

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

## Factorial Ecology of Al Hasa

By

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### Introduction:-

It is with no doubt that a good deal of research has been undertaken in the mosaic of the issues that relate to urbanization in general. However it is safe to infer that more effort is still needed in many aspects of urbanization. In the face of the ubiquity of the studies in the developed world, the third world is misereably lagging behind. Even within the developed world the variation of the intensity of research between the United States and the rest of that world is definitely quite evident. Even Berrie Morgan failing to indentify the patterning of the life - cycle stages as predicted by the standard ecological models in his study of Exeter blamed that on the fact that the theories dealing with the residential structure in the British cities were too dependent on empirical work carried out in North America.<sup>1</sup> Thus there is dire need for rigorous research in the Third World.

This paper addresses a case of urbanization in a middle - size Saudi Arabian town. A casual observer would not miss the fact that there is a host of questions that are of interest to any researcher looking into the Saudi urban system. Such issues as the internal structure of the city, the city plan,

the core - periphery relations, conurbanization; to name a few are examples in point that warrant scientific investigation. This research paper is an attempt, hoping to be in the right direction, to look into the internal structure of the Saudi Arabian Eastern urban cluster<sup>2</sup> of Al Hasa and as well examining its social area variations.

### The Study Area:

AL Hasa is an oasis turned into an urban - settlement nearly a century ago<sup>3</sup>; yet it is known to be one of the oldest rural communities of the Kingdom of Saudi Arabia<sup>4</sup>. The pear - shaped oasis is located, as shown in (Fig. 1), in the Eastern Region of Saudi Arabia some 140 km south of Dammam and roughly at the intersection of latitude 25°N and longitude 49E. It appears from (Fig.2), that it is a Gulf community, however it lies 45 km away from the west shore of the Gulf. It is surrounded by the relatively smaller and less important administrative units of Abqiq, Ain Dar, Odailia and Salwa with a wide flank of the Empty Quarter " Al Rubus Al Khali cutting through the southern corner.

The oasis represents a moderately high plain with an average elevation between 120-160 meters above sea - level. The total area is 223 Sq. km<sup>5</sup> of which 7073 hectares are classified as urban land<sup>6</sup>; though only 3746 hectares of that are actually utilized. It is almost unanimously agreed upon the source of the name - Al Hasa.<sup>7</sup> It refers to the liquid of sand and loom mixed up in a puree - like water. It is the kind of water one gets when

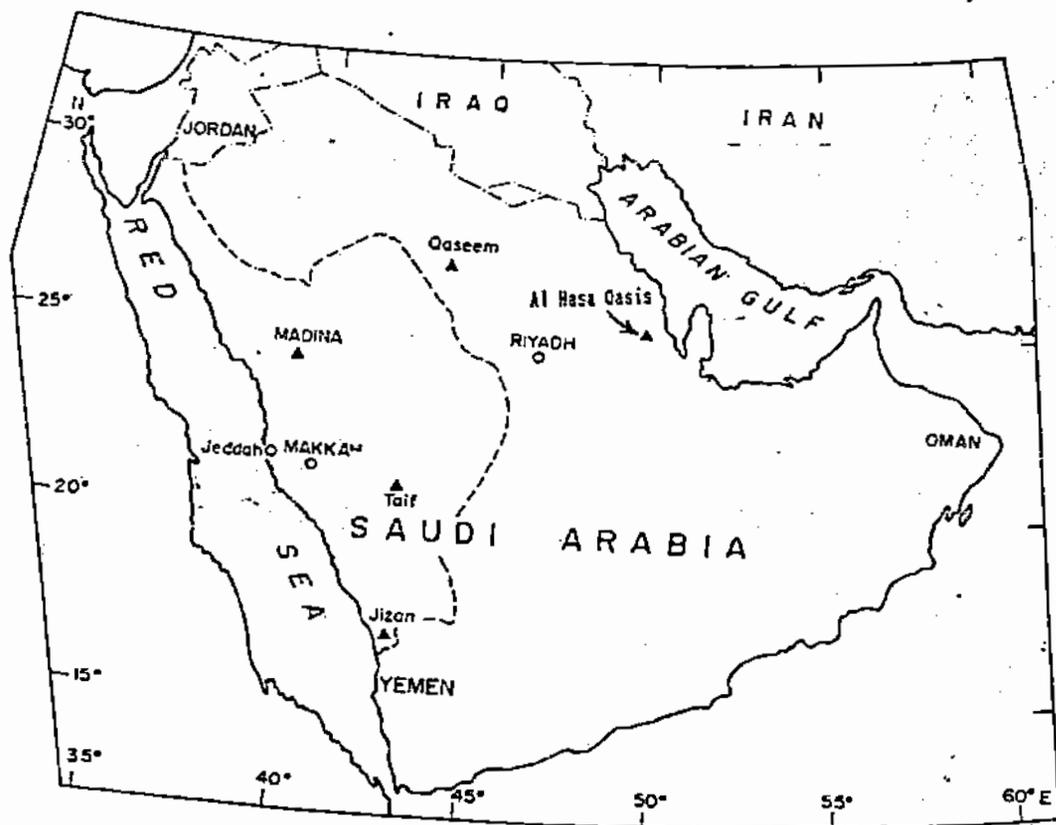


Fig. 1. Location map of Al Hasa Oasis.

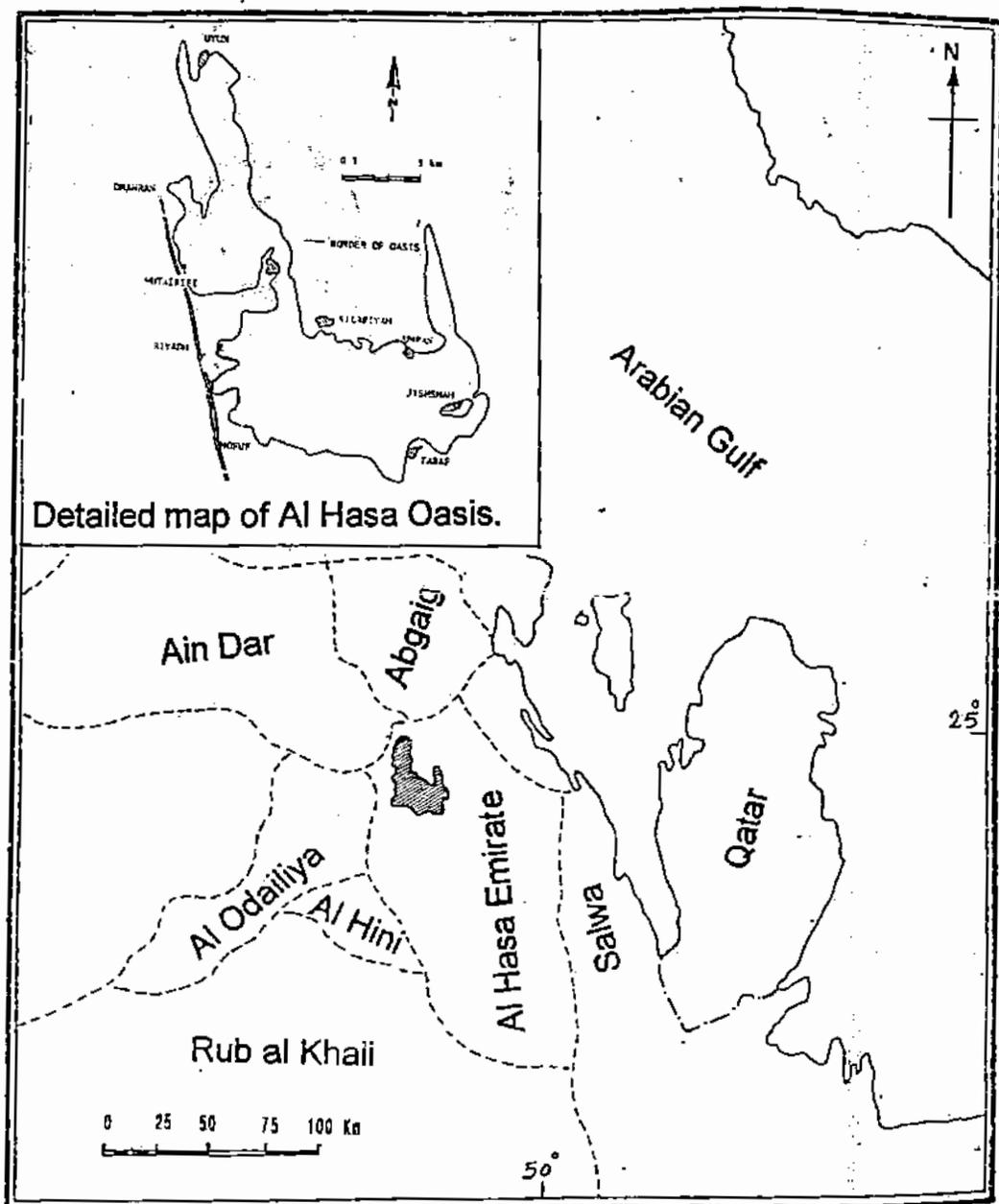


Fig. 2. Location map of the study area.

he digs a shallow ditch in the earth. It all denotes the availability of the underground water close to the earth surface.

Urbanization is relatively a recent phenomena<sup>8</sup>, however two urban centers dominate the setting in the oasis. The town of Hofuf, the administrative seat of the Emirate; annexed to it the relatively smaller town of Al Mukaraz. The twin towns act like the hub around which centers the life of the oasis community with a population of approximately 250 thousands and an average density of 36 persons per hectare<sup>9</sup> for a total area of 76.8 sq. km for the urban core (Hofuf and Mubaraz).

To the east and northeast of the urban core lies a periphery of a myriad of rural communities shown on (Fig. 3). Though they form a somewhat continuous and unbroken curve on the eastern edge of the core; yet it is commonly treated into distinctively separate clusters; the North Villages and the East Villages. While the North Villages still maintain so much of their rural nature and made up of mostly rural communities like Al Kelabia, Al Qara, Al Heilala Al Mansur e.t.c. the East Village are approaching the process of urban transformation and thus places like Al Jafr, Al Jasha, Al Tarraf which hold some of rurality are rapidly being urbanized as we shall see later.

### **The overall Problem:-**

It is commonly believed that the city plan, any city plan for that matter; is the product of the social and cultural background of the planners governed by the circumstantial constraints. In other words the final outcome of the city map is engendered by the desire and thinking of the

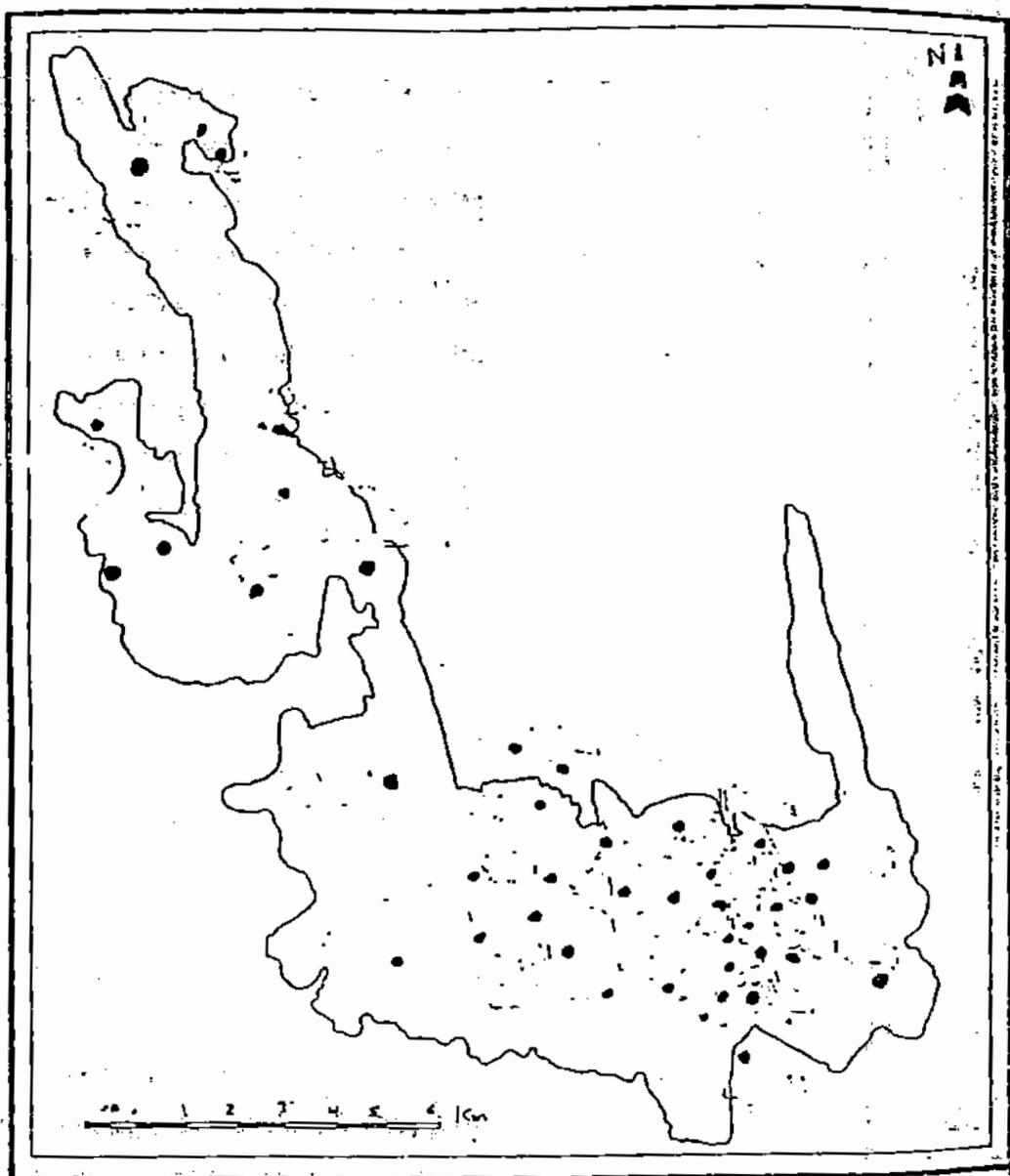


Fig. 3. Villages Clusters of AL Hasa

planners and the physical and human forces that interact to influence it. The physical and human factors involved do not only influence the physical lay - out and structure of the city map but they also shape the quality and functions of the neighborhoods.

The object of the study here contains both the internal structure of the city and quality of the neighborhood. The structure, the setting and the variation among the neighborhoods of Al Hasa have certainly been a product of numerous physical and human factors. Al Omair in his study of the rural settlement in oasis has enumerated some of them<sup>9</sup>. Therefore there is a certain internal structure to be studied as well as certain ecological and environmental variations and disparities to be examined.

### **The Specific Problem and Objective of the Study :-**

This paper has a double - fold purpose. First to test if the internal structure of the urban settlement<sup>10</sup> in the light of the classical models as presented by Earnest Burgess, Homer Hoyt and Chauncy Harris and Edward Ullman holds true as far as the pattern of urban structure in the area of the study - Al hasa is concerned.

Secondly to look into and examine the variations within Al Hasa urban system, i.e. the ecological and environmental disparities among the different parts of the whole settlement area.

To fulfil both objectives the classical models will be applied and superimposed over the existing spatial structure to test their fitness and the quality of Al Hasa neighborhoods will be quantitatively investigated. To facilitate that the following hypetheses will be tested :-

#### **Hypothesis I :-**

The concentric zone model postulated by Earnest Burgess in 1925 holds true for the spatial structure in Al Hasa.

#### **Hypothesis II :-**

The sector model as hypothesized by Homer Hoyt in 1939 holds true for the spatial structure in Al Hasa.

#### **Hypothesis III :-**

The multiple - nuclei model as presented by Chauncy Harris and Edward Ullman in 1945 holds true for the spatial structure in Al Hasa.

#### **Hypothesis IV :-**

The parameters of the neighborhood quality vary among the different parts of the urban setting.

#### **Previous Studies :-**

The literature to be reviewed here falls broadly into three categories. First, the research undertaken on Al Hasa as far as issues at stake are concerned here. Secondly literature on the internal structure of the city with a particular attention on the classical models. Thirdly, research on social area and the ecological quality.

There is an evident paucity of research on issues of urbanization in the study area - Al Hasa. There is a single comprehensive study that alludes to some of the issues to be discussed in this research paper. Al Omair<sup>11</sup> offered a comprehensive study in so far its intents and purposes are

concerned; however he restricted himself in the rural settlement only. He did not delve into the study of the urban settlement, however he uncovered a reasonable amount of information on the history of urbanization and the factors affecting the urban growth. The rest of the literature are either sketchy reports produced by some companies like ARAMCO, Dixados<sup>12</sup> or government departmental reports. There are several books that recorded the history of Al Hasa and mentioned the emergence of the urban centers by way of recording a historical events. Sobhi Y. Eid in his " The Agricultural Geography of Al Hasa " discussed the effect of the urban centers on the agricultural production<sup>13</sup>.

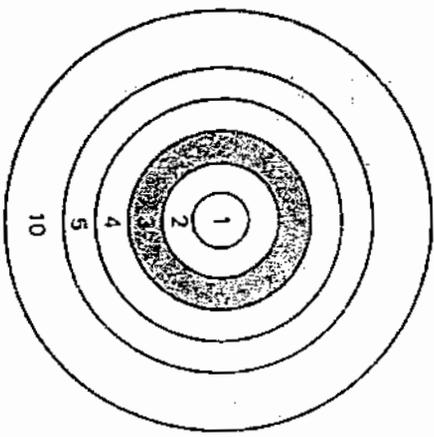
Issues of urbanization in Saudi Arabia have been the subject of several research efforts. The Saudi city as a whole was treated by Ahmed Ismail in his study of Jeddah<sup>14</sup> (1975) and (1985); Omar A.S. Rajab in his "Studies in the Geography of the Kingdom of Saudi Arabia" (1978), and "Al Madinah Al Munawarah " (1979) and " The Hijazi cities" in 1981;<sup>15</sup> Abdulrahman Al Shareef<sup>16</sup> in "Riyadh City" and later his two volumes on " The Geogrphy of the Kingdom of Saudi Arabia" 1984; and Fathi Musailhi<sup>17</sup> in his " The charcter of the Saudi City" 1984; that is to name a few.

On the stages and nature of the urban growth Al - Ankry, K. and , E.S. El Bushra.<sup>18</sup> (1989) indentified the stages that urbanization has gone through and the factors that have led to that. Al Siriani M.M. (1992) in his "Features of urbanization in the Kigdom of Saudi Arabia" made reasonable efforts to trace down the historical phases of urbanization and its level as well as the internal structure of the city and a discriptive study of the urban public utilities. Issues that relate to patterns, size, structure

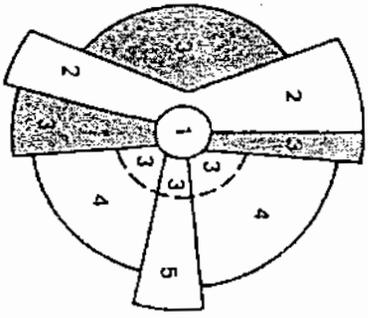
and land use, functions and intra-urban relations are dealt with by Al Hatbloul, S. (1983)<sup>19</sup> Mekki, M.S. (1983) Al Soliman, T. (1989)<sup>20</sup>, Al Hatbloul, S. and Anis ur Rahman (1989)<sup>21</sup>, Daghistani, A. (1989)<sup>22</sup>. General planning issues are discussed by Qadi, A. and Ibrahim H. (1981)<sup>23</sup>. The core periphery relations is treated by Al Khalifa, A. and Frisbie W.<sup>24</sup> (1989) and Al Ankry K. and E.S. El Bushra (1989).

The classical models of the internal structure of the city are popular and widely used. There is not a single text on general urban geography that does not present them in spite of the fact that there is a considerable lapse of time since the last of them appear which means that they still exhibit some appeal. Burgess E. presented his concentric zone model 1925. Studying the city of Chicago, he theorized a land use pattern comprised of several concentric zone the center of which is the central business district (CBD). Arranged in concentric order around the CBD, the zone of transition, the zone of workingmen's homes, the zone of better residence and the commuter zone, see (Fig. 4 a). The sector model of urban land use structure was developed in 1939 by Homer Hoyt. He postulates that high rent residential areas are instrumental in shaping the land use structure of the city and other land use zones are located in accordance with location of the high rent neighborhoods which do not develop in concentric manner as postulated by Burgess but in sectors along the transportation arteries, see (Fig. 4 b). The multiple nuclei model was developed by Harris, C. and Uuman E in 1945. It states that there is not a single nucleus that can by itself shapes the land use pattern, but in fact there are a number of separate nuclei that can do that see (Fig 4-c).

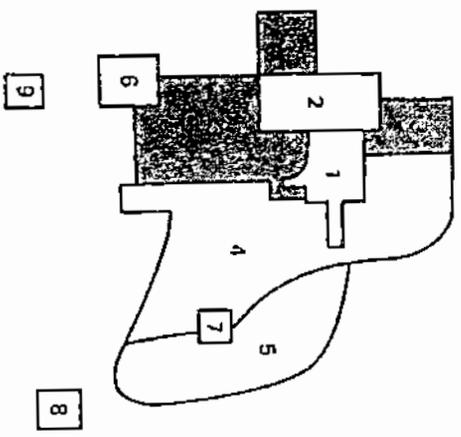
**A** CONCENTRIC MODEL



**B** SECTOR MODEL



**C** MULTIPLE NUCLEI MODEL



- 1 CBD
- 2 Wholesale light manufacturing
- 3 Low-class residential
- 4 Medium-class residential
- 5 High-class residential
- 6 Heavy manufacturing
- 7 Outlying business
- 8 Residential suburb
- 9 Industrial suburb
- 10 Commuters' zone

The studies of the social area of the city were first pioneered by Shevky E. and W. Bell, in 1949 when they analyzed the social areas of Los Angeles. However the most referred to are the works of Abu lugud 1969, 1971 J. Berry B. and P.H. Rees (1969) and to some extent Brand, R. (1972). The first for her reputable studies in Cairo, the second couple for their research in Calcutta and the third for his work in Accra, Ghana. They used different techniques notably factorial ecology to shed valuable insights into the variations in the social and physical structuring in three Third World big cities. The main components of the social area; socio economic, family status ethnicity, and life - cycle are often used in these studies. <sup>25</sup> The study of Murdi in Toronto (1969) is an example of a research effort in a developed world city.

### **The Methodology :-**

The classical models of the internal structure of the city; the concentric, the sector and the multiple - nuclei models will be tested in several ways. First they will be tested by being superimposed on the map of Al Hasa urban settlement to check if they really conform to the set of the spatial patterns in the whole urban complex. The conformity requirement if met will certainly attest to the applicability of any or all of these models. Secondly the regularity of the land use patterns will be examined to find out if it offers an evidence to the presence of any or all of these models. Thirdly the disparity in both land prices and rent will be investigated to detect how much of a proof they offer to any or all of the models.

The testing of the ecological and environmental variations among the different social areas of the urban settlement entails a mixture of factorial ecology and social area analysis.

Factorial ecology essentially addresses the question how does the system cohere and pattern. The main tool of factorial ecology that suits the task in this particular research paper is factor analysis<sup>26</sup>, which fortunately along with the principal component analysis, is a prime and efficient tool used by the social area analysts. The justification for using factor analysis would therefore be that it is a multivariate technique which reduces a large number of variables, some of which exhibiting strong inter - correlation, to a few independent dimensions called factors. These factors are responsible for the variation exhibited among the original data. That is why factor analysis is highly desirable in this situation. However it is to be cautioned that factor analysis is a technique that does not generate adequate result except with availability of a considerable amount of data which is the case here. Factor scores have been standardized to a mean of zero and standard deviation of one by mapping the distribution of these score we can get a spatial interpretation of the underlying factors.

Social area analysis is a technique developed in 1949 by sociologists Eshrev Shevky and Wendell Bell in their study "The Social Areas of Los Angeles: analysis and typology" published both in Berkeley and Los Angeles. They attempted to classify the urban subdivisions of Los Angeles along the lines of three indices : economic status, family status and ethnic status. It was an early attempt at conceptualizing the social space of an urban area along small number of constructs. However that very early

endeavor was augmented by another one when both authors produced in 1955 some form of fundamental study in social area analysis. They published " Social area analysis, theory, illustrative application and computational procedure". Receiving the helping hand with the advent of computer technology social area studies expanded immensely. These studies try to indentify the main indicies, created by the grouping of the variables, along which the urban subdivisions exhibit variation. Social area analysts select the main variables bearing in mind that the city is the product of the complex whole of the modern society. They understand the social forms of urban life within the context of the changing character of the larger containing society.

Thus mixing up both methods will further the objectives of this paper; that is examining the dimensions of the social space by employing social area analysis along with using factorial analysis to uncover the character of the main indices made up of the variables collected from the field will bolster the purpose of the factorial ecology.

For the purpose of facilitating the study, Al Hasa area with an exception of Al Gura Al Shimalia (North Villages), which is of predominantly rural nature will be divided into five major divisions (see Fig. 5) as follows:

#### **1. Division I :-**

This includes the old Hofuf town made up of Cout, Neathil, Mazrouia, Rogaiga, Moalimin, East Moalimin, Awamria, Ain-Ali, Taleia, Gysaila, Zegaigan and Faisalial.

## **2. Division II :-**

This includes Hofuf peripheral quarters like Salmania, Bandaria, Khalidia, Rawda, Hai K. Fahad and Bosaira.

## **3. Division III :-**

This includes the old Mubaraz town made up of Hazam, Gesaiba, Khasara, Sheiba, Oyouni, Gedaimat, Magayed, Andalus, Nowaiser and Seyasil.

## **4. Division IV :-**

This includes new parts of Mubaraz and Mahasin and made of Rashidia, Mangour, Yahia, Khars, Shurofia, Mahasin Aramco, Mahasin Al Ghadisia, Mahasin Al Badou, Mahaasin Al Hakouma, New Mahasin 1, New Mahasin 2.

## **5. Division V :-**

This includes Al Qura Al Sharggia (East Villages and made up of Menaizla,, Fodoul, Al Jafr, Al Jasha and Al Tarraf.

However a note worthy of being mentioned here, by way of precaution, that some of the names enumerated above are arbitrary and been given by the residents themselves without having an official reference; yet they are useful being the actual names used in every day life dealings.

The divisions above, which they themselves are arbitrary too have enormous utility in terms of collecting the data and identifying the spatial variation of each factor studied across the area.

### **Data Collection :-**

The variables used in this study are product of a data collected during field work and through field observations over a period that spanned two years between 1987 and 1989. Thus some of what has been collected earlier has to be updated. However a total of thirty six (36) variables covering demographic, socio - economic, housing and neighborhood quality were selected. They are as follows.

**Table 1. Variables List**

<b>Code</b>	<b>Name</b>
<b>C</b>	<b>% Male Children (1)</b>
<b>F</b>	<b>% Female Childrem</b>
<b>M</b>	<b>% Males</b>
<b>F</b>	<b>% Women</b>
<b>AFS</b>	<b>% Average family size</b>
<b>S</b>	<b>% Saudi Citizens</b>
<b>PD</b>	<b>% Persons per Dwelling unit.</b>
<b>AF</b>	<b>% of Arab foreigners.</b>

Code	Name
ASF	% of Asian foreigners.
ES	# of Elementary Schools (Boys & Girls)
EIS	# of Intermediate Schools (Boys & Girls)
SS	# of Secondary Schools (Boys & Girls)
JC	# Junior College.
GC	# Girls Junior College.
U	# Uuniversity.
V	# Trade and Vocational School.
PS	# Specialized Schools (e.g. Nours Inst. for Blinds).
GR	# Groceries and small shops.
SU	# Supermarket and Department Stores.
R	% Renters.
O	% Owners.
HQ	% High quality Housing.
MQ	% Medium quality Housing.
LQ	% Low quality Housing.
AR	Length of high quality Roads in km.
BR	,, ,, Medium quality Roads in km.
CR	,, ,, Low quality Roads in km.
MC	# of Medical Centers.
HP	# of Hospitals.

Code	Name
PP	# Public Phones.
AU	# Cars per house.
ST	# Service Stations.
T	# Tailor Shops.
PU	# Park & Open Spaces.
JL	# Jail and Penitentiary.
RR	# Restaurants and Cafeterias.

N.B. # are numbers. % are percentage.

- All numbers and percentages were treated in absolute terms to fit in the program.
- It was not possible to get exact information on uncome.

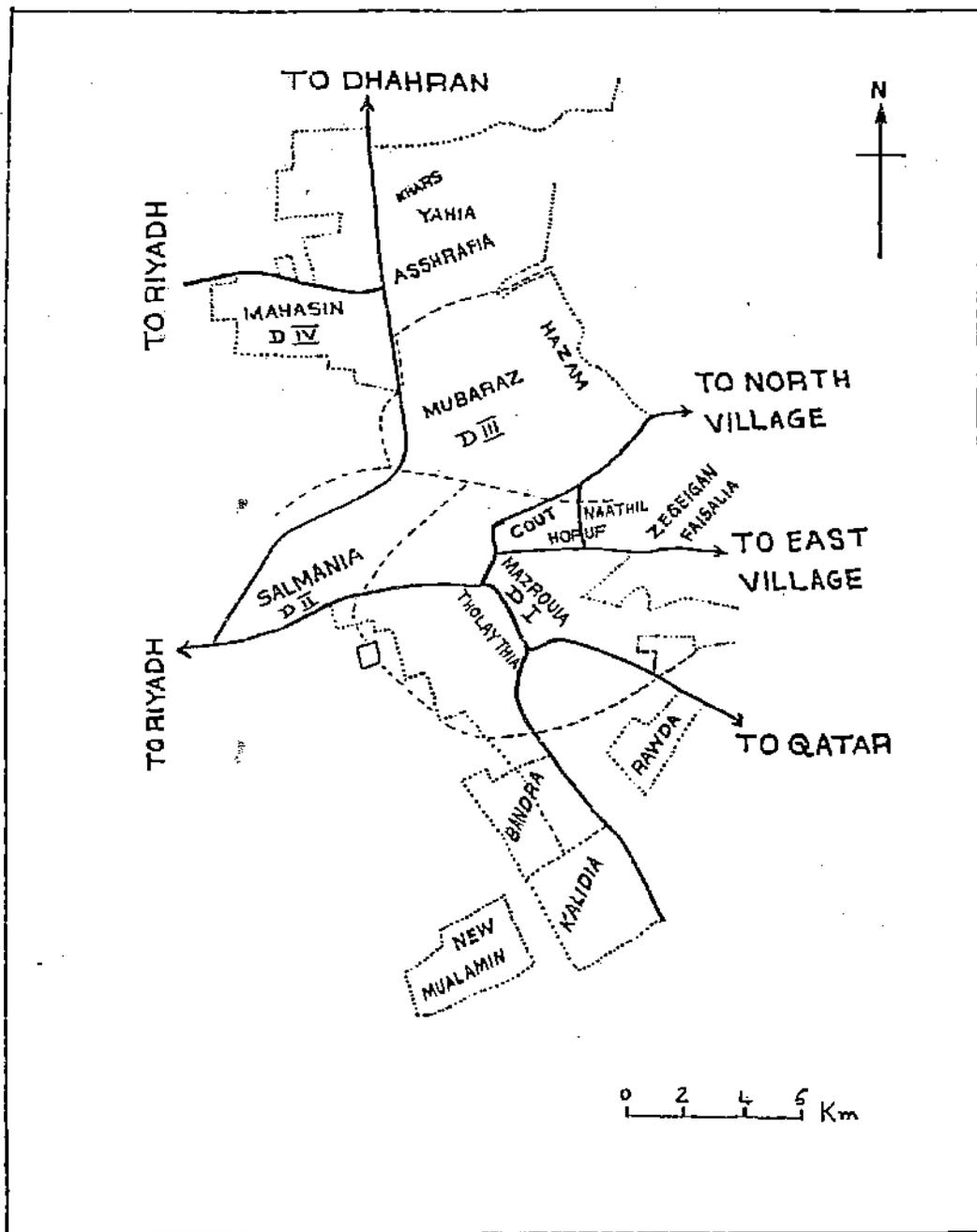


Fig. 5. Al Hasa Area (Neighborhood).

### Factor Scores:

Listed below on Table 3a, b and c are the variables and the factors with which they are most associated (factor loadings).

Table 2 a

Factor I : Affluence 39.8% of the variance explained.

Variable	Loading
Saudi Citizen	+ .8802
Super market	+ .6051
Elementary Schools	+ .2003
High Quality Housing	+ .9113
Medium Quality Housing	+ .5447
Good Quality Roads	+ .7645
Cars	+ .8991
Parks and Open Space	+ .7137
University	+ .6986

**Table 2 b**

**Factor II : Low to medium neighbour hood 28.7% of the variance explained.**

<b>V a r i a b l e</b>	<b>L o a d i n g</b>
<b>Average Family Size</b>	<b>+ .8041</b>
<b>Arab Foreigners</b>	<b>+ .6001</b>
<b>Asian Foreigners</b>	<b>+ .6796</b>
<b>Secondary School</b>	<b>+ .6777</b>
<b>Junior College</b>	<b>+ .9891</b>
<b>Girls College</b>	<b>+ .9371</b>
<b>Trade Schools</b>	<b>+ .9732</b>
<b>Renters</b>	<b>+ .7028</b>
<b>Low Quality Housing</b>	<b>+ .6713</b>
<b>Medium Quality Roads</b>	<b>+ .2334</b>
<b>Low Quality Roads</b>	<b>+ .7789</b>
<b>Service Stations</b>	<b>+ .3114</b>
<b>Medical Centers</b>	<b>+ .7003</b>
<b>Hospitals</b>	<b>+ .5224</b>
<b>Jail and Penitentiary</b>	<b>+ .9981</b>
<b>Person Per Dwelling Unit</b>	<b>+ .6662</b>

**Table 2 c**

**Factor III : Commercialism 15.2% of the variance explained.**

<b>Variable</b>	<b>Loading</b>
<b>Groceries and small retailers</b>	+ .6341
<b>Public Phones</b>	+ .6132
<b>Tailor shops</b>	+ .8042
<b>Stationary and Book shops</b>	+ .9113
<b>Tire Repair places</b>	+ .7203
<b>Restaurants and cafeterias</b>	+ .7134

The strength of each of the three factors is displayed below in the form of the average scores according to the urban subdivisions on each of the factors:-

**Table 3 : Average Scores of the Urban Subdivision on the three main factors.**

<b>Subdivision</b>	<b>Factor I</b>	<b>Factor II</b>	<b>Factor III</b>
<b>Division I</b>			
Naatbil	19	-11	79
Mazroua	39	02	73
Cout	-12	-34	88
Zegaigan	-08	-13	64
Moalimin	56	47	56
Faisalia	76	78	49
<b>Division II</b>			
Salmania	83	73	43
Bandaria	78	75	21
Khalida	79	70	51
Rawdu	81	79	32
Bosaira	87	83	27
<b>Division III</b>			
Hazam	31	-14	67
Gesaiba	42	11	24
Sheiba	33	18	18
Andulus	40	27	29
Seyasib	23	19	21
<b>Division IV</b>			
Rashidia	76	80	25
Kharas	81	79	31
Shurofia	73	77	61
Armco Mahasin	88	84	56
Mahasin 1	88	81	13

<b>Division V</b>			
Al Jafr	69	79	29
Al Jesha	74	79	31
Al Taraf	71	73	33
Al Fadoul	64	59	09
Al Menaizla	59	56	11

### Data Analysis = Spatial Pattern and Hypotheses Testing :

Since the days of Earnest Burgess who attempted to theorize and formalize the general pattern structure along the basis of a solid model in 1925 so much water has gone under the bridge. The essence of Burgess model is that as the city grows it expands radially from its center to form a series of concentric zones. He used the city of Chicago as an area of application. Given the situation Burgess had to deal with and the paucity of the data by then; his model could be considered as an adequate description of the American city of his time. Homer Hoyt wrote on Burgess, "cities appeared to be a chaotic mixture of structures with no law governing their growth. Burgess with acute powers of observation and without all of the great body of census and planning data that has been available since then, made a remarkable formulation of principles that were governing American city growth in 1929."<sup>28</sup>

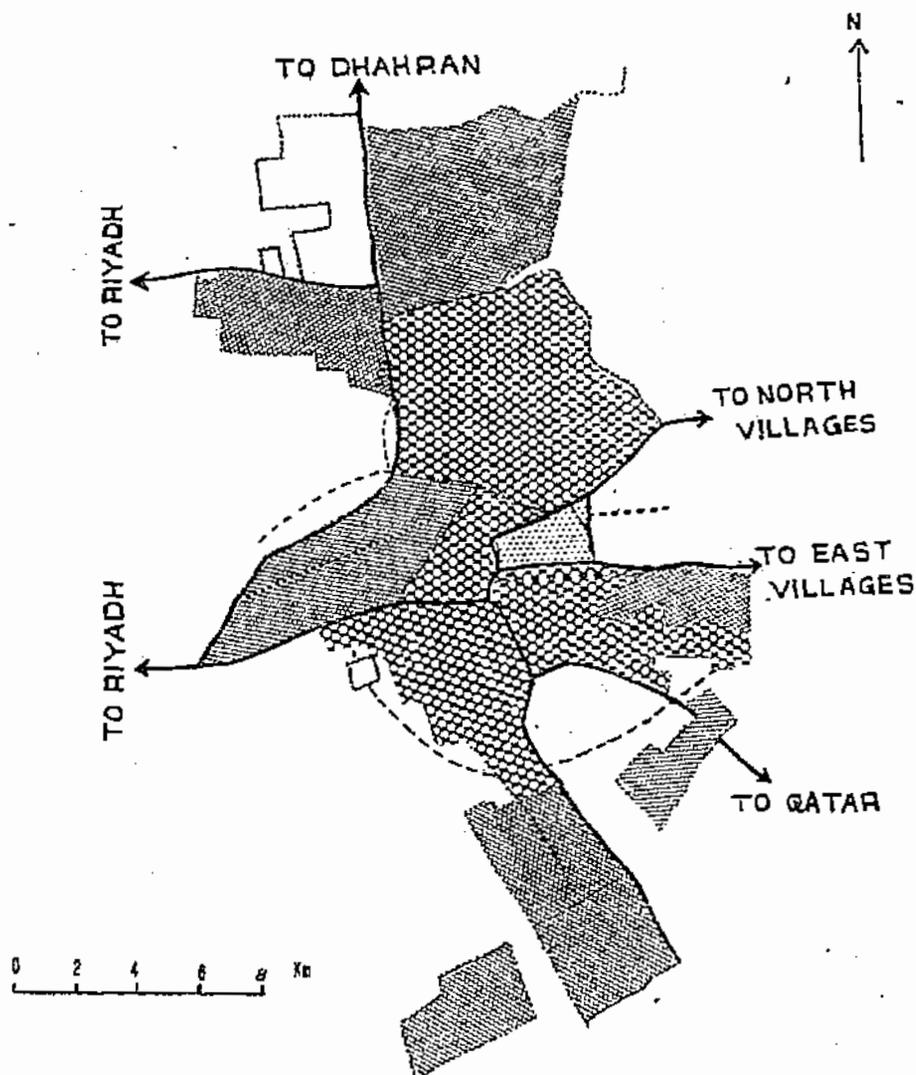
Hypothesis I states that the concentric zone model postulated by Earnest Burgess holds true for the urban spatial structure in Al Hasa.

For the purpose of verifying the validity of hypothesis I it is useful to realize that the operating mechanism in the model offered by Burgess centers on the tendency to expand outward fanning in a regular fashion

from a single center which is the central business district; the CBD. The notion of expansion in itself is a weak point in the model. There are certain amenities and private and public entities that are immobile to fan outwards.<sup>29</sup> Burgess was not able to visualize the effects of the on - coming dominant automobile culture.

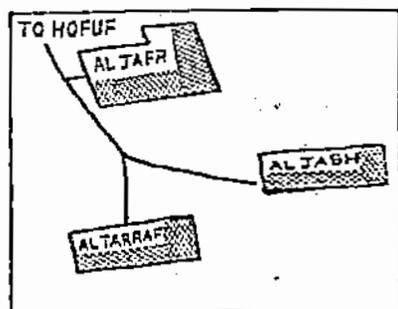
The conformity requirement alluded to in the methodology section does not lend very much of support to the concentric zone model as far as Al Hasa spatial structure is concerned. Judging by (Fig. 6) which is in essence based on both Table 2 and Table 3 concentric zones are virtually non- existing. As it has been stated earlier the conformity means to super - impose the model on the actual land use map (Fig. 6) and judge if they both overlap. The distribution of all forms of land use is decidedly not in any perfect concentric manner.

Ernest Burgess maintains that land values and population density vary directly with distance from the city center. Land values in Al Hasa are so irregular and have no guideline and rules to govern to infer any generalization. Although most of the land is owned by the government the competing market forces play an important role in deciding lots prices. There is not so much of an evidence in Al Hasa which proves that the population density exponentially declines the way Burgess and later Berry, Muth, Seidman<sup>31</sup> predicted it to be. It is neither the way Newling sees through his rule of intra - urban allometric growth where the rate of growth of density is a positive exponential function of distance from the city center<sup>31</sup>. By and large one can not infer, particularly in the absence of



**Legend:**

-  A= Affluence
-  N=Neighborhood Quality
-  C=Commercial Zone
-  Planned Vacant Extension\,



INSET FOR EAST VILLAGES

Fig. 6. Ecological Variations in Al Hasa Area during 1987-1991.

adequate data, that the pattern of the population density neither support nor refute Burgess postulation.

The concentric zone model which Burgess advocates appears to hold only partially almost virtually for all the factors; affluence, neighborhood quality and commercialism depicted on Table 2 and (Fig. 6).

Infering from the above hypothesis I is being partially supported. There are no complete rings across the spatial structure but there are curves that could have made rings had it not been for the interjections that would not allow a perfect circle.

Hypothesis II suggests that the sector mode as hypothesized by Homer Hoyt in 1939 holds true for the spatial structure in Al Hasa.

According to Hoyt high rent residential neighborhoods are basic in shaping the urban land use structure. The high rent residential neighborhoods, according to him also, proceed towards high grounds along established lines of travel or towards existing trade centers or other nuclei, therefore creating a pie - shape sectors.

This research did not find that this is the case in spite of the fact that Hoyt sectorial model is a further extension and amendment of Burgess model where he writes<sup>32</sup>,

"I also had noted in 1939, the extension of string - like commercial developments beyond the central business district centers." Hoyt 1964

In criticizing his model as well as Burgess model too Hoyt writes,<sup>33</sup>

" Thus in view of the shifting uses in the central business district, the overall decline in the predominance of central

retail areas, the rapid growth of office centers in a few cities compared to static situations in others, the emergence of redeveloped areas, and intown motels, the former description of patterns in American cities must be revised to conform to the realities of 1964<sup>11</sup>

It is by no means possible to accept the idea that the urban growth in AL Hasa has been influenced by the axial arteries of transportation or by the location of the high rent residential neighborhoods. Al Omair has found out that the urban growth as well as the rural settlements growth is a product of complex fabric of factors. Thus it is erroneous oversimplicity to go by Hoyt assumptions here.

The lack of a clear sectoral pattern for the socio-economic dimension depicted on (Fig. 6); affluence, neighborhood quality and commercialism is at variance with Hoyt sector model. The fact that there appears to be a pie - shape of affluence and high neighborhood quality in the south-eastern part of the study area namely the urban villages of Al Jafr, Al Jesha and Al Tarraf which ostensibly not in concordance with the main curve of affluence of Rashidia, Khars, Mahasin, Salmania, Bandaria, Khalidia and Rawda does not lend credence to Hoyt assumption and I find the evidence here quite inconclusive. Dealing with that part (Al-Jafr - Al Jesha - Al Tarraf) which undoubtedly an urban enclave in a rural meieu; it has in a way to be considered a continuation of the affluence curve mentioned earlier. Nevertheless it is being dissected and kept a part by an impediment of physical features e.g. Four Hills (Jabal Al Arbaa), Sand dunes e.t.c. However the eastern and south-eastern flanks of the urban area

display a patchwork of various forms of land use where farms juxtapose with residential plots and isolated government and services buildings. Thus the overall picture seems more of a mosaic of activities rather than a uniform set of a land use patterns. In short all this may lead to the belief that the sectoral model is not exemplified in this area at all or at best in a very restricted way.

To sum up the available evidence does not support hypothesis II.

Hypothesis III states that the multiple - nuclei model as presented by Chauncey Harris and Edward Ullman in 1945 holds true for the spatial structure in Al Hasa.

Harris and Uman assume that in every city there is not only one node that induces growth around it, but there are several of them. They call these nodes nuclei and each of them functions independently or semi-independently. Judging by the urban spatial structure in Al Hasa the case is not typically that way. In a market oriented economy where the market processes and forces enjoys the freedom to operate on competitive bases; the location becomes a priori prerequisite to any successful business operations. In Al Hasa the city center CBD is still the place that is attractive to numerous types of business operations. The accessibility factor is not a point of worry for all sorts of enterprise in Al Hasa urban settlement. In fact there are a number of goods and services that are only offered at the city center and quite accessible to all residents.

In dealing with issue of the core - periphery relationships within the context of the expansion theory Al Khalifa and Freskie found that the relation are vivid and alive, virtually across the board for the functions

between the core and the close - by peripheral settlements in all types of settlements within the Kingdom of Saudi Arabia. In other words Al Khalifa and Freshie identify the distance - the accessibility factor - as the only crucial variable to mould the core - periphery relationship.

When the multiple - nuclei model is overlaid on the map of Al Hasa there would not be a high degree of conformity; in essence the model and the map are not exactly congruent. One would be tempted to pick out Mahasin on the west side, Al Mubaraz on the north and Al Khalidia on the south as three possible nuclei. However that is not exactly the case. In each of these nodes, though there is a host of services offered within it, the trip to the CBD is never expendible. It is to be generalized that in spite of the presence of what could be semi - independent urban growth pole in the three subdivisions mentioed above; that has lended hut a meagre support to Hypothesis III.

To sum up there is no any single classical spatial structure model that can perfectly hold true in the strict sense of the word in the area but that without denying the partial existence of each of them, at varying degrees, particularly Earnest Burgess concentric zone model.

Hypothesis IV assumes that the parameters of the neighborhood quality vary among the different parts of the urban setting. Thus the basic assumption here that Al Hasa urban setting is spatially organized in such a manner that reflect some degree of disparity among its different subdivisions as far as its ecological and environmental standards are concerned. Therefore the questions arised; would there be any ecological and enviromental variations among those subdivisions.

Using both Table 2 and Table 3 as well as (Fig. 6) helps to shed some light on that. The depiction of the three main factors: affluence, neighborhood quality and commercialism on Table 2 and (Fig. 6) leaves no doubt that there is a reasonable degree of variation and disparity among the different subdivisions in the area. Table 3 is an added proof of that. The three factors I, II and III are distributed in such a fashion demonstrating variegated areas and subdivisions with the urban mosaic that are clearly separate from each other and with its own distinct characteristics with minimum margins of overlapping. Table 3 a, b and c shows the average factor scores by subdivision. The variation along each column is quite clear. Factor I: (affluence) has high scores on the border and fringe subdivisions e.g. Mahasin Aramco, Rashidia Khars, Bandria, Khalidia, Bosaira e.t.c. while gets low average scores in the central and mid - town division e.g. Naathil, Cout, Mazroua e.t.c. Patterns of disparity also maintained along the second and the third columns depicting factor II (neighborhood quality) and factor III (commercialism) respectively.

Judging by the analysis above it appears plausible to generalize that there are ecological and environmental variations within Al Hasa urban setting thus supporting hypothesis IV.

### **Discussion, Conclusions and Policy Implication :-**

As I have alluded earlier that this research partially supports the dimensions of the model presented by Earnest Burgess in his study of Chicago 1925. This; however, does not mean I am in unrestricted support of the concentric zone model. It is enough to state that in this particular study alone I came across several obstacles that interrupt the perfect ring

which is the base for Burgess concentricity and eventually reduced it to just a curve. Such interruptions are the product of some physical features and the truncation that the farm lands and the rural areas impose upon the eastern and north - eastern fringes of the urban setting. However it is by no means possible to find a perfect concentric zone model and even the original model postulated by Burgess in 1925 never had perfect complete rings around Chicago where lake Michigan, a walking distance from down - town Chicago, infringes upon the whole schema. As far as Hoyt, Harris and Ullman postulations this research, though does not totally discard them, but hardly comes across what supports them because it is impossible that all the three models will present themselves in whole, side by side, in one city and here I borrow the words of Northam<sup>34</sup>,

" Is it not possible that all three models are manifested, in part in the modern city? This; then would represent a composite pattern of urban land use still zonal in nature."

The whole issue of the classical models of the internal structure of the city raises a very essential question about their utility. In essence are they still valid constructs to cater for the spatial organization of any city?

In a study that was conducted by Homer Hoyt in 1954 as an attempt to find out the location of the high rent residential neighborhood - the crux of his model - and how they influence the growth in the city he came out with the result that the high rent residential growth will not be entirely as he once postulated. He wrote,<sup>35</sup>

"..... future high grade residential growth will probably not be confined entirely to rigidly defined areas. some high income communities are being developed beyond low income sectors."

Howard Nelson expressed a cautious view to the invalidity of the classical models. He wrote,<sup>36</sup>

" Models such as these which emerge from the process of analysis and generalization do not conform to the reality of the city. But anyone familiar with large or medium sized American cities will recognize many elements of each model of our urban areas."

William Form attacking these models wrote,<sup>37</sup>

" ..... it would seem fruitless to describe a priori the geometric shape of the city as a series of rings, sectors or diamonds ..."

He also called for alternative models that cares and consider social realities. He wrote,<sup>38</sup>

" It is apparent that the economic models of classical economist from which these processes (ecological processes) are derived must be discarded in favor of models which consider social realities ....."

However Brian Berry comes in defence of the classical models when he wrote,<sup>39</sup>

" The three classic principles of internal structure of cities are thus independent, additive descriptions of the social and

economic character of neighborhoods in relation to each other and to the whole."

Whatever the case might be I personally find the three classical models reasonably useful in analyzing and understanding the spatial structure of the city. One basic advantage of these models is that they are not mutually exclusive for the latter two models are in essence modifications of the concentric zone model. Therefore in spite of the fact that they are some what dated they are still of some value and utility.

The second tool of this research is the social area analysis. The factorial ecology of Al Hasa using the technique of factor analysis supports the dimensions of the social space as postulated by the social area analysts. The socio-economic status was represented by one of its usual main surrogates which is affluence. Judging by the distribution on (Fig. 6) the affluent neighborhoods display spatial pattern of perfect congruency with areas that carry variables considered as indicators of high economic status. Such areas are Rashidia, Khars, Shroufia, Yahia, Mahasin (all parts) Salmania, Bandria, Khalidia, Rawda, H. K. Fahad, Bosaira and after an interjection of some physical features it continues to include the enclave of Al Jafr, al Jasha and Al Tarraf. The distribution of the average factor scores (Table 3) of the different areas on the first two factors points to a high degree of hemogeneity. While the first factor is characterized by high socio-economic status the reverse is true for the second factor which spotlights the low neighborhood quality areas of Naathil, Mazroua, Cout, Zegaigan, Hazam e.t.c.

There is a clear polarization on the distribution of the average family which was estimated to be 6.9 in the affluent areas; i.e. less than the general average for the whole area which is 8.8, while it is estimated to be 9.2 for the central parts of both Hofuf and Mubaraz e.g. places like Zegaigan, Naathil, Cout in Hofuf and Hazam in Mubaraz.<sup>40</sup> What is more interesting here is that Faisalia which is more of an extension to Zegaigan carries some resemblance to the affluent areas particularly in terms of housing quality.

Ethnicity is also equally dichotomized along the line of Saudi and non - Saudi. There is a clear concentration of foreigners mostly made up of an Asian element in the central part of Hofuf in particular and they thin out in a regular fashion towards the outer flanks. They are associated with the central business district. Such a concentration in such an area is natural and justified because that is the business core where they are predominantly employed. However it is evident that both Mahasin and Shrcufia two affluent areas in Muharaz have some pockets of foreign labor force. It is noticeable that the elite Aab labor force is spreading thin all over the urban area with recent light concentration in Mahasin where Aramco (the oil company) facilities are located. It observed that, though it requires further documentation, there is a very clear distinction between the mode of living of the Arab expatriates and Arab labor force in general and that of the Asian groups. The former generally prefer separate villas or family dwellings while the latter live in group form where the central city crowded dwellings house on the average 15 persons for each single unit.

Factor three - commercialism - is of a clear - cut business nature. As it is shown on (Fig. 6) this factor cover mostly the central business district

(CBD) and denotes the extension of the areas dominated by different types of commercial activities over the other patterns of land use. The new industrial area established in 1986 share with the CBD some of its properties especially in terms of the dominance of the commercial activities. That area which is located at the Mubaraz city limits along the side of the old Riyadh Road, the old artery that was once connecting the area with Riyadh, is still expanding.

Every city and every urban center is a unique case in the sense that every place on the earth has at least a characteristic that makes it different from other places. Walter Firey in 1947 pointed out the uniqueness of each urban area and studying Boston he suggested that consideration be given to the social values inputted to particular areas<sup>41</sup>. Al-Hasa is unique in some respect. The popular conventional view among the social area analyst that economic and technological factors are the cause of similarities and they are not the source of the ecological variations while cultural factors are the ones that create the variations among the communities; does not hold true for Al Hasa<sup>42</sup>. In fact culture here is more of a cementing factor rather than a source of division. People are mostly Muslim Arabs who come from the same cultural background

### **Conclusions :-**

Reviewing the results of the analysis of the classical models of the internal structure of the city and the factorial ecology it seems possible to reach to the following conclusions.

1. Al Hasa urban system has two distinct orientations: the first takes a form of a curve emanating from north - east

- moving towards the west to bend towards the south and the south - east. This curve could safely be characterized as a highly urbanized zone. This zone cover Division II, IV and V mentioned earlier in the methodology section. The second orientation is a series of pockets along a roughly north - south axis and on the average is made of old and somewhat declining neighborhoods and covers Divisions I and II. However this axis contains a viable trade zones, commercial clusters and archeological sites. Between the two orientations, however, there is a buffer of government facilities, utility companies and private sectors installations e.g. farms, hotels and a flea swap meet.
2. The disparity between the two zones is owed to a host of factors but to mention the least that the highly urbanized areas are the new and the less urbanized are the old.
  3. The two zones have, in a general sense, displayed noticeable ecological and environmental variations along the lines of the socio - economic status, neighborhood quality, family status and ethnicity.
  4. Contrary to the conventional view held by the students and proponents of the social area studies in regards to the role of culture as a dividing independent variable; culture does not enjoy that influence in Al Hasa. Culture is not a cleaver here but a cementing factor for the majority of the population. Even culture is rather immeasurable here

at least according to my computation and the variables such as schools, college e.t.c. are used as indicators of the affluence and the neighborhood quality.

### **Policy Implications :-**

The basic issue that the decision maker has to face is to bridge the gap between the new and the old; the highly urbanized and the less urbanized.

Extrapolating on the facts presented by the research it seems imperative that innovative and aggressive urban renewal campaign is very much needed to rejuvenate the old face of Al Hasa where the dilapidated and partly demolished houses of Cout and Naathil are only few miles apart from the fabulous villas of Mahasin, Salmania and Khalidia. I have to question here the validity of the unofficial report given by AL Hofuf municipality that only 4.1% of the houses are condemned dilapidated homes while 42.12% are in a moderate condition and 53.78 are in a reasonably good condition.<sup>43</sup>

Judging by the building heights it is to be found that the majority of the dwelling unit are between one to two storey houses. That may lead to vast areal expansion which may put more stress on the services.

The vacant lots and areas within Al Hofuf and Al Mubaraz are quite so many and as an example there are many of them along Al Malki street, the old car dealerships area, Ain Najm area, north and south of Jebel of Abu Gancima, west of Mahasin e.t.c. There is no justification for such lots and areas to remain vacant at a time when areas well beyond them were built.

The concentration of elementary and intermediate school is a bit irregular as some areas are served better than others Al Khalidia as an example, though is categorized as a high status neighborhood needs some attention; Mahasin on the contrary is well served.

The asphalt roads are connecting virtually all parts of the urban and rural areas and are in reasonably good condition except for some parts of inner - city Hofuf.

## Notes

1. Morgan, B. (1976) " The bases of family status segregation a case study of Exter " Inst. of Br. Geog. New series 1 P 83-107.
2. The term urban cluster is used here to denote the group of towns, townships and some urbanized villages in Al Hasa.
3. See Al Mashat A.A. (1989) Pages on the history of Al Hasa - Safahat fi Tariekh Al Ahsa " In Arabic - New House for Publication Al Khobar Also for more elaboration on that look into Al Abdul Gadir Mohammed " A user handbook on Ancient and Modern history of Al Hasa- Tohfah Al-Mustafeed fi tareekh Al-Hasa Al Jasir 1982 Al Maarif Bookshop Riyadh.
4. For more on the history of urbanization in Al Hasa see Al Omair A.A. (1989). "The geography of Rural settlement in Al Hasa Oases" Unpublished M.A. dissertation- school of Soc. Studies - I.M.S.L Un. Riyadh P. 2-9
5. Al Omair A.A. Ibid P11
6. Atlas Al Muddon Al Saudia 1987 Atlas for Saudi Cities P. 13-14
7. For more on the name look into Al Mashat and Al Abdul Gadir - Ibid.
8. Urbanization here is meant to be the modern and contemporary form of urbanization.
9. Atlas Al Muddon Al Saudia 1987 Atlas for Saudi Cities P 13-14.
10. Urban settlement here means the whole urbanized Hasa.
11. Al Omair was actually studying the rural settlement in the area.

12. Such reports normally deals with one single issue e.g. drainage, streets et.c.
13. The author was dealing with urbanization as an economic aspect.
14. See the Journal for Research and Arabic studies Vol. 6 July 1975.
15. This is one of very few studies that dealt with the Hijazi settlements.
16. The approach of Al Shareef, A. is more of regional geographers but evidently he has treated issues of urbanization.
17. Musailhi has adopted a semi analytic approach that makes his book of value.
18. The two authors edited a memograph which contained several articles on urbanization and development in 1989.
19. An Article contained in Al Ankry K. and El Bushra S. Ibid .
20. An Article contained in Al Ankry K. and El Bushra S. 1989 Ibid
21. An Article contained in Al Ankry K. and El Bushra S. 1989 Ibid
22. An Article contained in Al Ankry K. and El Bushra S. 1989 Ibid
23. Planning issues were indirectly embodied on most of the researches on urbanization.
24. Their treatment was primarily from a sociological angle.
25. For more on social area analysis see Murdie (1969), Timm (1971)
26. Factor analysis begins with data matrix, variable and cases. After identifying the data matrix, the second step is the calculation of the core correlation materix (R) which will then be compressed through the extraction of the factors to explain the maximum amount of variance that remained in the data. Hence a factor loading is produced; the sum

of the squared factor loadings which is the eigenvalues indicate the proportion of the total variance accounted for by each factor.

27. Vital statistics were obtained from reports of community medical centers, 1974 census and by estimates and assessments.
28. Hoyt, H. (1964) Distortion of classical model of urban structure, Land Economics Vol XL # 2 P 208.
29. Such as a railway stations, a bridge e.t.c.
30. They all agree on the fact the population density decline exponentially away from the city center see Muth R. (1969), Seidman D. (1964) Berry B. (1971).
31. Newling B. partially goes against the conventional idea that population densities decline regularly away from city center.
32. See Hoyt H. (1964) on Distortions of Classical Models of Urban Structure P. 206
33. Ibid P 209
34. See Nartham R. 1975 " Urban Geography" P191
35. Homer H. Ibid P. 211.
36. Nelson H. 1977 " The Form and the Structure of the city" P 80
37. Form W.1977 "The place of social structure in the determination of land use" P 318
38. Form W. Ibid P 318
39. Berry B. (1977) .Internal Structure of the City." P 101
40. See Atlas of the Saudi Cities 1987 P. 23
41. Firey W. (1947) Land use in Central Boston P. 17

42. Reference is to be made to the writings of Brand, Murdie and Abu Lugud.
43. The figures are given verbally by a city planner based on an unofficial study that they have conducted for the municipality in 1988.

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