or discouraged. Granted that a reasonable amount of data is available to allow some medium and long term predictions in economic and population behaviour, there is very little in growth pole theories or in central place or location theories that can tell us where about in a specific region that such towns would best be located and serve development objectives.[2] If on the other hand data are not available as the case is in Assarah that task becomes doubly difficult. Due to the physical shape of Assarah, its situation extending along the crest of a chain of mountains and because of other physical and socio-economical

1. Johnson, E.A.J. 1970 op. cit., p 392.
2. Thomas, M.D. 1972 "Growth Pole Theory: An Examination of its Basic Concepts" in N.H. Hansen (ed) op. cit. pp 50-81, pp 71-72.

differences between this region and its surrounding regions, the central place theory cannot be of much value in the spatial organization of Assarah except in a very limited way. It is difficult to envisage Assarah in a hierarchiaal order and concentric spatial pattern similar to that postulated in the central place theory.

In deciding what alternative approaches there are, we must take into account the main characteristics of the above mentioned physical shape and heterogenity and the existing pattern of settlements; their weight, their potentiality for expansion and the existing networks and highways that connect them. To sum up what has been said in relation to these characteristics in previous chapters, it is clear that settlement, though dispersed exhibit a tendency to cluster along in an elongated strip running parallel to coast line and the escarpment line. This has been accentuated in recent years by the fact that lines of transportation had to run along a likewise direction. Such elongated orientation of settlement is by no means a new phenomenon, it has been there as far back in the past as can be had from history books.

When looking at a detailed map of the southwestern part of Saudi Arabia, it does not take much imagination to be able to recognize four such lines of "regression" around which settlements tend to cluster i.e. along the coast the main settlements are Jizan, Ash-Shoqiq, Haly, Al-Qunfodah, Al-Leith and Jeddah which are connected by the sea and by coastal routes. Away from the coast and towards the foothills of the escarpment lie numerous villages with many market villages such as Al-Hajorah, Makhwa, and Al-Barik, these are connected by a route called "Tariq Al-Erdheyah". Further east along and on the escarpment lies Assarah which is an example <u>par excellence</u> in this respect. Towards the interior lie at larger intervals the oasis settlements of Najran, Tathleeth, Bisha, Ranyah, Tarabah and Alkhormah, these settlements

punctuating an old and famous caravan route, and connected by a motorable road long before the present Assarah highway (see Figure 14.6). Figure 14.7 is a modelized representation of these linear settlements. This interpretation of settlement network behaviour could be extended to include nearly all settlements in the country except perhaps for the more recent towns in the Eastern Province where they were established on a totally different plane, although the Trans-Arabian Pipeline gives us a contrasting example of linear magnet of settlement.

Having related the settlement network to the routes of communication, the question may arise as to which preceded which. With regard to the older settlement it does not very much matter in our context whether route came first or settlement since they are both there. In recent times however, many examples could be cited of settlements that attracted new roads and new roads that attracted new settlements; what matters then is that such linkage is substantially consistent. In a heterogenous environment like that of the south west of Saudi Arabia it is difficult for a central place system to develop. Consider for example Jeddah; south of the built-up city there is hardly any sizeable village for hundreds of kilometers let alone towns, while only sixty kilometers to the east lies Mecca, a major city which is as dominant as Jeddah itself or even more. The centrality has only a secondary effect in that a city node may be surrounded by more dispersed very poor or very rich residential areas or by some manufacturing firms, but these in the case of Jeddah, for example, are all within the domain of the town. What is absent here is a spatially distinguishable hierarchical order of the type found in the central place theory.

The linear magnet interpretation of settlement spatial behaviour which I am presenting here is more suitable for Assarah, the particular country of Saudi Arabia and indeed for the rest of the Arabian Peninsula

Fig.14.6 MAIN SETTLEMENTS AND ROADS IN THE SOUTH WEST PART OF SAUDI ARABIA Fig.

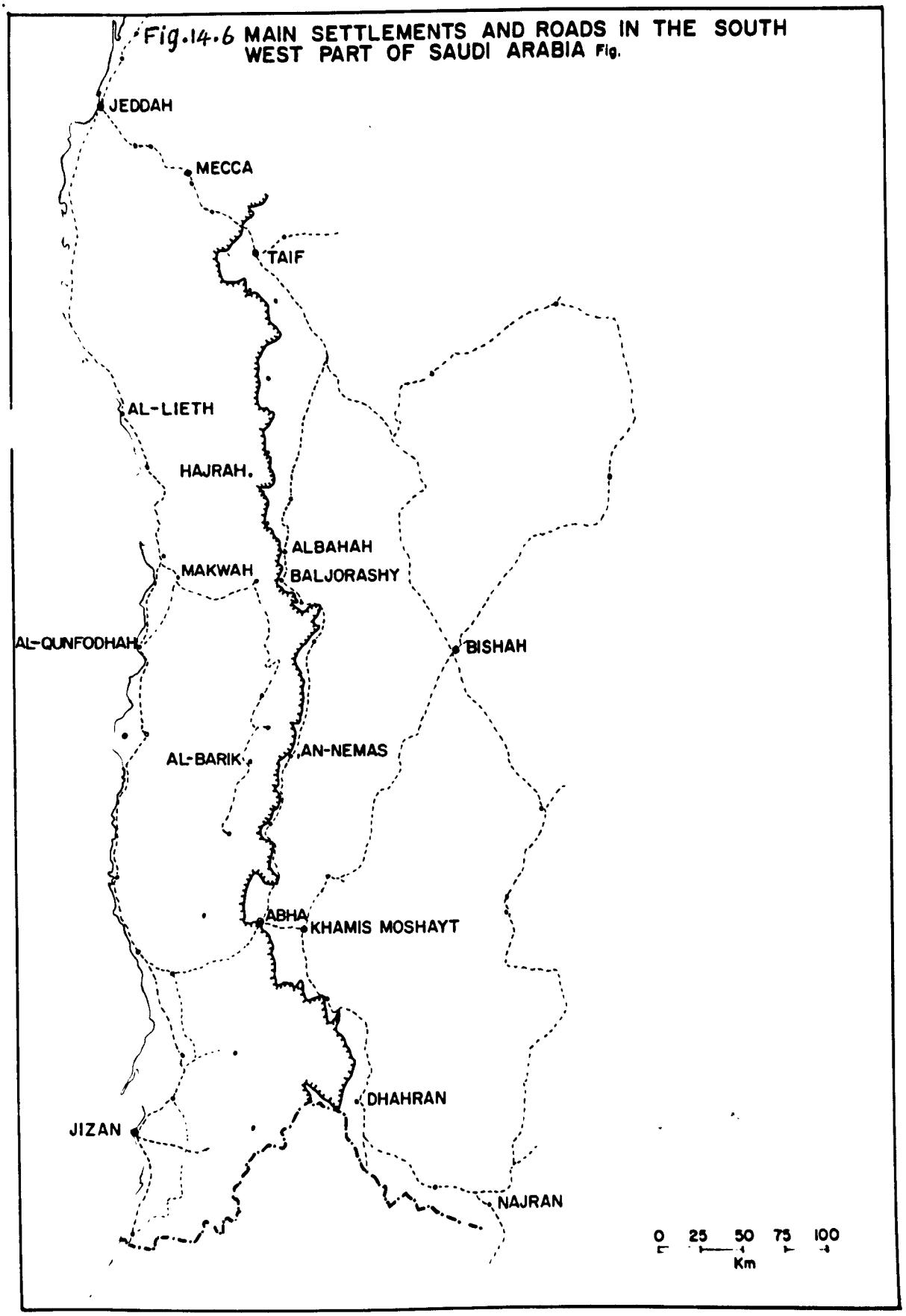
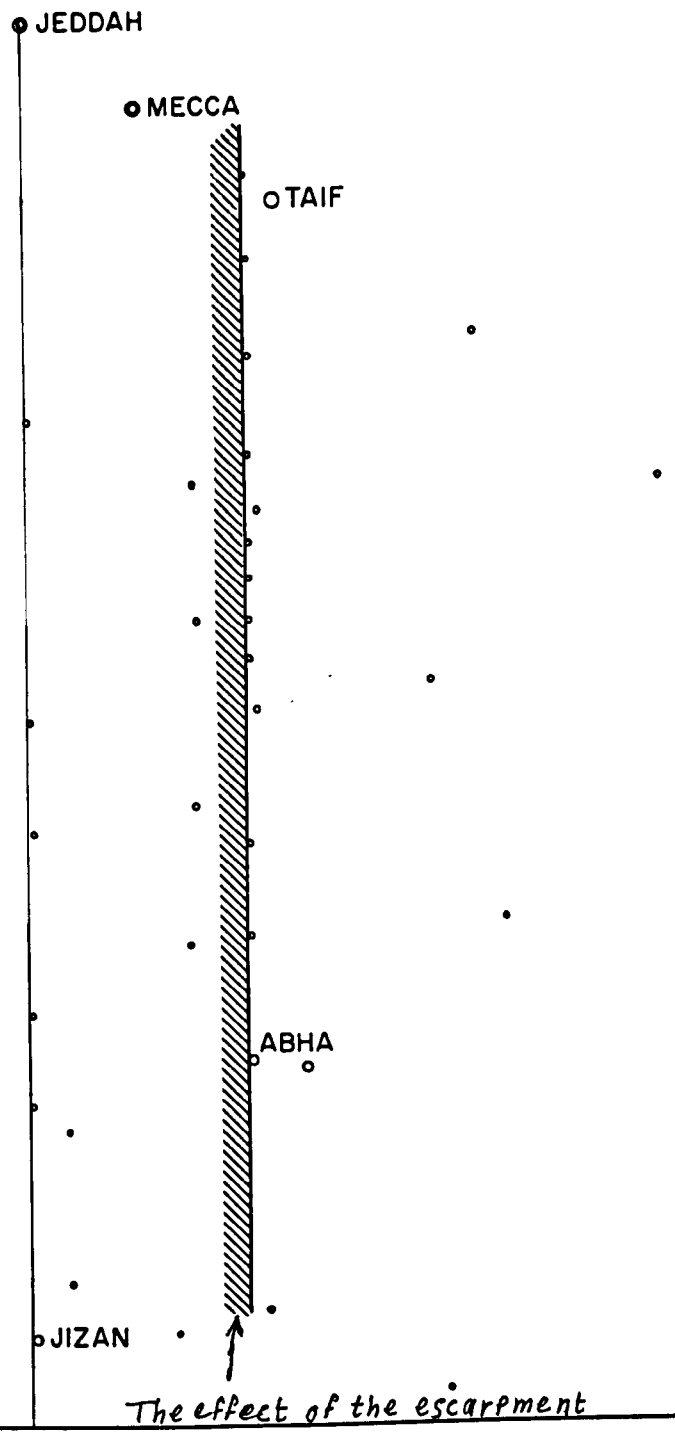


Fig. 14.7 Modelized map showing the linear patterns of settlements in south-west Saudi Arabia



and all dry regions and other areas where the barren expanses of land are considerably larger than the economically productive patches. It could be said that this linear magnet interpretation is not more than a modification on the modification of Von Thünen's concentric zones and Christaller's central place, and it may well be so; the departure here is that there is only a minimum zoning, and the zoning that there is, is linear rather than concentric. Whatever the interpretation may be it cannot be at this time more than an intuitive conclusion based on some informed estimates and on the examples given above. As the necessary data becomes available the empirical testing of the validity of this theory will be possible.

CONCLUSION

In Assarah we have a community which has developed over the centuries a particular set of ties governing its internal social structure and its relation with the physical environment. These relationships were enforced by some degree of isolation and stagnation. It appears also that some measure of self-equilibrating machanism was attained in this traditional system arresting its development at a subsistence level.

In the past few decades new exogenous factors began to affect the traditional way of life not only by disturbing its internal structure but also by exposing it and leaving it open to a dynamic and rapidly developing outside world. As a result most of the traditional values and criteria of behaviour in all fields of activities became increasingly irrelevant and alternatives had to be provided. In other words, the community is increasingly being geared to a global system in which new criteria and values have to be applied. The people of Assarah, by virtue of their limited knowledge of the new factors involved, find difficulty in making the right adjustments. Hence the necessity for expert assessment of the region's potentials and formulation of its development policy. Fortunately the government is well endowed with financial resources which can be deployed for development programmes. The availability of capital is no doubt a great asset and half way toward the solution, but it has its drawbacks. Nevertheless, with the availability of cash the problem is narrowed down to the assessment of potential and the formulation of policies.

It is the contention of this thesis that an all-embracing and

a holistic approach to all problems and all assets is a prerequisite for viable long term successful development. The society which is the subject of development whether in an advanced country or an underdeveloped one, is composed of complex interdependencies and complementarities.

It is of little use to try to make a development programme based on one resource, one region or one sector without foreseeing and providing for the side effects and consequences which will affect the other parts.

In the case of Assarah we have a region which has certain advantages, certain limitations and a certain role to play in the context of the whole country. The physical advantages lie in the fact that Assarah is climatically cool and rainy in an otherwise hot and dry country. The already established agricultural settlement is also another important advantage. However, these advantages have their inbuilt limitations. The rain is limited by its amount and its partial irregularity and the agricultural land and settlement are limited by various spatial discontinuities. The major limitations in Assarah are imposed by its rugged terrain and its lack of development resources other than for agriculture. However, Assarah may have potentially supplementary resources from some mineral deposits and potential as a summer resort. These fundamental resource assets and limitations indicate the role which Assarah will play in the future of Saudi Arabia. It will provide such agricultural products as a wide range of fruit, nuts, dairy products, and vegetables. Also most assuredly it will be a favourable summer resort for the increasing urban populace.

The physical environment, the human synthesis and the changes which are affecting them, which this thesis attempted to reveal, are the basis on which development planning must assess both the potentials

and the constraints. The trends of recent changes which we have also dealt with in this dissertation help to indicate the way toward the necessary steering of development processes.

A few points stand out clearly which have a direct bearing on the development problems and policies. First, there is a vicious circle which if not checked will lead to a serious ecological deterioration. Contracting margins are forcing people to abandon the marginal land - often the higher terraces. This will lead as has been proved time and again to soil erosion and moisture and vegetation depletion. The seriousness of the situation, to which even some development planners do not pay heed, is that ecological deterioration will not be limited to the upper terraces, but will spread through erosion and hydrological dislocation. This will force people to emigrate or to live on below adequate standards of living. What is needed is a new way of utilizing these upper terraces so that they continue to serve their ecological function.

Soil erosion is a serious problem which endangers the future of the region and which I make no apology for repeating. This danger does not stop at soil erosion; it actually spells disaster especially in an area like Assarah with nothing else to turn to once soil is gone. This problem, however, is not peculiar to Assarah nor is the warning of its dangers new; Plato more than 23 centuries ago warned of the danger of soil erosion in the hills around Athens. However, warning is not enough, it does not motivate a small holder to incur extra cost in order to preserve a good environment for the coming generations. What is needed is action, measures consciously formulated and consciously executed. An alternative cropping pattern is needed to make it worth the farmers' while to take care of the terraces.

In practice this implies the use of crop-plants which are known

and understood for commercial purposes and to meet demands for which there are already some forecast indicators. One ecologically suitable combination which matches these criteria, almond and barley growing, may be quoted as an illustrative example. Of paramount importance is to develop suitable machinery which can be driven or carried easily from terrace to terrace and which can manoeuver in corners and between trees and which is versatile enough to justify its cost for the small holder. A complementary measure would be to revive the traditional Hema system with those changes that would make it more acceptable to the modern systems and values. The question of subsidizing stable land use through agriculture of the upper terrace land should always be considered.

Secondly, and very much related to the above, are the water resources of Assarah. As has already been shown in Section Two Assarah has no source of water actual or potential other than the rainfall. Hence the key to water resources development lies in watershed management. The above mentioned suggestions are an indispensible part of a viable watershed management programme. The encouragement of sound commercial farming is also another way of up-valuing the water use. Special action must be designed to guard against serious over drawing of water.

Thirdly, with regard to urban development there are severe constraints to the development of big cities. Water shortages, limited agricultural land, distance from the sea, and rugged terrain are examples of these constraints. But this should not worry the planners too much if they approach the urban planning question on the basis of providing small but numerous urban centres rather than big cities. Whatever urban planning policy is to be adopted, the urban encroachment should not be allowed to endanger the ecological balance. For example, sewage water should be managed in such a way as not to contaminate

ground water, urban fringes and the surrounding land should not be allowed to be over-run by urban distructive elements. The right focus of development strategies should, to my mind, stem from the concept that in Assarah we have people and environment which must be kept productive on the best advantages of the long term. This calls for urban centres which are designed for the specific needs of rural areas and not vice-versa.

Fourthly, in a situation like that of Assarah where the old order is no longer the valid system it used to be, there is the danger that the people sponsoring its transformation might reject all elements of that order and try to bring in a wholly new system with wholly new components. This is hazardous and wasteful and therefore a wrong approach, because there are often some parts of the old system which can with slight modifications contribute to the new system.

It is hoped that this study has effectively presented the concept that it is much better and more effective in a region such as Assarah to adopt an approach of rural rather than agricultural development. It is also imperative that development should be approached as general development rather than just as economic development or specific resource development.

Traditional rural Assarah by rule-of-thumb experience arrived at one type of total stability - ecological, social and economic. Changes have destroyed this equilibrium and now we consciously seek for new stabilities which are richer for man but equally strong.

APPENDICES

APPENDIX I

Assarah: The Land Use Pattern

A Sample Sub-Region

(in pocket)

APPENDIX II

SOIL PROFILE DISCRIPTIONS

Profile 1

Locality: Some kilometers to the north of Banj Sar, Shrub and graminaceous pasture cover. Elevation: 2,100 m. Eastern exposure. Slope 8-10? Stoniness 30%. Rockiness 10%. External drainage very rapid. Mother rock chlorite schists.

A1:0-20 cm Lower limit abrupt on rock, wavy. Variable thickness. Sandy, fine sand. Fine and medium granular structure. Dry. Friable. Small and large coarse fragments. Abundant small and medium pores. Internal drainage rapid. Biological activity common. Minute vertical herbaceous roots. Field PH 6.5. Dry color yellowish brown (10 YR 5/4).

R:20-40 cm Very fractured chlorite schists, but with little trace of alteration. The roots of the plants penetrate very deeply into these fractures.

Profile 2

Locality: In a wide valley with numerous junipers near Sawdah (west of Abha). Elevation: 2,700 m. Eastern exposure. Slope 10°. Slight erosion. Danger of pronounced erosion when the herbaceous cover is removed. Stoniness absent on surface. Rockiness slight. External drainage rapid. Clastic metamorphics with a considerable quantity of quartz.

A11:0-15 cm Clear lower limit. Loamy silt. Slightly compacted top by grazing. Subangular rocky, cloddy structure. Dry slightly friable. No coarse fragments. Pores of various size common. Internal drainage rapid. Biological activity and roots common, the later being vertical, herbaceous. Field pH 6.5. Effervescence slight. Dry color from Sample No. S 12.1 taken

A12:15-40 cm Lower limit gradual. Silty clay. Averagely plactic. Non-sticky. Angular blocky structure. Start of carbonate efflorescence. For the remainder, as above. Field pH 7.5. Effervescence strong. Dry color from brown to dark brown (10 YR 4/3). Sample No. S 12.2 taken.

C1g:40-100cm Slightly massive. Sandy loam. Structure absent. Few coarse fragments. Pores small, Internal drainage slow. Iron oxide mottling and accumulations common. Water table at depth of 1.50 m approx. Roots and biological activity from slight on top to absent at depth. Field pH 6.5-7. Effervescence none. Dry color of mass, brown (10 YR 5/3) with very dark bpown mottling (7.5 YR 5/6). Sample No. S 12.3 taken.

Profile 3

Locality: Al Ghutamiyah. Elevation about 1,700 m. Alluvial plain in the wadi bottom, slightly sloping towards thalweg of wadi. Rockiness and stoniness absent. External drainage medium. From sericite and chlorite schists. The water table occurs at depths of 4-5 m. Herbaceous crops.

Ap:0-15 cm Lower limit not always clearly distinguishable. Sandy silt. Fine granular structure. Dry, friable. Coarse fragments rare, schists. Small pores common. Internal drainage medium. Vertical herbaceous and tree roots frequent. Biological activity abundant. Field pH 7.5-8. Effervescence slight. Dry color light brown (10 YR 6/3).

C11:15-70cm Lower limit clear. Fine silty sand. Loose. No structure. Small pores common. Small coarse fragments rare. Drainage normal. Vertical tree roots, tending to become horizontal on passing into the subhorizon below. Biological activity common. Field pH 6.5. Effervescence slight. Dry color light grew (10 YR 7/2).

C12:70-120cm As subhorizon above but with horizontal tree roots. Biological activity common. Permanently moist. Rare and but slightly evident mottling, traces of Fe and Mn. When dry appears cemented and capable of arching over. Field pH 8-8.5. Effervescence slight. Wet color of mass, brownish yellow (10 YR 6/6).

Profile 4

Locality: Al Zaniah in the Biljurshy zone. Manmade terrace on the mountain side. Stoniness slight. Rockiness about 20% with large boulders. Free drainage. Wind sorted particles on surface. Cultivated. Mother rock consists of granitoid materials.

Ap:0-30 cm Lower limit clear. Sandy texture. Fine and medium granular structure, weak. Dry, friable. Small and large pores. Internal drainage rapid. Few herbaceous roots. Biological activity common. Field pH7. Effervescence none. Dry color brown to light yellowish brown (10 YR 6/4) + brown.

C1:30-90 cm Coarse sand, loose without roots or biological activity. Small coarse fragments common. Internal drainage rapid. Field pH 6.5-7. Effervescence none. Dry color light yellowish brown plus grey (10 YR 6/4) + grey. From granites altered only physically.

Profile 5

Locality: Al Zaniah, in the Biljurshy zone. Irrigated terrace laid out in basin form. Near bed of wadi some 3-4 m above the thalweg line. Land form flat. Stoniness and rockiness absent. External drainage rapid. From granitic rocks.

Ap:0-20 cm Lower limit clear. Medium and large secondary granular structure. When the large aggregates are broken down rather inevident and friable plates are obtained. Wet, non-plastic, non-sticky. When it has been irrigated it tends to crack, cracks being 2-3 mm wide. Few small coarse fragments. Small and large pores common. Internal drainage medium. Average amount of bilogical activity. Unaltered organic matter not mixed with mineral fraction. Field pH 7-7.5. Effervescence slight. Wet color from brown to dark brown (10 YR 4/3), dry color pale brown (10 YR 6/3).

C1:20-140cm Sandy material and coarse material with rounded course fragments common. Loose. Abundant large pores. Internal drainage rapid. Biological activity slight. Few vertical tree roots. Field Ph 8-8.5. Effervescence slight. Dry color gray light brown (10 YR 6/2).

Source: Ministry of Agriculture and Water 1969 Water and Agricultural Development Surveys for Area II & III, Final Report, Land Inventory.

APPENDIX III

ANONYMOUS MANUSCRIPT

بسم الله الرحمن الرحيم فيها قوم من العبر ما يتعظ به اولوا الالباب

حوقد المساء حطمه بدا على السيفين اكلوا الناس فيها البساس

والمهد ونهب بعضهم بعض وغلبة بعض الدور ومنا اشهرا

ثم العرقوب الثاني جاء على الناس قحط وغلي السعر سماه عرقوب سعر الجبل

اربعة امداد بريال سنة ١٢١١ ثم ظهر الاسلام في بلاد غامد سنة ١٢١٢ ثم ورد

عرقوب سماه سادية وصل السعر اربعة امداد بريال سنة ١٢٢٤ ثم خرج

عثمان المضايفي من الطايف ولزموه الترك سنة ١٢٢٧ ثم جمعة وادي

يوم الاثنين رابع عشر شهر صفر سنة ١٢٢٨ ثم ظهر الصرعة على حزم

الشريف في كلاخ وقع فيهم قتل عظيم سنة ١٢٣٠ ثم ظهر الصعيد بجيش

بلاد غامد شهر ربيع اخر جمع بني ضبيان وقتلوا قومه قتلة عظيمة وقتلوا

بن جره مقدمهم اسمه مداوي من بني قشير وعم الصعيد وانهزموا

سنة ١٢٣٣ ثم جاء ظهر ابو صواب عاطفة في الخريفا وظهر ما في اسفل وادي

بالجرشي ما شرب منه مات الا ما شاء الله سنة ١٢٣٤ ثم نزل الشريف

منصور بلاد غامد في رغدان سنة ١٢٣٧ ثم وقع الطاعون وظهر الجراد

ونزل ابراهيم غاه في الباحة وخرج منصور من رغدان سنة ١٢٤٢ ثم

نزل الشريف هزاع بلاد غامد ابن عون في الباحة وسباها وحربوه

غامد سنة ١٢٤٤ ثم خرج عايض ابن مرعي بجيش قدر اربعين الف في

بلاد غامد ثامن شهر صفر ونزل البريدة والتقاه احمد باشا بجميع

العسكر عند ظفير الباحة وانهزم عايض يوم السبت ثاني عشر سنة ١٢٥٤

ثم لزموا الترك مشايخ العرب منهم عبد العزيز ابن احمد الغامدي وحسن ابن

جعال ومنزهران جمعان ابن راشد وجمع كثير يوم الخميس سابع او ١٧

وراح بهم الباشا بلاد مصر سنة ١٢٥٦ ثم خرج محمد ابن عون وشده الترك

من ارض العرب هم وسلطانهم احمد باشا شهر شعبان سنة ١٢٥٧ ثم ورد الله

عبد العزيز وربعه يوم الجمعة خامس شهر رمضان سنة ١٢٥٧ ثم خرج عبد الله ابن سيد الشيخ

بلاد غامد يوم الاثنين خامس عشر شهر جمادى سنة ١٢٥٧ ثم قتل حسن

ابن جعال بشانه من ربعه يوم الثلوث خمس تاسع شوال سنة ١٢٥٧ ثم

قتل محمد ابن عبد الله الغامدي عند بن عاصم بشانه سنة ١٢٦٧ ثم ورد

مسه وكثر فيها الجدري والجوع والجراد والمرض ورخصة العقار

وغلي السعر وصل اربعة امداد بريال سنة ١٢٧٥ ثم وقع الطاعون في

البقر وكثر فيها الموت الا ما شاء الله سنة ١٢٨٠ ثم خرج محمد ابن عايض

نزل لشكران سنة ١٢٨٢ ثم من بعده خرج الجراد واكل الزرع وصل السعر

رابعة بقرش وجمع محمد ابن عايض المسلمين للحديدة واصطلح هو والترك

وانهزم في شهر رمضان سنة ١٢٨٢ ثم خرج ريف باشا سنة ١٢٨٢ ثم

خرج علي باشا بلاد غامد وذبح حمد علي من بني جره وذبح الحسين ابن علي

من ضفير الباحة وذبح محمد ابن علي الحرفي سنة ١٢٨٢ وظهر عرقوب سماه

سفاف سنة ١٣٠٧ ثم بعده عرقوب سماه حلقه وصل السعر مدة

ثم ظهر عرقوب وصل السعر ثلاثة امداد بريال بقي سنتين والسعر من ثلاثة

الى خمسة امداد ثم كسفة الشمس فيه اخر جمادى اول جمادى سنة ١٣٢٤ ثم خروج

ابو ناب سنة ١٣٢٣ ثم ظهور احمد باشا وقتل سنة ١٣٢٤ وانهزام الترك

وخروج حكم الله الى من قرا الجبار مع موت احمد باشا ثم خروج الجنايه في

الحران والبركه يموت في النهار ١٢ نفر سنة ١٣٢٦ وظهر السيد من جيان سنة ١٣١٩

وقبل هذا اخره خياه دام غشت بني بلجرشي وبني ضبيان سنة ١٣٤٠

وظهور خالد ابن بجاد وسبيه سبيل بحسن الله الحاله

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ASSARAH

THE LAND USE PATTERN

A SAMPLE SUB-REGION

(Derived from uncontrolled air-photo mosaics 1:20,000)