

Urban Ecology of Jerash: 1983

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Abstract

This brief article illustrates the application of factorial ecological method in an attempt to evaluate the dimensionality of urban-social structure of Jerash city, Jordan. The heterogeneous character of Jerash residences in respect to ethnicity, non-Jordanian Arab minorities, and religion composition has not reflected in the identified Socio-economic dimensions, and therefore, the urban society is considered as integrated one. Based on these findings, the ecological urban model of Jerash showed a remarkable deviation from the ecological urban models which represent the "Western", "non-Western," and "Israeli" cities investigated elsewhere. Nevertheless, it is difficult to formulate a Jordanian urban - ecological model in light of available models describing the ecological structure of Western and Israeli Cities.

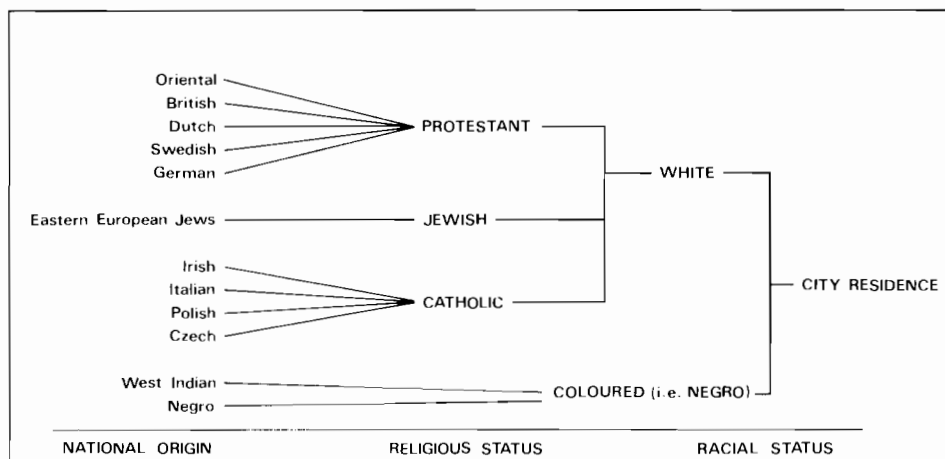
Introduction

The urban ecology of residential areas has been investigated over the last two decades by sociologists, economists, geographers, planners, and human ecologists (Gradus, 1976). Such investigations covered a wide range of Western cities (Rees, 1970, Murdie, 1969; Bowman and Hosking, 1971; Davis and Barrow, 1973; Hirst, 1977), and third world cities (Abu-Lughod, 1969; Berry and Rees, 1969; Hossain, 1976) including cities with "planned" or "command" economic and political systems (Gradus, 1976). The major objective of these studies were: to analyse the dimensionality of urban - social structure; to test the validity of factorial methods; to identify the effect of different factor procedures upon the understanding of urban-social structure (Davis, 1978) in an attempt to support evidence for the final interpretation of urban character (Hunter and Latif, 1973); and finally to compare the factorial ecology for different cities using single analysis (Davis and Barrow, 1973; Hirst, 1977). (Fig. 1a)

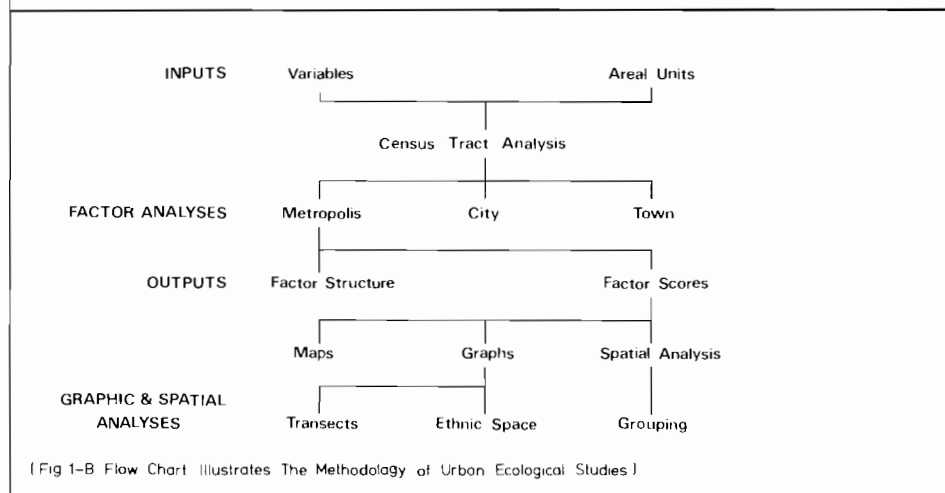
"The consistency required in studying the dimensionality of urban social areas has led factor analysis methods to become the standard technical procedures in the field, primarily because these methods were successful in providing the necessary objectivity and rigour needed by urban dimension and classification schemes" (Davis, 1978).

Three fundamental patterns of interaction in urban society were recognized and considered the basic dimensions common to all western urban areas: (1) social status, (2) Urbanization, and (3) segregation (Fig. 1b). These clearly represent the changing social structure as the society moves from the traditional to modern stage (Hossain, 1976). Studies related to the third world cities revealed prominent deviations from the western model. Abu-Lughod (1969); Berry and Rees (1969); and Hossain (1976) for example identified different dimensions in urban Cairo and Calcutta, these are: (1) Socio-economic status, (2) male dominance, and (3) social disorganization for Cairo, and (1) land use gradient, (2) social status, (3) core-suburb duality in activity, (4) houseless population, (5) household industry, and (6) transport districts for Calcutta.

On the other hand, In a study dealt with the factorial ecology of Haifa "as a controlled city" Gradus (1976) recognized four dimensions which are more or less resemble the western model, these are: (1) socio-economic status, (2) ethnicity, (3) Arab minority dimension, and (4) density and land value gradient.



(Fig 1-A The Polarization of Ethnic Groups In The Western and Israel Cities)



(Fig 1-B Flow Chart Illustrates The Methodology of Urban Ecological Studies)

(Alter Berry and Horton, 1970)

Generally, four models were elaborated and intended to provide descriptive generalizations of the spatial patterns of residential structure (Berry and Horton, 1970; Herbert, 1972) in western and Israeli urban areas. These are:

- the Burgess's concentric zones or the ecological view (Burgess, 1925).

- b. Hoyt's sector the land economist view (Hoyt, 1939).
- c. the multiple nuclei model (Harris and Ullman, 1945).
- d. the integrated spatial model (Rees, 1970).

The objective of the present study is to recognize and evaluate the socio - economic dimensions of Jerash city (Figure 2 & 3) residences and their spatial distribution around 1983. The results may provide beneficial information to social and town planners. In spite of Jerash city is small in terms of population size (approximately 10000 of population), five Arab and non-Arab resident groups are identified with marked differences in their residence in the city. In addition to the natives, Circassian migrants settled in the city since 1978, (Clark and Fisher, 1972), and Syrian

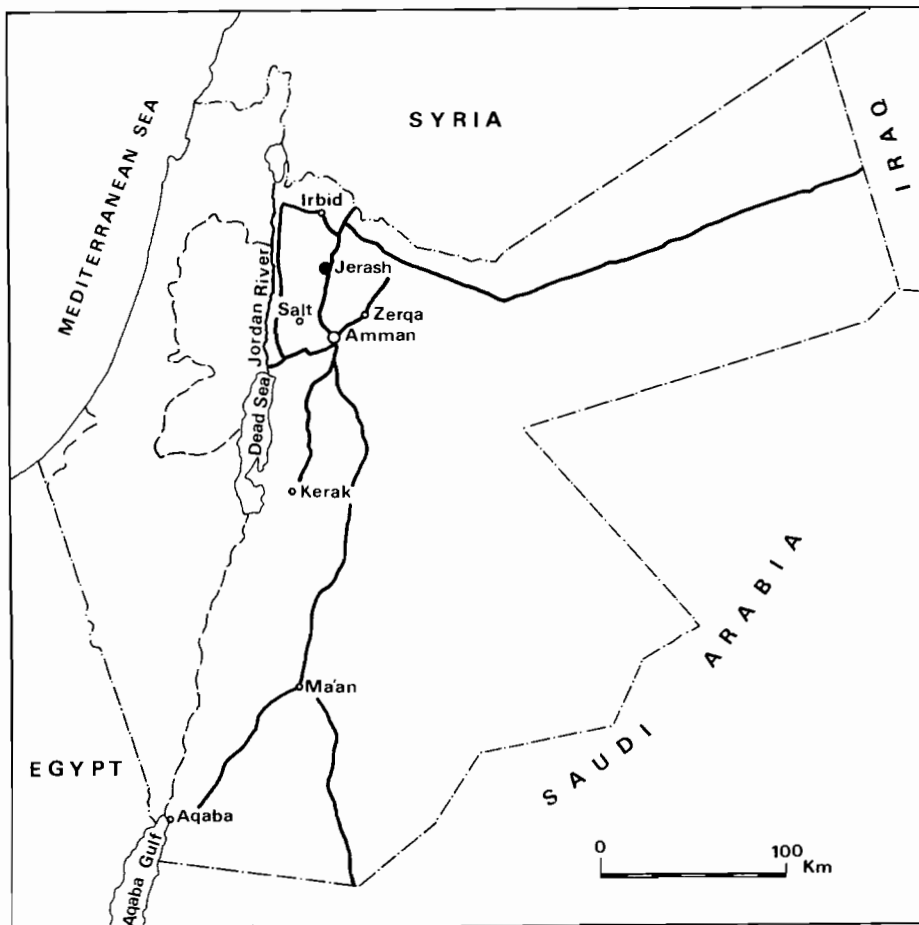


Figure 2 The Location of Jerash City

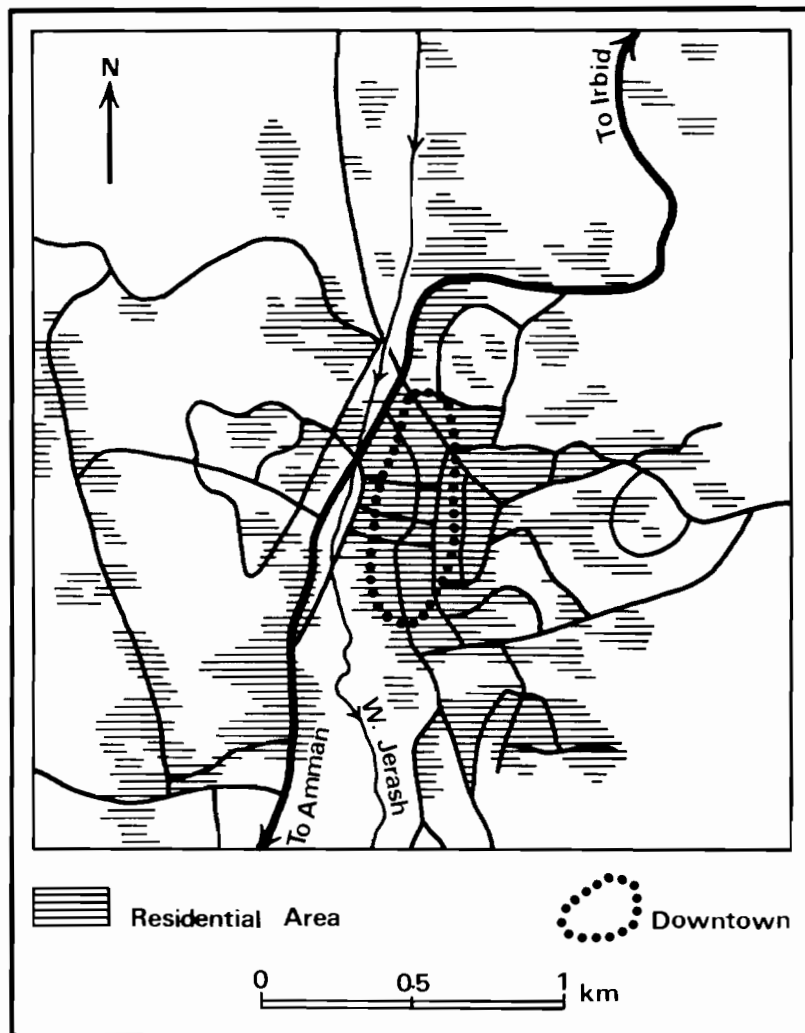


Figure 3 Residential Areas of Jerash City

migrants lived their since 1930's. Moreover, the 1948 and 1967 Palestinian refugees, and migrants from Beni Hassan tribes and from the surrounding villages are also found. Recently, a minority of Egyptian unskilled labours is settled in the city. Although Christian religion is existed in certain parts of the city, Islamic religion is dominant.

One may expect that such heterogeneous character might be reflected in the socio - economic dimensions of the city. Therefore, it is hypothesized firstly, that the patterns of interaction exist among the

population of Jerash and their spatial distribution can be identified and interpreted by a few basic factors, and their patterns may differ from those identified in the Western and the Israeli cities, and secondly, social status, housing style, and economic dimension are associated with topography. The higher the elevation above Wadi (Seil) Jerash (the irrigated agricultural areas), the higher the socio - economic status.

Data Source

Due to the lack of official and detailed census data pertaining to the Jordanian cities, a special questionnaire was designed and accommodates 43 variables to meet the requirements of the present investigation. Afterwards, a comprehensive survey was carried out and covers every single house family in Jerash municipality by utilizing the numeration map produced by the Ministry of Municipality and Rural Affairs and Environment at scale 1: 5000. According to this map, the city has been divided into 46 sub - areas which are considered here as census tracts (Figure 4). The Jerash comprehensive survey for this study started on the 15th of March 1983, and completed in the 15th of May 1983. Subsequently, the raw data matrix comprises of 43 socio - economic, demographic, occupational, educational and housing quality information related to 46 census tracts (Figure 4 and Table I) that constitute the city of Jerash. The list of variables was distributed among the various categories as follows: 8 demographic, 8 Arabs (natives & migrants), Circassian migrants and religious (Moslems and Christians), 9 occupation, 6 income, and 7 household and housing characteristics.

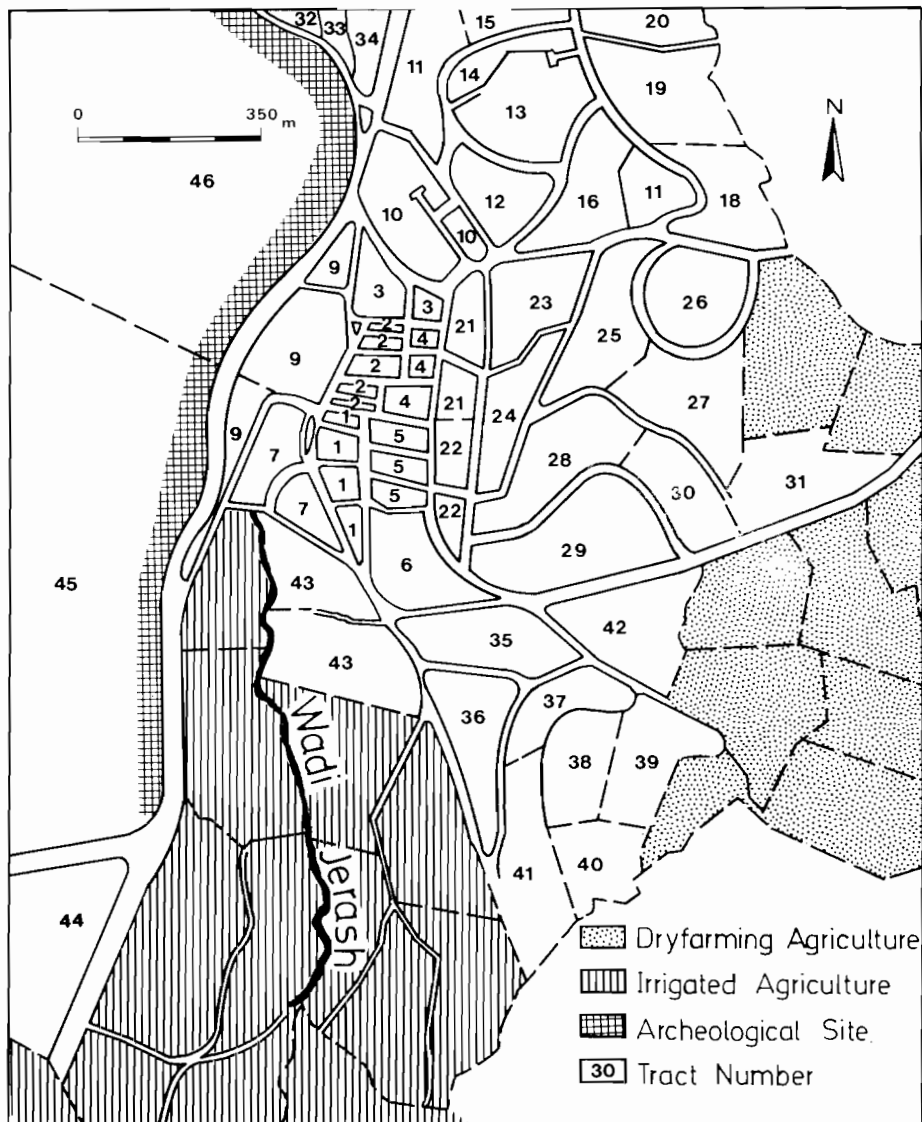


Figure 4 Jerash Census Tracts

Source: Census Tracts Based on The Numeration Map of Jerash Scale 1:5000; Ministry of Municipality & Rural Affairs and Environment

Table (I)
The Variables

Variable	Short title
1. Total population (on 15th March 1982) of tract areas.	Population
2. Number of children aged 0 to 4 years per thousand woman aged 15 to 45.	Fertility
3. Percentage of population under 14 years of age.	Children
4. Percentage of population over 55 years of age.	Old aged
5. Gross population density in persons per 1000m ² .	Density
6. Population of the tract area as percentage of the total area population.	Perc. Tract population
7. Percentage of male to female	Male/female
8. Percentage of population born in Jerash to total population in each tract.	Jerash born
9. Percentage of 1948 refugees to total population	1948 refugees
10. Percentage of 1967 refugees to total population	1967 refugees
11. Percentage of native population to total population.	Natives
12. Percentage of Syrian population to total population	Syrians
13. Percentage of Circassian population to total population.	Circassian
14. Percentage of others to total population.	Others
15. Percentage of Moslems to total population.	Moslems
16. Percentage of Christians to total population.	Christians
17. Percentage of labour force in mining occupation.	Miners
18. Percentage of labour force in manufacturing occupation.	Industrials
19. Percentage of labour force in electricity, gas and water.	Municipality Services
20. Percentage of labour force in Construction occupation.	Construction
21. Percentage of labour force in transport and communication occupation.	Transport & Communication
22. Percentage of labour force in commerce occupation.	Commerce
23. Percentage of labour force in finance occupation.	Finance
24. Percentage of labour force in public administration.	Administration
25. Percentage of labour force in agricultural occupation.	Agriculture
26. Percentage of secondary school educated labours to total labour force.	High schooling
27. Percentage of community college graduated labours in the total labour force.	Community college

28. Percentage of university graduated labours in the total labour force.	University
29. Percentage of less than secondary school educated labours in the total labour force.	Elementary schooling
30. Percentage of literacy in the total labour force.	No Schooling
31. Percentage of women aged 18 years and above in the total labour force.	Female in labour force
32. The average annual income of families.	Annual income
33. Annual income classes.	Income classes
34. Percentage of labours working in Jerash.	Jerash
35. Percentage of labours working away of Jerash but in Jordan.	Jordan
36. Percentage of labours working abroad.	Abroad
37. Percentage of families owning their house which they live in.	Owner occupied dwellings
38. Population per household.	Family size
39. Percentage of housing units occupied by more than one person per room	Person per room
40. Percentage of housing units built from stone materials.	Stone
41. Percentage of housing units built from concrete materials.	Concrete
42. Percentage of housing units built from bricks materials.	Bricks
43. Percentage of housing units built from other materials.	Other materials

Methodology

The matrix of raw data (43 x 46) was initially standardized and the original variables were transformed to a distribution of z-scores, so that each had a mean of zero and a standard deviation of one. This matrix is then subjected to factor analysis, where varimax rotation procedure is employed by utilizing the SPSS standard computer package program.

Factor analysis can be described as a summarizing technique, where it reduces the original variables to a smaller number of independent factors in terms of which the whole set of variables can be understood. Hence, factor analysis provide a simple but more compact explanation of regularities apparent in the empirical situation. The technique starts with the construction of a data matrix which includes "N" variables and "M"

census tracts. A correlation matrix representing single correlation between various pairs of the original variables is created out of the data matrix. This correlation matrix is then summarized by using factor analysis procedure to form a factor matrix. The identification and interpretation of the factors is based on loading of the variables on the factors. This process is simply measuring the correlation between the variables and factors. Every variable has loading or correlation with every factor. Thus the factor loading provides means of examining the patterns of interaction that exist among urban society. The next matrix derived by manipulating this factor matrix, is called factor scores matrix, which provides means for identifying the spatial dimension of urban sub-areas being defined in terms of those basic patterns of interaction. Factor scores are derived by weighting each variable proportionally to its involvement in a factor. Thus the more involved a variable, the higher the weight. Variables not closely related to a factor would be weighted near zero. To determine the score for a census tract on a factor, the census tract data on each variable is multiplied by the factor weight for each variable. The sum of these results gives the factor score for each census tract (Cattell, 1965; Rummel, 1971; Harman, 1976). This weighted summation will give the census tract high (or low) score if their values are high (or low) on the variable involved with a factor. The factor scores associated with the main dimensions are mapped using choropleth technique (Figure 1a).

Results: Factor dimensions and distribution

Factor analysis of the data matrix has resulted in five main factors (dimensions). The factors which drawn off are those with given values greater than 1. The five factors after rotation together contributed for total of 70% of variation. This indicates that only a 30% loss of information would be involved in using these five factors alone as representing the original 43 variables. The contribution of each factor to the variance is given in Table (II) which lists the loadings of the varimax rotated pattern matrix for the five factors, together with a short title of the individual variable involved. A broad descriptive label is also given to each dimension to ease the conceptualization of the pattern of loadings (Davis and Barrow, 1973). Before examining each dimension in detail it can be pointed out that the recognized dimensions demonstrate a pronounced deviation from those dimensions represent the western and third world city structures. Despite general social, economic, and religion / migrant dimensions exist in Jerash, family status and ethnicity which constitute a major dimension in the western and Israeli cities did not presented here. Similarly, dimensions such as male dominance, social disorganization, land use gradient, and houseless population which characterized the

large third world cities did not recognized as well. Nevertheless, the presence of the above mentioned general dimensions in Jerash demonstrate a rather simple city structure compared with those large cities "of complicated structures" investigated previously in both western and third world countries.

Table (II)

Varimax rotated factor pattern matrix: Distribution of loadings

Loading	Short variable title (number)
Factor I	General density (24.7% of the total variance)
0.97	Population (1)
0.73	Density (5)
0.97	Perc. tract population (6)
0.69	Construction (20)
0.54	Commerce (22)
0.73	Public administration (24)
Factor II	General Social status (18.7% of the total variance)
- 0.58	Fertility (2)
- 0.65	Children (3)
0.45	old aged (4)
0.69	Industrials (18)
0.69	Municipality services (19)
0.56	Finance (23)
0.58	Agriculture (25)
0.52	Community college (27)
Factor III	Housing style (11.7% of the total variance)
- 0.51	Fertility (2)
- 0.63	Persons per room (39)
0.56	Stone (40)
0.74	Concrete (41)
0.64	Bricks (42)
Factor IV	General religion and migrants dimension
0.40	Jerash born (8) (8.6% of the total variance)
0.65	Syrians (12)
0.94	Moslems (15)
- 0.93	Christians (16)

Factor V	General economic status (6.3% of the total variance)
0.43	Other (14)
0.52	High schooling (26)
0.80	Annual income (32)
0.73	Income classes (33)
0.78	Jerash (34)
- 0.69	Jordan (35)

Factor I: This is the largest construct in the analysis, accounting for 24.7 per cent of the over - all variance. Table (II) shows the loadings of the variables associated with this dimension. Two groups of variables are recognized: the first group represents the total population of tract areas, the gross population density in persons per 1000m², and the population of the tract area as a percentage of the total population of the city. The second group represents the commerce, public administration, and construction occupations. Since the first group of variables are linked with higher positive loadings on this factor than other variables, the decision had made to label this dimension "General population density". The factor scores of this factor are plotted in Figure (5). It is possible to distinguish between the high density areas and low density areas in the city. The highest density area is found in tracts close to the commercial and administrative zone or the original site of modern Jerash on the eastern flood plain of seil (wadi) Jerash. Four other sectors of less high population density can be distinguished, those are related to the residential peripheral areas. The first and second sectors are located to the north and south Jebel Al-Sheikh Meslih. The third sector is surrounding Hay Al-Atmat residential area. Meanwhile, the fourth sector comprises the most recent residential area emerged along Amman-Irbid highway to north and south of Bab Amman (Amman Gate) The high density sectors are separated by two wedges of low density.

Factor II: This dimension is the second largest factor accounting for 18.7 per cent of the original variance of the analysis. This factor is associated with the demographic (fertility, Children, and old aged), occupational (industrials, municipality services, finance and agriculture), and educational characteristics (community colleges), and thus has been called "General social status". The negative loadings are associated with the variables represent the number of children aged 0.0to 4 years per thousand woman aged 15 to 45 (fertility), and the percentage of population under 14 years of age (children). In this regard, negative loadings signify what Davis and Barrow (1973) termed "late family characteristics" meanwhile, positive loadings refer to comparatively "stable residential characteristics". The spatial pattern of factor scores

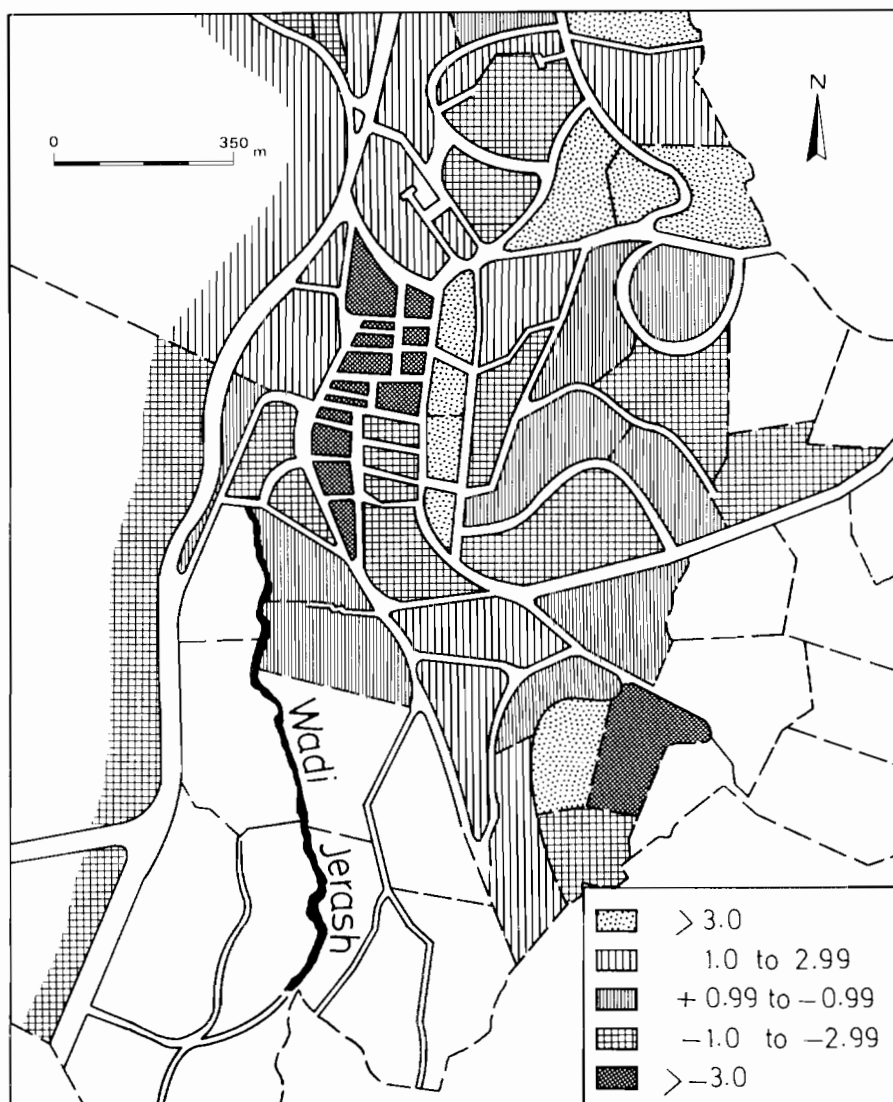


Figure 5 Factor 1: General Population Density

(figure 6) indicated that late family characteristics are found in the down town (where negative scores are presented) and surrounded by a zone of high positive scores represent early or established family patterns. High social status families are generally those of late family status which characterized with low fertility and low percentage of children, but with higher rank in the Christian, Syrian and Circassian residents. Three other zones of relatively high social status are found in the residential peripheral areas located at the highest elevation in the city those are: the area south of Jebel Al-Sheikh Meslih, the area Again, the sectors of high social status are seperated by areas of low social status.

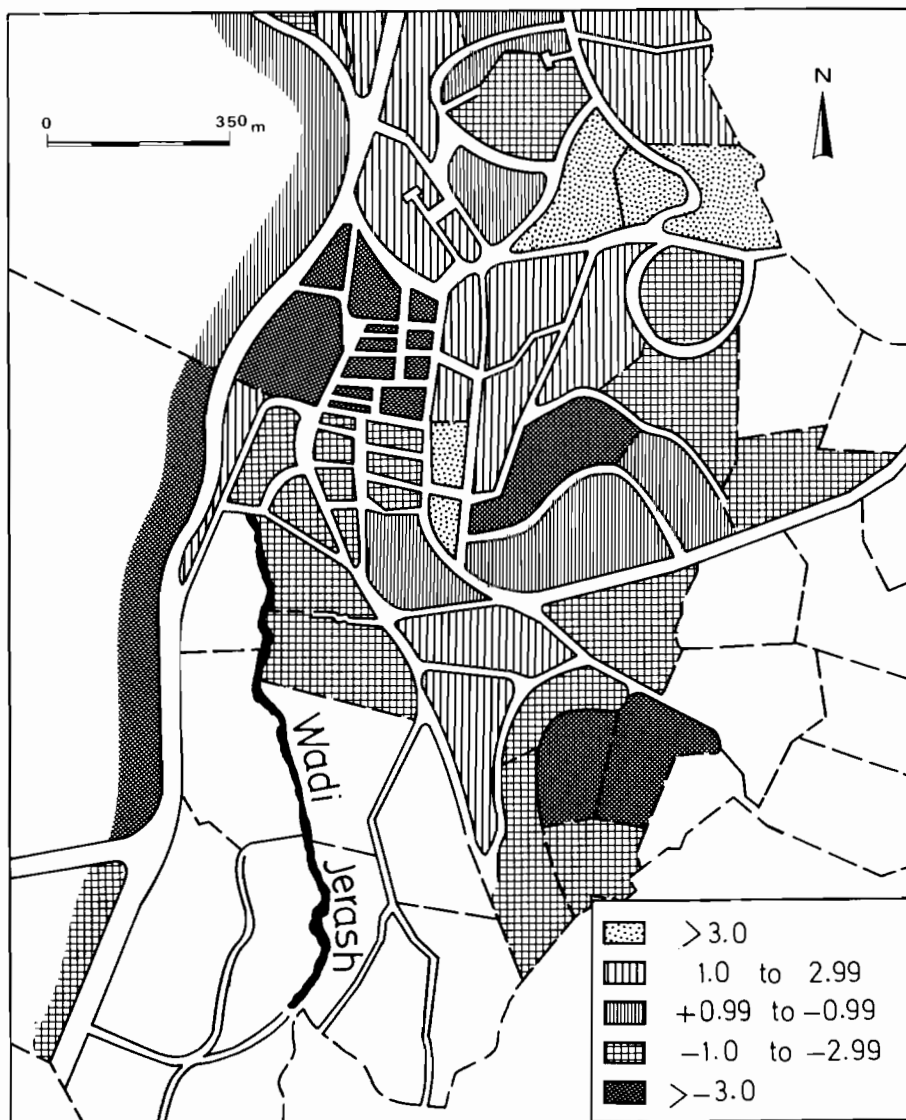


Figure 6 Factor II : General Social Status

Factor III: incorporates 11.7 per cent of the total variance and represents the housing dimension. The negative loadings are associated with variables represent the number of children aged 0.0 to 4 years per thousand woman aged 15 to 45 years (fertility), percentage of housing units occupied by more than one person per room (persons per room),

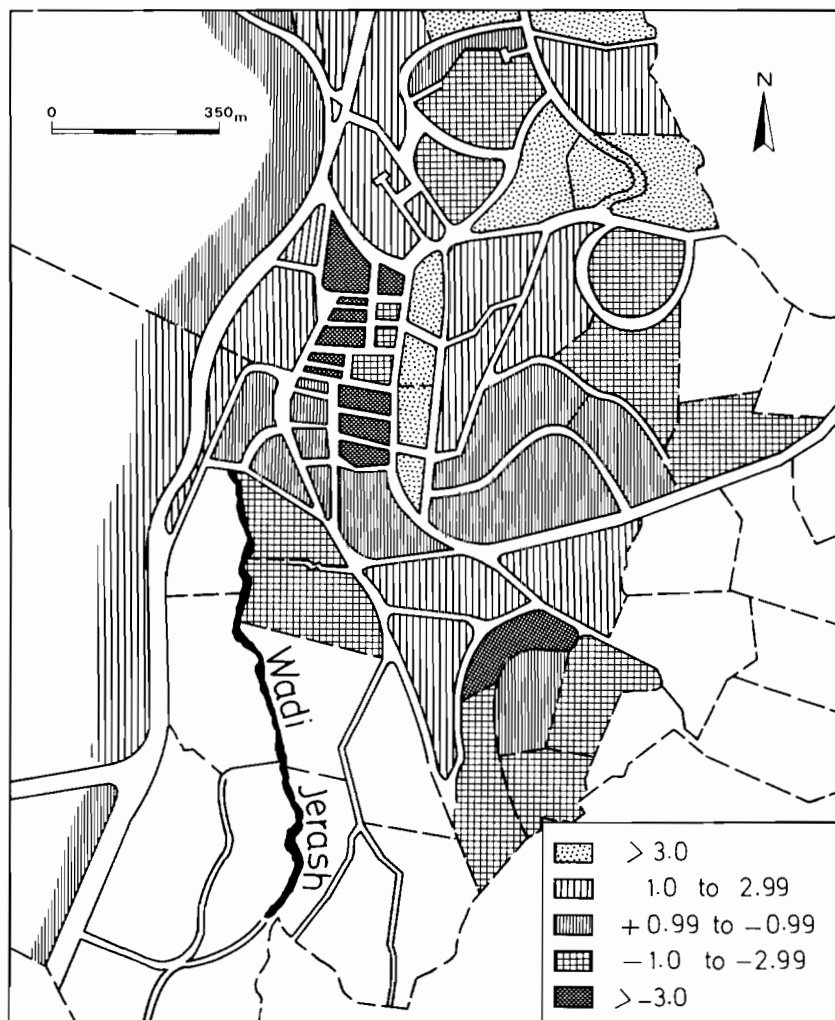
and percentage of housing units built from concrete materials (concrete). This indicates that high housing quality is associated with families of low fertility, and since the family size in Jerash city and Jordan is generally high (Approximately 7 persons) each room in the housing unit is occupied by more than one persons.

Although the housing units located close to the commercial area are built mainly from stone materials, the concrete houses are increased towards the periphery (or the upper slopes looking at Seil Jerash), where 90% of the housing units constructed in the last decade are of concrete materials. Again the same spatial patterns identifies in the previous dimension are recognized here (Figure 7) where sectors of high social status are characterized with high housing quality.

Factor IV: Accounting for 8.9 per cent of the total over-all variance. This factor is dominated by high positive loadings for "percentage of Moslems to total population", "population born in Jerash", and "percentage of Syrian population to total population". One high negative loading is found for "percentage population". One high regative loading is found for "percentage of Christian to total population". Since this factor reflects religion, Jerash born population and migrant variables, it was appropriate to label it as "general religion and migrant dimension". Although Christians are concentrated in specific tracts (10% - 38.5% percent of the total population) of the city, moslems are dominant. In addition, Syrians and Circassians migrants are used to concentrate in the down town, but in the last decade a large number of Syrian and Circassian families left the down town and moves to live in the peripheral areas. Figure (8) illustrates the distribution of moslems, christians Syrians, and Circassian. Although a semi concentration pattern of distribution is identified, it is difficult to claim the presence of ethnicity dimension (which refers to the Circassian and Syrians) or what may be termed "religion - minority' segregation". This is support by the fact that high social status and high housing quality characteristics are not restricted to a specific group of Jerash population, and subsequently, high and low social status and housing quality are presented at different level among each group (Compare Figures 6,7 and 8). Adding to that, field observations indicated that the Circassian migrants were gradually absorbed into the Arab population both the Syrians, Jordanians and Palestinians (Clark and Fisher, 1972). Therefore, one may conclude that Moslem population constitute an integrated society irrespective of ethnical origin (i.e. the Circassian) or the Arab migrant groups (i.e the Syrians, Palestinian refugees, and Beni Hassan tribe migrants).

Factor V: is the smallest factor, representing 6.3 per cent of the total

variance. This factor is characterized with positive loading on variables represent annual income (0.80), income classes (0.73), high schooling (0.53) and labour working in Jerash (0.78). Conversely, a negative loading is found on one variable referring to the labour working away of Jerash but in Jordan (-0.69). Therefore, it was appropriate to label this factor as "general economic status". Such patterns indicate that a considerable part of male's work force in the city are working in neighbouring cities, where 36.75% of the force working in Amman, Irbid and Zerqa cities and conducting daily commuting.



Figur 7 Factor III : Housing Style

Figure (9) showed the pattern of factor scores related to this factor. The spatial pattern of economic status coincides to a large extent with social and housing status patterns (Figures 6 and 7). Again high or low economic status character are not restricted to a specific population group or religion in the city. Similarly, although a high economic status sector is found close the down town, other sectors of high economic status are recognized on the summits and upper slopes surrounding Jerash (i.e. south of Jabel Al - Atmat, Hay Al-Shiekh Mesleh and Bab Amman). The dominant occupation in these areas are either commercial and high administrative occupations, or land property agents. The annual income of families related to this group exceeds 1800 JD per annum and sometimes it reaches 6000 JD per annum. The low economic status tracts are characterize oftenly with workers working with governmental and army institutions, and making daily commuting. The annual income of families included in this sector is less than 1800 JD per annum for each family.

Discussion: factorial ecology, the western model for rooting socio-economic stratification and ethnic segregation:

The present study is only the first step to identify the residential ecological structure of the Jordanian cities. Despite the existence of general population density, social, housing, religion - migrant, and economic dimensions in Jerash, family status and ethnicity dimensions which represent the Western and Israeli cities did not exist here. It has been shown that although the Syrian, Circassian, and Christian concentrated in a pronounced clusters close to the down town these clusters are not linked to specific socio - economic dimension as the case in the Western and Israeli cities where major ethnic, cultural and religion distinction is always linked closely to variations in social and economic status. Subsequently, ethnical, Arab minorities, and religious segregation which characterized the western and Israeli cities did not present in Jerash. This is not surprising since the non Jordanian Arab minorities are descending from the same ethnical and cultural origin as cultural origin as the natives. Even the Circassian who came from different ethnical origin they are religiously and culturally moslems, and therefore, Islamic religion and Arab culture are common between all population groups who are living in Jerash since different periods of time. In addition, high and low socio-economic status are not restricted to a specific group of Jerash population. In other words, one can find low income and high income families within each residence group regardless of their ethnic or religious status. The same conclusion is obtained regarding housing and education status.

In spatial terms, it was difficult to identify sectoral or concentric patterns of interaction that exists among the population of Jerash. Thus the recognized general dimensions in Jerash demonstrate a rather homogenous city structure compared with those cities of complicated structures investigated elsewhere in Israel and the Western countries.

Also, the descriptive analysis of Amman (Malarkey, 1974), contains some confirmation of our conclusion regarding Jerash. Malarkey (1974, p. 70) noted that the topography of Amman tends to isolate economic units, where certain Jebels retain and perpetuate economic inequities. In this context the suq area along the Seil isolates the Jebels of low income residence to the south and east of it from those Jebels of high income residence to the north and west. However, such conclusion is questionable since Islamic traditions allow for mixed incomes and dwellings to exist anywhere in the city. Adding to that, she reported that areas of highest literacy rate are dominant in Western Jebels while areas of low literacy rate are found in the southern and eastern Jebels. Such findings are also in opposite with economic inequalities she reported above (Malarkey, 1974, p. 81 - 82). In other words the residence of high income are not necessarily the most educated groups, which is not the case in the Western and Israeli Cities.

Similarly, in a study of Cairo, Abu - lughod (1969) found that no factorial separation exists between indicators of socio - economic rank and familism variables as found in contemporary western and Israeli Cities. She also concluded that socio - economic, ethnic, and religious conditions are not fulfilled, and thus the city is perfectly homogenous.

The Western urban ecological model is not only fulfilled in the Israeli Cities, but also it is highly exaggerated. In this regard it is a true mirror which reflects the planned and controlled policy of the Israeli political system or "the zionism ideology". The Arabs minority in Israel for example (the original natives and owners of the country - Palestine) was transformed to a culturally isolated community (the Palestinian pale), or more specifically to a "Ghetto" remodelled on apparthoid basis. Above that, Hamdan (1965, p. 51), formulated a factual hypothesis which reflects the structure of the Israeli society, where he concluded "the Palestinian Arabs are the "rejected" group within the caste zionist system of Israel; the Sephardim and the Oriental Jews represent the residuals of the Israeli society, while the Ashkenazim are considered the top social group and the distinguished class.. "Economically, the Sephardim proletarians and the Oriental Jews works for the benifits of the Ashkenazim capitalism on occupied lands belong to the Palestinian Arabs".

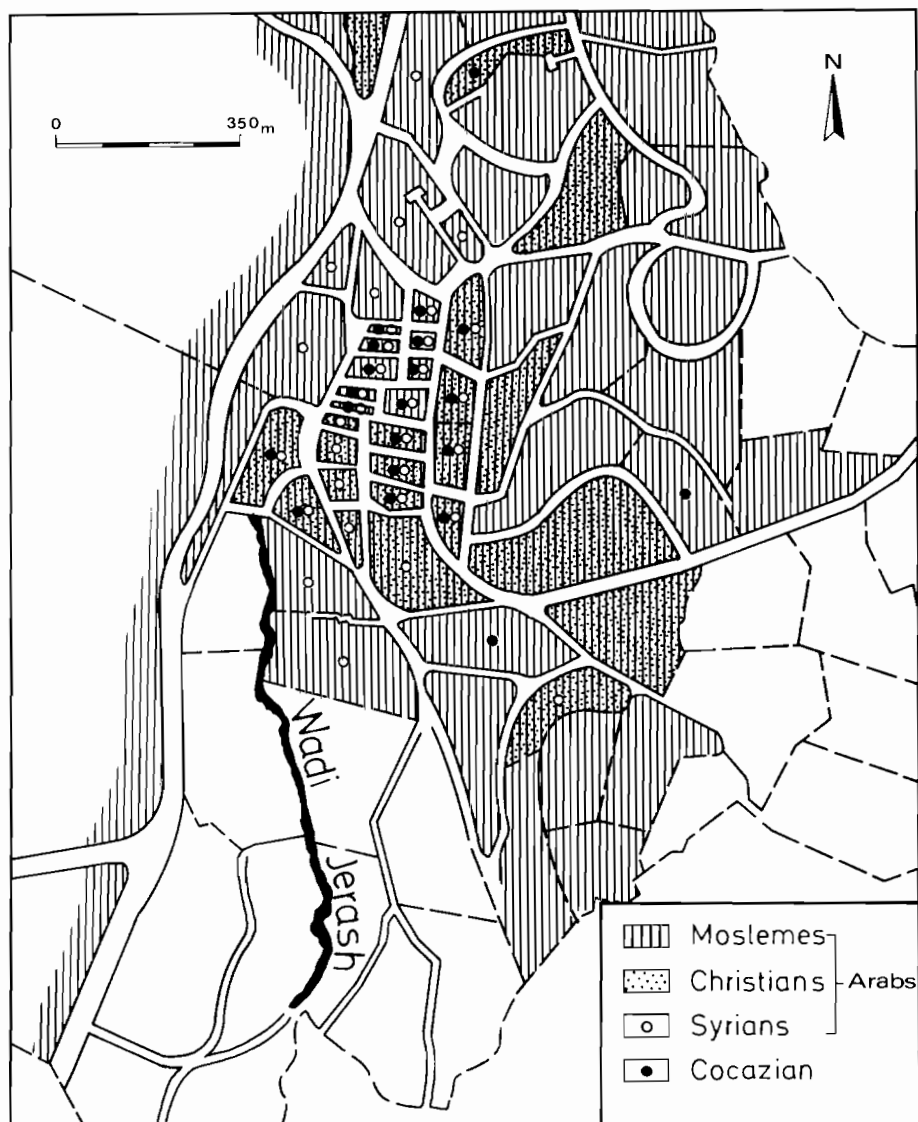


Figure 8 Factor IV: General Religion and Migrants Dimension

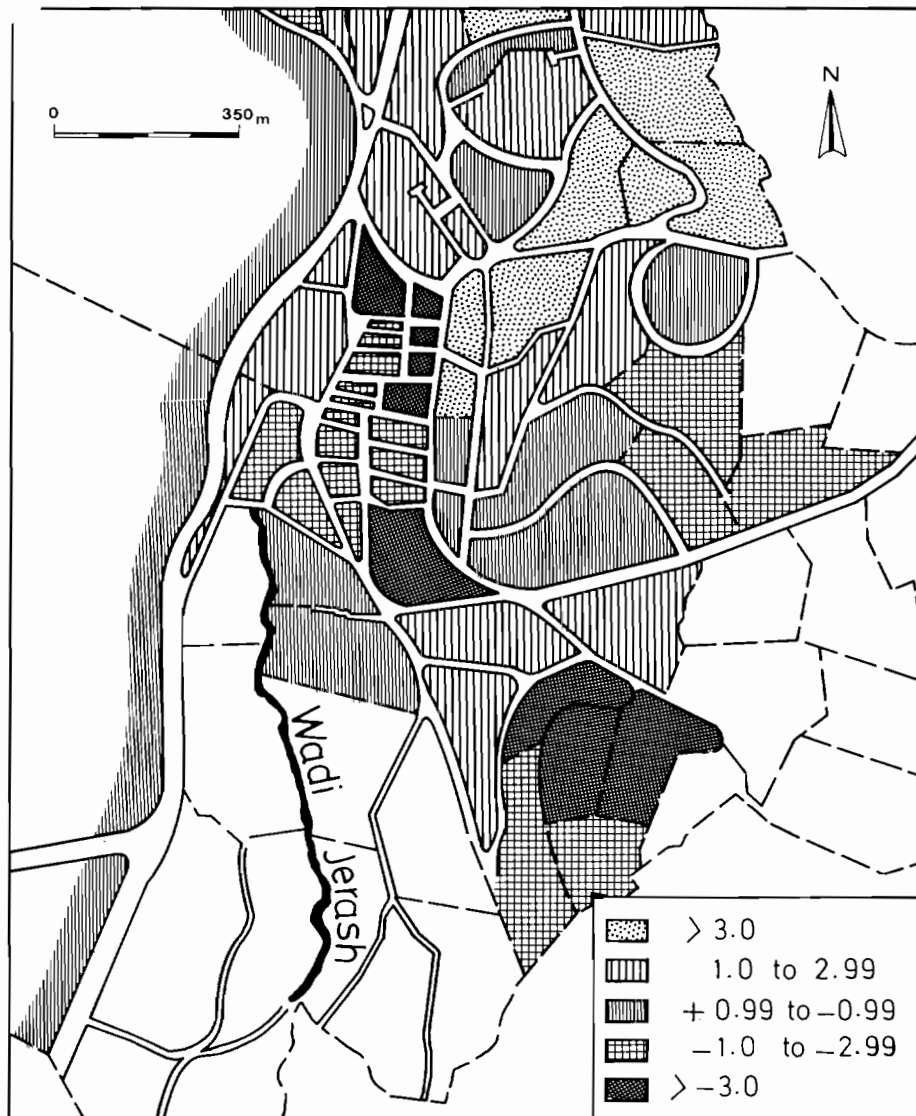


Figure 9 Factor V : General Economic Status

The exaggerated western urban ecological model characterized the Israeli cities is not surprising since zionism represents the highest rank of imperialism.

Nevertheless, it is difficult to establish a Jordanian urban - ecological

model in light of available western and Israeli models, which proved to be also not applicable on the Eastern - European cities as revealed by results obtained from Warsaw and Prague cities (Herbert, 1972). The Contemporary Eastern - European cities are perfectly homogenous in terms of socioeconomic characteristics, housing quality, demographic and educational variables.

Finally, our task must be to explore the uniqueness of the Arab urban - ecological setting which is a challenge awaiting the Jordanian and other Arab Geographers.

Acknowledgement

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