The Impact of Residential Land Classification on Neighbourhood Design

The Case of a Third Class Residential Areas *Ishash Falata*, Khartoum City, Sudan

Moh'd Nageeb Suleiman Elhoweris

Assistant Professor

Faculty of Engineering & Architecture - Department of Architecture - University of Khartoum

Architect/Urban Planner
Bsc, Msc, Postgrad. Dip.
University of Khartoum, P.O. box 321 Khartoum- Sudan.
General Manager: Badya International Consultancy Office – Khartoum, Sudan

The concept of residential lands classification system in Sudan was firstly introduced in the year 1906, it comprised three residential classes (first, second and third), and the system envisaged the three classes for deferent population groups. The present classification system is a further developed one; it comprises five classes, with two more classes than the previous system (fourth & fifth). This classification was made according to the economic ability of the beneficiary and his ability to develop a big plot.

According to the classification, the first class areas have the big plot sizes, long lease duration and durable minimum building materials permissible, while the third class areas have the smaller plot sizes, shorter lease duration and less durable building materials permissible. This situation consequently affected the neighbourshoods design stage of deferent classes in many ways; much efforts and time were put for the design of the upper classes (first & second), while less attention and time were put to the lower classes(third & fourth). This situation resulted in:

Unresponsive neighbourhood designs for the lower classes;

Inadequate design to meat the daily needs and movements of the residents.

The practice showed that the residential classification was done regardless to other more important factors, such as environmental, socio-cultural Etc.

This paper is aiming at investigating, analyzing the shelter problem of the implications of the residential lands classification on the neighborhoods design through the following approach;
Analysis of an existing third class residential area (Ishash Falata) in order to identify the design shortcomings that affect the performance of the neighborhood.
A comparison of other deferent residential neighbourhoods design with the third class design from the pattern, layout and clustering points of view.
As an outcome of the this analysis, the paper will propose some new design concepts and directives to be injected and implemented to the practice in order to improve the performance of the lower class residential classes.

Shelter Situation Analysis

Basic General Data1:

Geography and Administration

The Sudan

Sudan is the largest country in Africa, and the fourth worldwide (slightly more than one quarter the size of the U.S.A.). The Sudan extends over on area of 2.505.810sq.km (where land occupies 2.376.000sq, km and water 129.810sq.km), in Northern – East Africa, bordering the Red Sea, between Egypt and Eritrea. It lies between latitudes 30-220 North and longitudes 230-380 East. Its 7687 km boundaries are shared with other nine African countries namely, Egypt, Eritrea, Ethiopia, Uganda, Kenya, Congo, Central African Republic, Chad and Libya, with only outlet being through the red Sea (853 km).

The Sudan is a country of immense size, its 1900 km North-South extent results in a variety of climates, with dry desert in the north, tropical and equatorial in the South. The rain falls varies from less then 50 mm per year in the North to over 1000 mm per year in the South during the rainy season from April to October. The River Nile and its main tributaries penetrate the general flat terrain of the country, where most of the important human settlement centres lies, especially in the drier North either by or near the various tributaries of the Nile.

[1] CIA the Fact book. (SudanFile://C:\Documents%20and%20Settings\inte1\My%20Documents\sudan.htm)

The Socio- cultural mosaic of the country from the point of view of ethnicity, Languages, religious believes, tradition, life modality, endemic diseases, environment and settlements pattern is changing every 50-100 km.

The National Capital Khartoum

Greater Khartoum is the capital of the Sudan. It lies at the confluence of the Blue and the White Niles and covers an area of about 900 sq km. Greater Khartoum comprises the three towns of: Khartoum, Khartoum North and Umdurman, where Khartoum on the left bank of the Blue Nile, Khartoum North on its right bank, while Omdurman is situated at the junction of the White and the Blue rivers. Tuti Island lies in the middle of the Blue Nile just as it joints the White Nile to form the Famous River Nile (fig.No 1). The city is located at longitude 32' 32 East and latitude 15' 36

Figure 1: Khartoum City at the Niles confluence

North and at an elevation of 1352 feet above sea level. The three towns have had different origins and developed in a different distinctly characters: Khartoum was planned to be a modern European town like to house the new rulers of the country (1910), while umdorman is a typical traditional Sudanese like town with a mixture of Arab-African character and Khartoum North as an industrial town.

Khartoum lies in the traditional zone between the Sahara and the Savannah belt. It has a tropical continental climate, characterized by very hot summer with occasional rainfall during July to September. Dust storms or "Haboobs" are frequent prior to the rainy season.

Demography and Health

The Population of the country is estimated to be around 40 million inhabitants (July 2005 est.) with the following age structure (0-14) years represents 43.2% (male 8,865,331\ female 8,488,218), (15-64) years represents 54.5% (male10,952,566

female 10,930,218) and the population (over 65) years representing 2.4%. The urban population of the country reaches over 35.62% of the total population, while the rest 65% are rural (nomadic + peasant). The annual rate of the population growth is estimated to be 2.6 % (2005 est). The birth rate is 35.79 birth/1000 population, while the death rate is 9.37 deaths/1000 population. Life expectancy is 56.96 years for males and 59.36 year for females (for total population is 58.13 years). The infant mortality rate is ; 62,5 death /1,000 live births for total, 63.29 death /1,000 live birth for male and 61.67 deaths / 1,000 live birth for female (2005 est.). The net migration rate is – 0.02 migrant(s) / 1,000 population (2005 est). The average household size is 6.4 persons.

The population of Greater Khartoum is estimated to reach 5,5 millions representing 16.1% of the total country population (2004 est.).

Figure 2: Settlements distribution & categories in Sudan

Economy:

Sudan has turned around a struggling economy with sound economic policies, infrastructure investments, but is still faces for middle economic problems, starting from its low level of per capital output. From 1997 to date, Sudan has been

implementing IMF macroeconomic reforms. In 1999, Sudan began exporting crude oil and in the last quarter of 1999 recorded its first exporting of oil, this associated with monetary policy, has stabilized the exchange rate. Increased oil production, revived light industry, and expanded export processing zones helped sustain GDP growth at 6.1% in 2003. Agriculture production remain Sudan's most important sector, employing 80% of the work force and contributing 39% of GDP, but most farms remain rain-fed and susceptible to drought. Chronic instability- including the long standing civil war between the North and the South, adverse weather and weak agricultural prices- ensure that much of the population will remain at or below the poverty line. The total labour force is estimated to be around 11 million (1996 est.) divide by occupation into 80% for agriculture, 7% for industry and 13% for government employees ,while the unemployment rate is around 18.7% (2002est). The population below the poverty line is about 40% (2004 est.).

Shelter Related Facts and Figures

Lands Classification System

Historically, the Sudanese cities and villages were characterized by homogeneous and big residential plots due to the nature of the family size, the strong family ties and the extended family type of the Sudanese society. The concept of residential lands classification was firstly introduced in 1906 through the legislation of division of housing lands. Preference was given to government officials and wealthy people to live in Khartoum town. In 1924 the concept of ' Native Lodging Areas' was introduced to accommodate temporary urban workers came to the major town looking for work. As the result of the expansion of Khartoum, the towns and Lands Scheme Act was introduced in 1947 to enforce the division of housing into three classes: first, second and third class, as illustrated in table No. 1. The system envisaged three classes of residential zones differentiated by plot size, building material and lease duration. This system continued until the 1960s, when changes were introduced as a result of the need for more urban land and a desire to build in modern building materials (concrete, bricks and cement), therefore the plot sizes were reduced by an average of 25% for all classes.

The present classification system is a further developed system; it comprises five classes, two more classes than the previous system.

Table No (1) Housing Classification System, 1947

Source: An Atlas of Khartoum conurbation

Housing Sector

CLASS	TENURE				MINIMUM AREA M2	PERMISABLE BUILDING MATERIALS
	Primary Period	1st Renewal	2nd Renewal	Total		
First	50	30	-	80	800	- Red Bricks - Stones & Cement
Second	30	20	20	70	400	- Red Bricks - Stones & Cement
Third	20	10	10	40	300	- Mud Gishra

Residential lands are by far the most extensive type of land in urban areas, as indeed in other cities elsewhere. In all the three towns of Khartoum, Khartoum North and Omdurman, the majority of the built up areas is devoted to residential use. The large size of plots (as a desire for privacy, the arid and hot climate, and the universal development of the one story type of house with the courtyard in most of the residential areas) associated with the existence of extensive squatter localities and the considerable space occupied by very wide roads, are the main reasons behind the horizontal sprawl which characterizes the Sudanese cities and towns.

There are two major types of residential areas in Greater Khartoum: the planned districts and the unplanned settlements.

The planned districts are classified into four classes based on the head household's income, with different areas, minimum building materials permissible and the land lease duration (as mentioned previously). The minimum size of the plot in each category was larger in the past, but at present has been reduced to 400 ,300, 200 and 400 sq. meters for the first, second, third and fourth classes respectively.

In this classification the minimum plot size is determined according to the income level, regardless the family size or the future family growth. The result was that,

some houses were overcrowded while others were under occupied. This practice has brought about sever problems of urban lands in the cities, such as low densities and disconnected urban parts and the financial consequence of government failure to allocate sufficient funds to provide services and facilities.

The unplanned settlements were scattered all over the metropolitan area and found not only in the margins but also in the middle of the city, inside or on the edge of the industrial areas and within the area planned as first , second and third class areas, amidst agricultural areas. The squatter areas of Khartoum, unlike those of many other cities of the Third Word, which are hidden by the facade of shops, from whole neighbourhoods or even small town.

Existing Housing Policy

The housing situation in Greater Khartoum is very unsatisfactory, as for many people no decent housing is available. Consequently a housing policy was formulated in order to solve the sever problems and shortcomings. The housing policy in Sudan in general has been linked to the development plans, itould serve the goals and objectives of the economic development projects by relating the location and quality of housing to the development plan. The gist of the policy is that:

Provision of adequate housing for all people is a National concern, as it is one of the human rights which assists in security and settlement of the families and prepares for good environment for production, which will mean:

Facing the accumulated needs and demands which resulted from natural population increase and migration.

Facing the deteriorated conditions of the existing housing stock to improve the local environment.

Mainly the authorities implement the policy through site and service housing schemes, upgrading of squatter settlements and urban renewal of some parts of the existing cities and towns, and also through very limited built houses.

Actors in Shelter Delivery and their Roles

The main actor for the shelter delivery in Sudan is the Government. According to the unregistered lands act of 1970 the government (Central\ regional) have the right to register all the unregistered lands after the issuance of the act to the government

name, where the disposal of urban lands will be according to the Physical Planning and Lands disposal Act 1994. Moreover the Government through its various agencies and departments provided very limited built houses projects for low income class people, but the bulk of the housing schemes were delivered through the so called site and service schemes.

Other Agencies, like Military forces and Police have had their own housing projects for their employees.

Recently, in the last ten years, the private sector was encouraged by the Government to invest in housing schemes, specially in the Capital Region (Khartoum) and consequently a number of schemes were executed but only for those who can pay (high income class people).

Research institutes and universities, have a significant role in shelter design and improvements, training of the architects and tackling researches aiming to improve the existing housing stock.

The University of Khartoum through its various departments has a significant national role in graduating well trained architects and tackling research housing programmes and projects. Among these programmes, is the housing project for the second undergraduate level, in which the students are put in an extensive training programme of studying, analysing, designing a residential neighbourhood.

As for the CBOs and NGOs, although not so active in the Sudanese urban societies but have an escalating primary role in housing delivery especially in the rural areas where (Nafeer) is used (to build houses for each other).

Identification of Critical Shelter Problem.

The main problem with the new residential developments in urban areas of Sudan is that; land classifications imply different plot sizes (area) and dimensions (depth, frontage) for different residential classes which were determined according to the economic ability of the user supposed to develop the plot, but; regardless the other socio-cultural and environmental necessities of the users. This situation affected in so many ways the process of the neighbourhood design at the urban design stage. Moreover the building byelaws in turn have other requirements (set-backs, coverage and heights) which will have more implications on the house unit design in later stages.

The third class residential areas, where the majority of urban population live, should be approached carefully in the design stage in order to satisfy the environmental, socio-cultural and the economical requirements of their people, bearing in mind their vulnerable nature and that they are the most densely populated areas (186 per/ hec.) and have the higher household size (7.5 pers.)2 among the other residential classes.

Historically, the neighbourhoods of different residential classes were designed in a prototype design usually in a monotonous gridiron pattern especially for the third class areas, while first and second classes receive more attention and designed in a more careful and different ways.

Moreover the architecture education and training in Sudan lacks sufficient programmes and projects for housing studies (planning, design, financing and management) which deemed necessary and important for the new urban designers.

Because of all these reasons this paper will tackle the problem of designing the third class residential neighbourhoods in an attempt to improve their performance through applying innovative and creative design approaches and methods.

Analysis of Shelter Problem

The shelter problem of designing residential neighbourhoods in Sudan previously stated will be investigated and analysed in two levels:

Level one: Is to analyse an existing third residential class area (Ishash Falata community) in order to identify the design problems and shortcomings that affect the general performance of the neighbourhood and the daily people's life and movements for work or to the communal services plus the clustering of the plots.

Level two: Is to compare between designing different residential classes from the point of view of pattern, layout density, accessibility, and plots clustering.

Through this analysis it is aimed to develop a new concept for designing third class residential areas in urban centres which will better satisfy the special requirements of the third class residents in Khartoum and which can be applied for urban settlements of the whole country.

---

[2] - the Structure plan of Khartoum 2000

The Design Requirements for Different Residential Classes

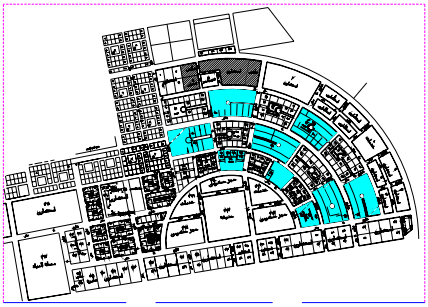
First of all it deems necessary to state the main criterion governing the design of different residential neighbourhoods in Khartoum, which are:-

a/ land use percentages

For the purpose of designing the residential classes in Khartoum, The Khartoum Structure Plan (KSP 2000) (3) determined different percentages to be applied for different land uses within the residential neighbourhood which should be as follows:

For the First Class

- 55% for residential plots;
- 30% for roads & open spaces;
- 15% for the communal services.



Figures 2, 3 : First class residential area

For the Second Class

- 50% for residential plots;
- 35% for roads & open spaces;
- 15% for the communal services.

Figures 4, 5 Second class residential areas

[3] - The Khartoum Structure Plan 2000 prepared by Doxiadis Associates

For Third & Fourth Classes

- 45% for residential plots;
- 40% for roads and open spaces;
- 15% for the communal services.

Figures 6, 7: hird class residential areas

These percentages were originally put to satisfy the targeted residential densities for the city as a whole, which is shown in table No (2)

Table No (2)

Recommended plot sizes and densities for Khartoum Metropolitan Region

RES. CLASS	PLOT SIZE	NET POPULATION DENSITY
1st class	500sq.m	80 pers. / hectare
2nd class	400sq.m.	95 pers. /hectare
3rd class	200sq.m.	190 pers. /hectare

Source: Doxiadis 1960 - 1990

Roads, Blocks, Plots and Open Spaces Dimensions and Shapes 4

Roads should not be less than 10 meters wide while principal roads should be wider still.

- Blocks should be oblong and not square and one of the dimensions should not be more than 40-50m, while the other can be 100m or more.
- No plot shall have a road frontage of less than 10 m and that the depth of a plot shall not exceed three times its frontage.
- In general plots should be so designed that houses can be built on an East West axis.

[4] - The Central Town Planning Board Circular No 7

- Open spaces need not be very large or exactly regular in shape (30X30m is usually used)|.
- Large open spaces should be provided within the layout (as playing fields)

Growth & Net Residential Densities[5]

The plan of Doxiadis stated that the overall density of Khartoum Metropolitan region was rather low (about 53 persons per hectare) and the gross residential density was around 115 persons per hectare, while the net residential density was 220 persons per hectare. Consequently, the plan proposed the necessity to increased those densities by 30%

- Overall density should reach 70 per / hectare
- Growth densities should be around 150 persons per hectare.
- Net residential densities should reach 300 persons per hectare.

Environmental Requirements[6]

In designing a plot or a plot layout, it is well to be bearing in mind that the East and South sides of a house the best for sitting out. The East side is shaded by the house when the Sun is setting and the South side catches the prevailing breeze in the Summer while in Winter it is sheltered from the cold North wind on North- South in the case of oblong plots. The long axis of plots should lie east- West.

Analysis of Ishash Falata Residential Area (third class)

Ishash falata is a reletevly new residential community in Khartoum city, as the resedences of the area were relocated from their previous site located in the inner city. This relocation project was executed in the year 1990 after a long and a harsh struggle of the people to remain in their original place .

The name of Ishash Falata was originated from the two words which mean, the small huts (Ishash) of the (Falata), a muslim tribe originally from West Africa (Niger,Nigeria and Chad) came and settled in Sudan for along time ago, this tribe and others from West Africa used to pass Sudan on their way to and from Mecca.

[5] - Doxiadis Plan
[6] - The Central Town Planning Board Circular No 8

The new location area is only ten kelometers far from the previous one at the outer frings of the Souther part of the city, this area was previously reserved as a green belt for the city. Afterwards, it was deforestated and tranformed into one of the new residential quarters of the city.

The total area of the neighbourhood is 200 hectars composing of more than 3000 plots of 300sq.(20X15) and accomodating a number of population of 18760 inhabitants (3685 families).

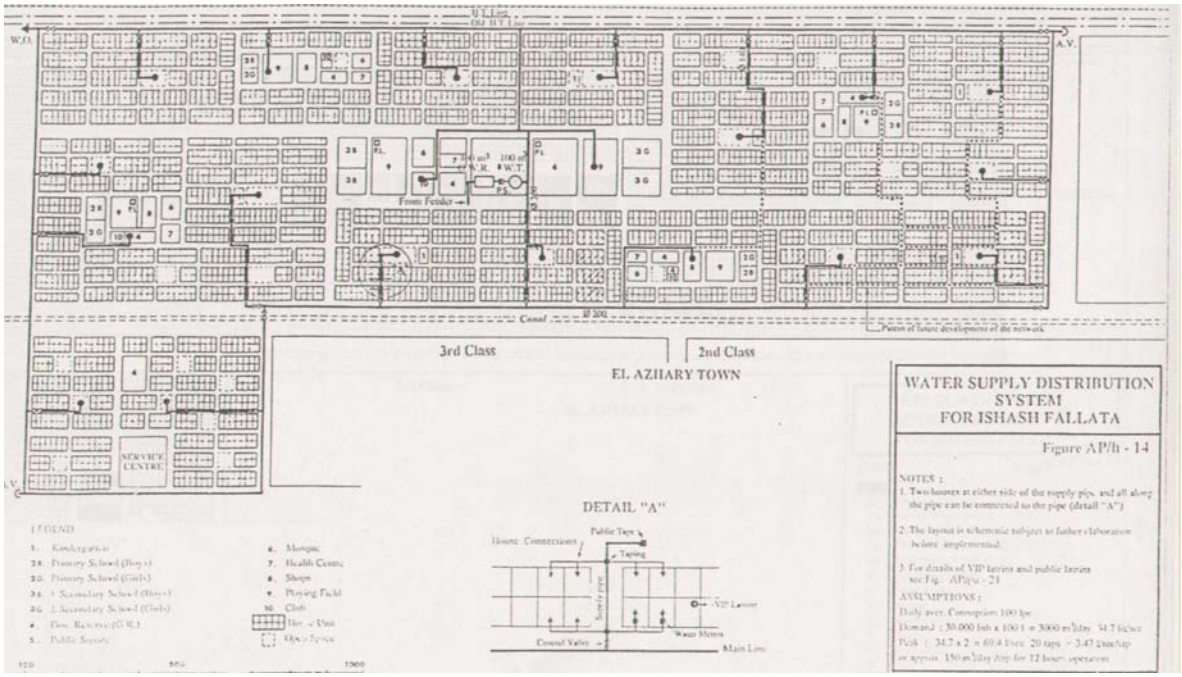


Figure 7: Ishash Falata new neighbourhood plan

The growth residential density of the area is around 93.8 per. / hec. While the net residential density is 209 pers./ hec.

The main shortcomings of the new neighbourhood plan can be summarized in the following:

- Monotonous layout in gridiron pattern;
- Scattered small open spaces;
- Centrally located community facilities;
- Wide main roads;
- Illusive pattern;
- Similar and repeated clusters;
- No clear divisions between different tribe or ethnic groups

As was seen in the figures illustrated previously, the design of the class depended on the level of its classification, where it is obvious that the design of the first class takes more time and attention, the design of the other classes take less time and attention. For the case of Ishash Falata area, the neighbourhood design was done in a hurry and without any concept as usually done for the third class. Moreover, the third classes areas were located in remote areas and behind the other classes.

New Design Methods for Third Class Areas

To improve the living conditions of the low income people residing in the lower residential classes it should begin with the neighbourhood location, siting and design. Moreover innovative approaches and methods should be introduced to improve the design of the neighbourhoods, such as;

- Mixed residential neighbourhoods are to be introduced, first, second, third classes all together to benefit form the level of services provided and the wealth of the residents;
- New locations for the third classes must be easily accessible;
- Free patterns instead of monotonous grid iron is to be introduced;
- Clustering of the plots should reflect the socio-cultural aspect of the residents;
- Scattered small open space should be avoided (father less spaces), instead relatively big spaces is to be designed in order to be created as recreational and social spaces, the experience showed that the small spaces were usually transformed into garbage collection areas.
- Wide and continuous roads are to be avoided or minimize in order to raise the densities and exclude the though traffic from the neighbourhood;

Proposal for Change and Improvements

The new design concepts and directives coming out of the analysis done previously will be enforced and injected in the urban planning practice through the following ways:

The housing project used to be tackled for the second class undergraduate level at the department of architecture – university of Khartoum, to train the students on

innovative ways to design residential neighbourhoods with special emphasis on the third class areas.

To inject the new concepts in the housing sector of the new Structure plan of the national capital, Khartoum (KPP06).

The future professional practice of the author in research and urban projects of other settlements.

Action Plan

Designing the residential neighbourhoods in an adequate way is of great importance for the people living in them as it will consequently affect many of their daily lives and behaviours. The design should satisfy the socio- cultural, environmental, economical and movement's of the people.

Short term Goals

For the short run a workshop will be arrange and held by the Department of Architecture Faculty of Engineering and Architecture University of Khartoum in collaboration with the Ministry of Physical Planning and Public Utilities Khartoum State under the theme of "Towards Innovative and more Responsive Design Concepts for Residential Neighbourhoods." This workshop will focus on training the planners working in the town planning department of the state Ministry of Town Planning on new design approaches and methods. (December 2006).

Through the housing project for the second year at the department of architecture university of Khartoum, which will be conducted in the second term (January 2007), where, study, analysis and neighbourhood and house unit design will be tackled among other things of the low cost housing sector.

Long Term Goals

Training of new urban designers at the architecture schools on the new concepts and approaches for better and more responsive neighbourhoods' design.

Through the structure plan of Khartoum Metropolitan area (KPP 06) which supposed to commence by November 2006, the problem of designing different residential classes will be raised among the other housing problems in the capital region in order to be studied, seeking to inject new concepts and approaches to improve the current

design methods of different neighbourhoods, with special focus on the lower housing classes.

Organizing short training courses (one month) for young town planners from different regions or states of the country through the department of architecture on the problems of design of housing neighbourhoods.

References:

Khartoum structure Plan (KSP200), doxiadis Associates &AMMP1990.

Doxiadis Plan 1959, Doxiadis Associates.

Central Town Planning Board Ordinance and directives.

CIA the Fact book

SudanFile://C:\Documents%20and%20Settings\inte1\My%20Documents\sudan.htm)