ISSN 0024-9521
IJG Vol. 45, No.2, December 2013 (125 - 134)

INDONESIAN JOURNAL OF GEOGRAPHY

RESIDENTIAL MOBILITY AND SOCIO-SPATIAL SORTING IN KADUNA METROPOLIS, NIGERIA

Olumide Akinwumi Oluwole
oaoluwole@nda.edu.ng
Department of Geography, Nigerian Defence Academy

ABSTRACT

Residential mobility is a process which has significant effect on the urbanscape. The preferred directional bias of the mover households in Kaduna metropolis typifies the Schelling's model of residential tipping which ultimately resulted in residential segregation. The level of the segregation was subjected to analysis by the use of multigroup analog, and was found to be 0.58. This index is moderately high. Also, residential mobility, amongst other factors led to the expansion of the metropolis, strengthen family ties and above all led to the socio-spatial sorting of the residents. This study recommends continuous research in residential mobility because it is very useful in the forecast of future landuse patterns which are critical to urban development.

Key words: residential mobility, urbanscape, households, residential tipping, residential segregation, multigroup analog, socio-spatial sorting, residents

ABSTRAK

Mobilitas penduduk merupakan sebuah proses yang berdampak signifikan pada daerah perkotaan. Bias yang terjadi pada arah perkembangan rumah tangga yang berpidah pada wilayah metropolis Kaduna menunjukan tipe model Schelling. Hal ini menghasilkan segregasi permukiman dengan tipe yang sangat berbeda. Level segregasi ini menjadi subjek analisis multigroup analog, dan menghasilkan nilai indek sebesar 0.58. Indek ini menunjukan segregasi yang terjadi di kota tersebut adalah sedang hingga tinggi. Mobilitas penduduk, apabila dibandingkan dengan beberapak faktor lain menghasilkan ekspansi dari kota, memperkuat ikatan kekeluargaan, dan terutama menghasilkan pemilahan penduduk secara spasio-temporal. Penelitian ini merekomendasikan bahwa studi berkelanjutan dalam bidang mobilitas penduduk sangat diperlukan, terutama dalam memprediksi pola penggunaan lahan di masa mendatang yang sangat berperan dalam perkembangan wilayah perkotaan.

Kata kunci: mobilitas perumahan, urbanscape, rumah tangga, tipe perumahan, segregasi perumahan, Multigrup analog, pemilahan sosio-spasial, warga.

INTRODUCTION

The movement of households within an area is an increasingly important issue which has attracted renewed research interest over the years [*Ahmed*, 1995; *Pawson and Bramley*, 2000; *Oishi*, 2010]. Residential mobility is primarily a response to a change in housing needs [*Gobillon*, 2008]. Clearly, changes in neighborhoods arise mainly from shifts in the composition of the population and it is increasingly recognized that mobility rates may well have implications for the social stability of urban neighborhoods. This is because locally high rates of turnover are both a sympton, and a cause of social disorder, since housing supply is relatively inelastic in the short run [*van der Vlist et al.,* 2001; *Pawson and Bramley*, 2000]. *Eluru et. al.,* [2008] viewed residential mobility as a critical component of landuse dynamics; because landuse dynamics are driven by relocation decisions made by households and businesses. Models of landuse dynamics need to consider residential relocation or mobility behavior of households to be able to forecast future landuse patterns which are critical to activity and travel demand forecasting.

Kaduna metropolis is the capital of Kaduna State (Figure.1) of Nigeria. It is located between latitudes 10^{o} 22' 00'' - 10^{o} 40' 00'' N and longitudes 7^{0} 20' 00'' - 7^{0} 28' 00'' E [*Adewuyi*, 2008].

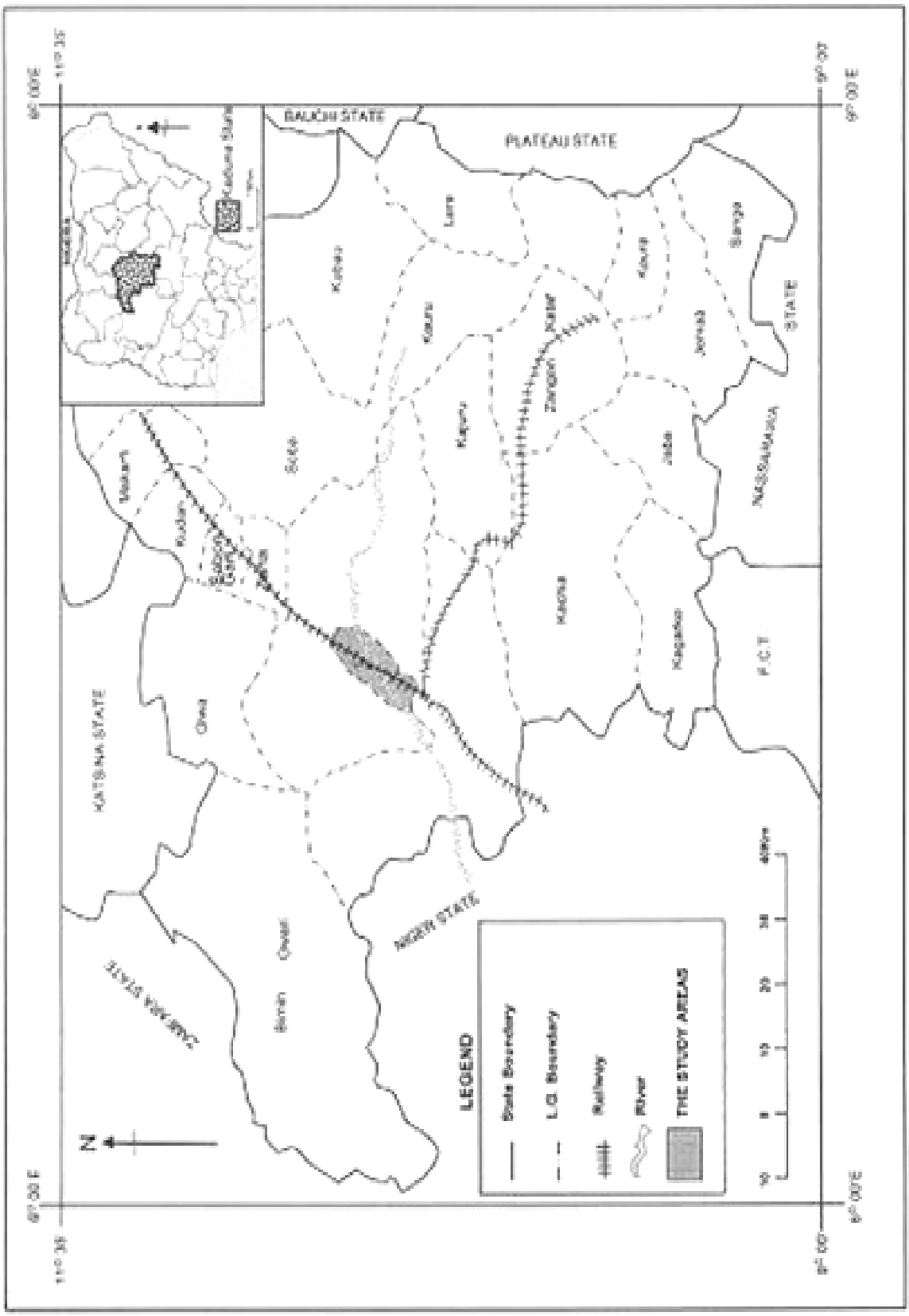

Figure 1. Kaduna Metropolis in Kaduna State
Source: Geo.Dept NDA Kaduna 2012

The metropolis occupies an area of about 260 km^2, and the distance between the eastern and western limits of the city is approximately 13.7km though this keep changing as development increases. It is made up of four Local Government Areas: Kaduna North, Kaduna South, Igabi and Chikun. Historically, Kaduna metropolis became prominent as a result of being the administrative capital of Northern Nigeria Protectorate from 1912 to 1917 and headquarters of North Central State from 1967 to 1975 (the North Central State was made up of Zaria and Katsina provinces). In 1975 the name changed from North Central State to Kaduna State but Kaduna metropolis remained the capital and maintained its sphere of influence. In 1987 Katsina State was created from Kaduna State and boundary adjustments were made. Kaduna metropolis attracted different types of individuals and groups from diverse socio-cultural backgrounds before, during and even after independence [*Ajibuah*, 2008].

Right from the period of colonial administration, Kaduna metropolis has recorded a steady growth in population from 10,653 in 1931, through 44,500 in 1952 to 149,910 in 1963 [*Kore*, 2000]. The census figures of 1991 put the population at 976,272 out of whom 518,180 (53%) were males and 458,092 (47%) were females [*Kaduna State of Nigeria*, 1991]. The 1991 census gave a growth rate of 3.2% per annum for Kaduna State, which is greater than the national growth rate of 2.8% per annum. Going by this projection, Kaduna would have registered a population of 1,073,035 in 1994, 1,179,378 in 1997, 1,295,623 in 2000 and 1,487,454 in 2005. The population density of the city has recorded a steady growth from 155 people per km^2 in 1931 to 1,077 people per km^2 in 1960, by 2000 it had recorded 4,148 people per km^2 and 4,540 people per km^2 in 2005 [*Adewuyi*, 2005; *Adewuyi*, 2008].

The population of Kaduna State is distributed over the high, medium and low density residential areas of the city. The low density residential areas are the Government Residential Areas (*GRAs*) of Malali in the northern part of the city and Barnawa in the southern part of the city. The medium density residential areas are the areas located not far from the city centre, while the high density residential areas are typical of the Ungwas, for example, Ungwan-Sarki, Ungwan-Kanawa, Ungwan Rimi, and Ungwan- Boro.

Kaduna is inhabited by various ethnic and religious groups. The low density and the medium density residential areas of the city are not dominated by any particular ethnic or religious group. However, some parts of the metropolis are dominated by certain ethnic and/or religious groups. For instance, Ungwan Boro, Ungwan Pama, Ungwan Makama, Ungwan Romi and Sabo areas of the metropolis are dominated by Christians and heterogeneous ethnic groups. On the contrary, Ungwan Rimi, Ungwan Sarki, Ungwan Muazu, Ungwan Kanawa, Tudunwada and Rigasa are dominated by Muslims and Hausa/Fulani ethnic groups.

THE METHODS

Data Types and Sources

The categories of data used for this study were basically two. The primary data via field survey were the key data to this research. Questionnaires were administerred in the field to derive data on socio-economic and cultural characteristics of the respondents such as age, sex, income, marital status, educational qualification, access to information, religion, ethnicity, migration history etc. The secondary data were obtained from documentary sources such as the National Population Commission (*NPC*) reports and Kaduna State Urban Planning and Development Authority (*KASUPDA*).

Reconnaissance Survey

Reconnaissance survey was first carried out in the study area. This was done to get acquainted with the various census tracts and the neighborhoods were the research would take place. During the reconnaissance survey, the boundary of the four Local Government Areas (*LGAs*) and the Wards within them were identified. In the Kaduna North *LGA*, nine Wards were identified, in the Kaduna South *LGA*, seven Wards were identified, in Chikun *LGA*, four Wards were identified, while in Igabi *LGA*, only one Ward was identified to be part of the study area.

Pilot Survey

A pilot survey was carried out at Janruwa (a census tract in the study area) to test the adequacy of the survey instruments for the research and to gain experience ahead of the main survey. During the survey, field assistants administered instruments for the study after intensive training on field work was conducted for them.

Sampling Technique

The National Population Commission (*NPC*) survey of locality and subsequent demarcation into Enumeration Areas (*EAs*) was used as the spatial frame for the household sampling. The sample size for the study was 0.3 percent of households. The sample size was used because the households' number in the metropolis was fairly large; hence, the sample size of 0.3 percent gave a very large number of households which when carefully selected across the metropolis was representative enough for the opinion of the respondents. The sample size consists of 1036 households out of the total household's number of 345,236. However, 1020 were returned which is 98 percent of the sample size. The data from the field were eventually subjected to analysis.

Stratified-systematic sampling technique was employed in selecting the respondents. This design was used in order to allow the respondents to be chosen only by chance so as to avoid any kind of bias and for a proper representation of the study area. This could not be divulged from the fact that the population of the study area is recorded along census tracts [*NPC*, 1991], thereby making each of the census tracts to stand as a stratum and due to the heterogeneous nature of the study space in terms of ethnicity and religion.

Data Collection

Research assistants (*RAs*) were engaged for data collection. Two supervisors were employed to co-ordinate as revolving field assistants. Fourteen RAs were used for the data gathering and these comprise of ten males and four females, all who were conversant with the local languages. The *RAs* were divided into two groups (seven in a group) with each group having two females. This structuring is essential because of the cultural space. The female *RAs* were made to enter into houses where entry is forbidden for men ("baa-shiga") to interview the respondents while their male counterparts wait for them outside the house. Each group is answerable to a supervisor who coordinates their activities on a daily basis. The data collection sheet was designed to include both structured and unstructured questions. Data collection lasted for two weeks.

RESULTS AND DISCUSSION

Expansion of the City

Residential mobility amongst other factors led to the expansion of Kaduna metropolis. *Knox* [1987] posits that the city begins to expand in spatial terms when families and households move from one part to settle in another. As this occurs, the city expands to its neighboring peri-urban areas. This process is true of Kaduna metropolis. The city began as a pure administrative and commercial centre but has now grown in size to embrace new areas such as Marabarido, Ungwa-Mejero, Rafinguza and Kamazou not covered by this study. Insufficient

accommodation in the areas people moved to, forced the movers to buy parcels of land and build their own houses. Furthermore, the ever-increasing demand for housing against the limited number of housing supply favors land-owners and house-owners. This has led to land and housing speculation in Kaduna metropolis to the detriment of tenants.

Strengthening of Family ties

Change of residence within the metropolis also resulted in the strengthening of family ties. As a family changes residence, it improves its networking with people that share the same faith and the same tribe. Most of the mover households are non-indigenes and as such they carefully move to areas inhabited by similar culture. *Afolayan* [1994] posits that movements within the city could be influenced by *social links and Hedman* [2012] explains that social ties are among the most important factors explaining destination choices of mover households. Social tie is a significant predictor of residential mobility within Kaduna metropolis.

Residential Segregation

The residential mobility in Kaduna metropolis resulted in residential segregation of the metropolis. Cultural issues are important in the conversations about the housing segregation phenomenon [*Clark*, 2009]. The issue of culture is better explained by agent-based model. One of the first agent – based models was Schelling's (1971, 1972, 1974, 1978, 2006) model of residential tipping which showed how the preferences of autonomous individuals about where to live give rise to (unanticipated) aggregate patterns of residential segregation. *Ajibuah* [2008] explains that ethno religious issues are social and historical phenomena. They are not just experiences of reality, which are personal and ultimate, but they have vision of reality and means of articulating those visions expressed in concepts. Ethno-religions are not only sources of identity but they are also ideological systems. Their visions incorporate identity frames which weaken private identity because of their emphasis on collectivism. Residential mobility within the metropolis eventually led to socio spatial sorting of the residents in the metropolis (Figure.1.2)

Socio-Spatial Sorting of the Residents

Figure. 2 shows that socially determined local residential preferences can result to socio-spatial sorting in the long run. The socio-political dimension of religious identity is enormous. For instance, *Komolafe* [2012] explains that religion and politics have been bedfellows throughout Nigeria's history. He noted that this symbiotic relationship has been the ground for conflicting ideological currents and the central factor that is shaping alignments and antagonisms. The most pervasive are those along the fault lines between Islam and Christianity, Nigeria's two major religions.

In Kaduna political arrangements are shaped in such a way that religion serves as the ideological preference for national identity much more than any configuration along cultural or historical lines. For instance, in the 2011 general elections, the Congress for Progressive Change (*CPC*) with a Muslim as presidential candidate won larger number of votes at Igabi Local Government Area (Muslim dominated area), while the Peoples Democratic Party (*PDP*) with a Christian as presidential candidate won larger number of votes at Chikun Local Government Area (Christian dominated area) of the metropolis.

Multigroup Analog

Multigroup analog was used to describe the differential distribution of the religious groups across the neighborhoods in the metropolis (Table 1). The multi-group dissimilarity index or multi-group analog describes the extent to which two or more population groups are similarly distributed among sub areas [*Reardon and Firebaugh*, 2002]. The most common conceptual-

lization of residential segregation is based on the dimension of evenness which refers to the differential distribution of the subject population, across neighborhoods in a metropolitan area. It ranges from 0 (complete integration) to 1 (complete segregation). Multigroup dissimilarity indices are ordered for universal interpretation. Basically, the index value below 30 is considered low, index between 30 and 60 is taken to be moderate while the index above 60 is high.

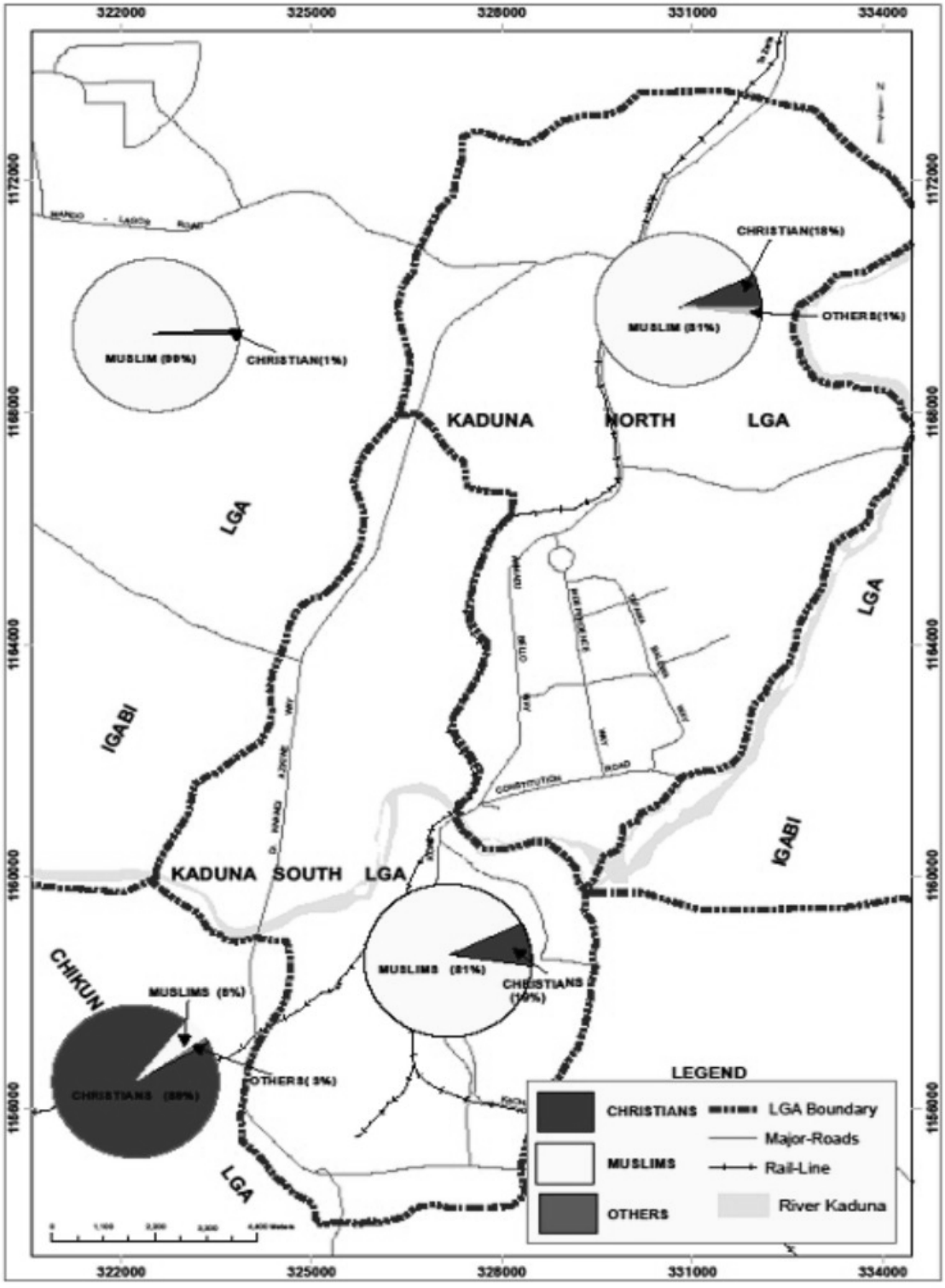

Figure 2. Located Comprable Circles Showing Religion of Households across the Metropolis

Table 1. Multigroup Dissimilarity of Households in Kaduna Metropolis

S/N	WARD	t_j	I	2TI	RELIGION	π_{jm}	π_m	$\pi_{jm} - \pi_m$	t_j	$\pi_{jm} - \pi_m$ 2TI
1.	CW3	63	0.448371	914.677	1.Christianity	0.904	0.322	0.582		0.040
					2. Islam	0.048	0.670	0.622		0.043
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.048	0.006	0.042		0.003
2.	CW7	64	0.448371	914.677	1.Christianity	0.797	0.322	0.475		0.033
					2. Islam	0.203	0.670	0.467		0.033
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
3.	CW8	25	0.448371	914.677	1.Christianity	0.920	0.322	0.598		0.016
					2. Islam	0.040	0.670	0.630		0.017
					3. Traditional	0.040	0.003	0.037		0.001
					4. Others	0.000	0.006	0.006		0.000
4.	CW9	28	0.448371	914.677	1.Christianity	0.928	0.322	0.606		0.019
					2. Islam	0.036	0.670	0.634		0.019
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.036	0.006	0.030		0.001
5.	IW7	92	0.448371	914.677	1.Christianity	0.011	0.322	0.311		0.031
					2. Islam	0.989	0.670	0.319		0.032
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.001
6.	KDNW1	57	0.448371	914.677	1.Christianity	0.281	0.322	0.041		0.003
					2. Islam	0.701	0.670	0.031		0.002
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.018	0.006	0.012		0.001
7.	KDNW10	45	0.448371	914.677	1.Christianity	0.356	0.322	0.034		0.002
					2. Islam	0.622	0.670	0.048		0.002
					3. Traditional	0.022	0.003	0.019		0.001
					4. Others	0.000	0.006	0.006		0.000
8.	KDNW11	21	0.448371	914.677	1.Christianity	0.060	0.322	0.262		0.014
					2. Islam	0.920	0.670	0.250		0.014
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.020	0.006	0.014		0.001
9.	KDNW12	50	0.448371	914.677	1.Christianity	0.500	0.322	0.178		0.007
					2. Islam	0.500	0.670	0.170		0.007
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
10.	KDNW5	38	0.448371	914.677	1.Christianity	0.109	0.322	0.213		0.013
					2. Islam	0.873	0.670	0.203		0.012
					3. Traditional	0.018	0.003	0.015		0.001
					4. Others	0.000	0.006	0.006		0.000
11.	KDNW6	55	0.448371	914.677	1.Christianity	0.143	0.322	0.179		0.001
					2 Islam	0.857	0.670	0.187		0.001
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
12.	KDNW7	7	0.448371	914.677	1.Christianity	0.364	0.322	0.042		0.002
					2. Islam	0.636	0.670	0.034		0.001
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
13	KDNW8	33	0.448371	914.677	1.Christianity	0.069	0.322	0.253		0.016
					2. Islam	0.931	0.670	0.261		0.017
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
14	KDNW9	58	0.448371	914.677	1.Christianity	0.069	0.322	0.253		0.016
					2. Islam	0.931	0.670	0.261		0.017
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
15	KDSW10	25	0.448371	914.677	1.Christianity	0.040	0.322	0.282		0.008
					2. Islam	0.960	0.670	0.290		0.008
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
16	KDSW11	39	0.448371	914.677	1.Christianity	0.282	0.322	0.040		0.002
					2. Islam	0.718	0.670	0.048		0.002
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000
17	KDSW12	59	0.448371	914.677	1.Christianity	0.136	0.322	0.186		0.012
					2. Islam	0.864	0.670	0.194		0.013
					3. Traditional	0.000	0.003	0.003		0.000
					4. Others	0.000	0.006	0.006		0.000

18.	KDSW2	117	0.448371	914.677	1.Christianity	0.496	0.322	0.174	0.022
					2. Islam	0.504	0.670	0.166	0.021
					3. Traditional	0.000	0.003	0.003	0.000
					4. Others	0.000	0.006	0.006	0.001
19.	KDSW5	63	0.448371	914.677	1.Christianity	0.000	0.322	0.322	0.022
					2. Islam	1.000	0.670	0.330	0.023
					3. Traditional	0.000	0.003	0.003	0.000
					4. Others	0.000	0.006	0.006	0.000
20.	KDSW8	39	0.448371	914.677	1.Christianity	0.282	0.322	0.040	0.002
					2. Islam	0.718	0.670	0.048	0.002
					3. Traditional	0.000	0.003	0.003	0.000
					4. Others	0.000	0.006	0.006	0.000
21.	KDSW9	42	0.448371	914.677	1.Christianity	0.071	0.322	0.251	0.012
					2. Islam	0.929	0.670	0.259	0.012
					3. Traditional	0.000	0.003	0.003	0.000
					4. Others	0.000	0.006	0.006	0.000

Source: Households Survey, 2011

Eva [2008] studied residential segregation of S[t] Paul's West Side and found that the residential segregation there was influenced by ethnicity. *Parisi and Lichter* [2012] used secondary data and found that both in 1990 and 2000; the segregation index for "Hispanic segregation in America's New Rural Boomtowns" was roughly 50 which is moderately high by conventional standard. The segregation Index of 0.58 for Kaduna metropolis is similar to the Index of 0.50 for "Hispanic Segregation in America's New Rural Boomtowns". Hence, the segregation index of 0.58 for Kaduna metropolis is moderately high.

RECOMMENDATIONS

The findings of this research have shown that the pattern of movement of the households depicts the Schelling's model of residential tipping. The residents of Kaduna metropolis are given to religious bigotry which in turn influences the destination of movers. This is a bad trend for future urban development as it widens differences between neighbourhoods. Some neighbourhoods within the metropolis experiences rapid transformation while other neighborurhoods have degenerated from their original status. This negates public policies for housing at attempt to promote integration among people. The magnitude of the residential mobility was fairly high as about 46 percent of the respondents were known to have changed residence within the metropolis. This resulted in traffic hold-ups in some of the neighbourhoods, hence, increase work-travel-time on daily basis. The residential sorting in Kaduna metropolis also influence residential property values as variations in the values of the available properties in different neighbourhoods is very glaring. This in turn affects land and landed property investment in the metropolis, whereby some neighbourhoods are experiencing rapid investment and transformation when compared to others. However, there is land speculation in the neighbourhoods experiencing rapid investment.

Public policies at attempt to promote equal development of the metropolis may have to address the improvement of infrastructural facilities in the degenerated and less favoured neighbourhoods so as to encourage people to live there. There must also be additional incentives such as tax rebate on the properties in the less favourable neighbourhoods. Government should make adequate Mass Transit Buses (*MTB*) available and improve on road network of the various neighbourhoods in the metropolis so as to reduce the work-travel-time of the residents. Government should also establish low cost housing schemes in descent socioeconomic neighbourhoods to mitigate

massive outflow of people from such neighbourhoods.

CONCLUSION

Residential mobility is a process which has significant effect on urbanscape. Its effect is highly noticeable in Kaduna metropolis. The residential mobility in the metropolis can better be explained by agent-based model of residential tipping which showed how the preferences of autonomous individuals about where to live give rise to residential sorting. Religion is a major factor of cultural divide in the metropolis. Christians prefer to live in the Christians dominated neighbourhoods and Muslims in the Muslims dominated neighbourhoods. This led to socio spatial sorting of residences in the metropolis with its attendant effects. Knowledge of these effects would be useful in the forecast of future landuse patterns in the metropolis.

ACKNOWLEDGEMENT

This paper is part of my PhD research. Thanks due to my supervisor, Prof. Stanley, I. Okafor of Dept. of Geography, University of Ibadan, Mr. Bernard Helda of GIS Lab, Dept. of Geography, Nigerian Defence Academy, Kaduna and anonymous reviewers for their contributions.

REFERENCES

Adewuyi, T.O. (2005). Analysis of Changes in Landuse and Landcover of some Parts of Kaduna Metropolis, *BEST, 2* (1), 9-14.

Adewuyi, T.O. (2008). Land Degradation in the Peri-Urban Area of Kaduna Metropolis, Nigeria, *Unpublished Ph.D. Thesis*, Department of Geography, Bayero University, Kano.

Afolayan, A.A. (1994). Migration, Social links and Residential Mobility in the Ibadan Region: A case study of Ojoo and of Sasa Residents, in Filani, M.O., Akintola, F.O. and Ikporukpo, C.O. (eds.) *Ibadan Region*. Rex Charles Publication, 136-144, Ibadan

Ahmed, M. (1995). Pattern of Residential Mobility in Bahawalpur City, *Unpublished PhD Thesis*, Department of Geography, Islamia University, Bahawalpur, 1-202.

Ajibuah, B.J. (2008). Ethno-Religious Conflicts and Residential Segregation in Kaduna Metropolis, *Unpublished PhD Thesis*, Dept. of Geography, Faculty of Social and Management Sciences, Bayero University, Kano, 10-50, Kano.

Clark, W.A.V. (2009). Changing Residential Preferences across Income, Education, and Age: Findings from the Multi-City Study of Urban Inequality, *Urban Affairs Review*, 44 (3), 334 – 355.

Eluru, N., Sener, I.N., Bhat, C.R., Pendyala, R.M., and Axhausen, K.W. (2008). *Understanding Residential Mobility: A joint model of the reason for residential relocation and stay duration*, 1-26 http://-www.ce.utexas.edu/prof/bhat/-ABSTRACTS/ResidentialMobility_1Aug2008.pdf.

Eva, D. (2008). *Residential Segregation of Immigrants: A case study of the Mexican Population on S^{t} Paul's West Side*. Center for Urban and Regional Affairs (CURA), University of Minnesota, Minneapolis, 38 (1), 3 – 11.

Gobillon, L. (2008). *Une Synthese de la Litterature sur la consommation de Logement des Menages*. Working Paper.

Hedman, L. (2012).Moving Near Family? The Influence of Extended Family on Neighbourhood Choice in an Intra-urban Context, *Population, Space and Place*, January 31, doi: 10.1002/psp.1703.

Knox, P. (1987). *Urban Social Geography, An Introduction*, 2nd ed. Longman Group, Harlow.

Komolafe, S. (2012). Politicization of religion and the origins of fundamentalisms in Nigeria (Part 1 of 3), *Nigeriaworld News*, 12, 1 – 7.

Kore, W.M.J. (2000). Causes and Control of Road Accidents in the Kaduna Metropolis, *Unpublished B.Sc. Dissertation*. Department of Geography, NDA, Kaduna, 7 National Population Commission (NPC: 1991).

Oishi, S. (2010). The Psychology of Residential Mobility: Implications for the Self, Social Relationships, and Well-Being, *Perspectives on Psychological Science*, 5 (1), 5-21.

Parisi, D., and Lichter, D.T. (2012). *Hispanic Segregation in America's New Rural Boomtowns*. Population Reference Bureau.

Pawson, H., and Bramley, G. (2000). Understanding Recent Trends in Residential Mobility in Council Housing in England, *Urban Studies*, 37 (8), 1231 – 1259.

Reardon, S.F., and Firebaugh, G.(2002). Measures of multi-group segregation, *Sociology Methodology*, 32, 33-7.

Schelling, T. (1971). Dynamic models of segregation, *Journal of Mathematical Sociology*, 1, 143 – 186.

Schelling, T. (1972). A process of Residenti- al Segregation: Neighborhood Tipping, in Pascal, A. (ed.) *Racial Discrimination in Economic Life,* Lexington, MA: D.C. Heath, 157 – 184.

Schelling, T. (1974). on the ecology of micro-motives, In R. Marris (ed.), *The Corporate Society*, Macmillan, 19-55, London.

Schelling, T. (1978). *Micromotives and Macrobehaviour*, Norton and Co., New York.

Schelling, T. (2006). Some fun, thirty-five years ago, *Handbook of Computational Economics*, 2: 1639 – 1644.

van der Vlist, A.J., Gorter, C., Nijkamp, P., and Rietveld, P. (2001). Residential Mobility and Local Housing Market Differences, *Discussion Paper*. Tinbergen Institute 1-8, Amsterdam.