International Journal of Sustainable Land Use and Urban Planning
ISSN 1927-8845 | Vol. 1 No. 1, pp. 1-20 (2013)

SCIENCE TARGET
www.sciencetarget.com

Assessment of Quality of Life Using Geographical Information System Approach for Poverty Alleviation Decision-Making

Olajuyigbe, A.E[1*], Osakpolor, S[2] and Adegboyega, S.A[3]

[1]Department of Urban and Regional Planning, Federal University of Technology, Akure, Nigeria

[2]Department of Remote Sensing and GIS,

Regional Centre for Training in Aerospace Surveys Ile-Ife, Nigeria

[3]Department of GIS and Remote Sensing, Federal University of Technology, Akure, Nigeria

Abstract

The effectiveness of the mapping and assessment of Quality of Life (QoL) in the identification of problem areas and in monitoring development policies makes it a suitable method in poverty studies. In an attempt to enhance QoL as a strategy for poverty alleviation decision-making, this research has adopted the analytical tool of Geographical Information System (GIS). Twelve indicators were used to assess the QoL of Egor Local Government Area (LGA), Edo State, Nigeria. These indicators were grouped into three different domains of life (social, economic and physical). Spatial autocorrelation check was performed on the indicators to determine the spatial prediction method that was used to map each indicator. Of all these indicators, only two were spatially auto-correlated. The two indicators were mapped using the Inverse Distance Weighting (IDW). The other indicators were mapped using the voronoi polygons. The twelve models were used to model and assess QoL with the utilization of Multi-Criteria Decision Analysis. The weights used for the combination of the various mapped indicators were given by the respondents. The QoL model was cross-validated using leave-one-out (LOO) cross-validation method. The result showed that the QoL of 61.53% of the geographic space of Egor LGA was below average, 17.94% was extremely poor, and 14.55% was average, while the classes above average and excellent were not on the QoL model. In addition, the research identified priority development areas and concluded that the QoL of the people of Egor LGA was poor and required urgent conscious intervention by all development partners including the government.

Keywords: *Quality of Life, Poverty Alleviation, GIS, Multi-Criteria Decision Analysis, Inverse Distance Weighting*

1. Introduction

The application of the concept of Quality of life (QoL) is fast becoming world-wide. However, the concept tends to be multifaceted and loosely-defined. Studies have revealed that no universal framework for assessing and describing QoL and human well-being currently exists (Leidelmijer et al. 2002). This is attributed to the fact that QoL is a broad term which encompasses notions of good life, a valued life, a satisfying life and a happy life. QoL has been studied in geography, criminology, urban planning, and sociology as a multidisciplinary subject (Michalos and Zumbo 2000). In a simple term, the quality of life of a person is what he/she perceives it to be (Zaid and Popoola, 2010).

* Corresponding author: olajuyigbe03@yahoo.com

Specifically, QoL is defined as individuals' overall satisfaction with life. The study adopts the latter definition as the working definition for this research.

The relevance of this concept in the modern day urban and regional planning context cannot be over emphasized. To a large extent, the concept assists in diagnosing previous policy strategies and drafting new planning policies (Lee, 2008). In addition, the outcomes of QoL also facilitate a good understanding of community problems and issues. The concept embodies new ideas about the state of the environment, housing, people's state of happiness, work, marital satisfaction and the total well-being of the population. Most research efforts have been directed towards the analysis of the various indices related to the objective assessment of the concept. However, QoL is often measured using either subjective or objective indicators. Subjective indicators are derived from surveys of resident's perception, evaluation and satisfaction with life. Objective indicators, on the other hand, relate to observable facts that are derived from secondary data. This study dwells much more on subjective indicators to have a direct assessment of the QoL in the study area given the fact that subjective indicators have lower data reliability and higher validity (Foo, 2000).

QoL studies have received an increasing research attention. The studies also vary in the scale of interest since some are applied at country level, some are at the city level; and very few are at local level. The reason for large scale QoL studies is to enable international comparison and this trade-offs details for predictability (Costanza and Maxwell, 1994). A study of this nature recently placed Nigeria at 156 out of 187 countries on QoL Index (United Nations, 2010). The inability of such studies to disaggregate their results to smaller units such as Local Government Areas (LGAs) and cities denigrate their importance for planning purpose. Furthermore, most theories and empirical studies of QoL originated from western society (Tesfazghi, 2009). Such studies might not take into consideration the peculiarity of the problems of developing societies. Thus, the application of such QoL studies for the development of developing societies may be misleading. Also, QoL studies for communities in Nigeria are noticeably rare. In view of the foregoing, this study attempts, using subjective indicators, to assess and map QoL of communities in Egor L.G.A., Edo State, Nigeria with a view to providing models that can serve as decision support systems for poverty alleviation in the country.

2. Materials and Methods

2.1. Study Area

The study area is Egor LGA. It is one of the LGAs that make up Benin City which is the administrative capital of Edo State, Nigeria. Egor LGA has an area extent of 93 km² with a population of 339,899 (2006 census). The headquarters of Egor LGA is Uselu. Edo State lies approximately between Latitude $05^{o}44^{'}$.N and $07^{o}34^{'}$.N of the Equator and between Longitude $06^{0}\ 04^{'}$.E and $06^{o}43^{'}$.E (Fig. 1). It is situated 320 km by road, east of Lagos. Benin is the centre of Nigeria's rubber industry. However, oil palm processing is also an important traditional industry.

There is a prevailing high level of poverty in this LGA as evidenced by dearth of essential facilities such as water, sanitation and health among others. Most dwellers are farmers and petty traders whose incomes are rarely sufficient for their upkeep. Generally, the people of Egor LGA rely on the government to improve their QoL, as the government is in possession of their common wealth. Unfortunately, governments have failed in terms of delivery of development to the people of this LGA. It is appropriate to therefore attempt to measure the QoL in this LGA with the intention of suggesting various measures that can assist in alleviating the seemingly prevailing intractable high poverty level.

2.2. Conceptual Framework

This study relies on (Pearl, 2011) model of Quality of Life as depicted in Fig. 2. The model relies essentially on the use of subjective approach that makes use of perception parameters for the measurement of quality of life. These perceptions are assumed to show people's QoL assessment based on their experiences. Evaluated indicators are subsequently grouped into three main domains, the physical, social, and economic, which constitute the subjective QoL.

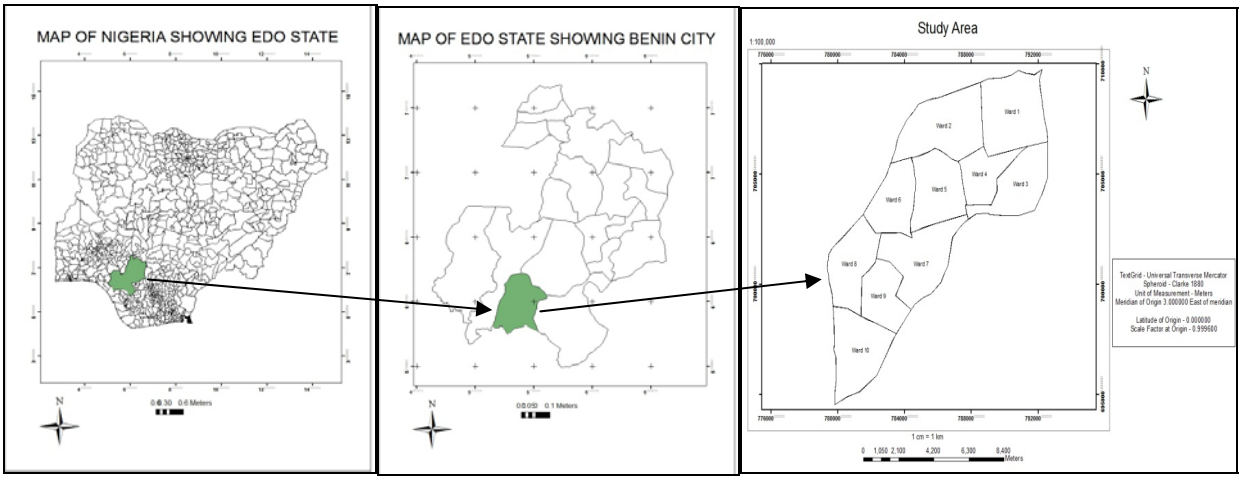


Figure 1: The Study Area

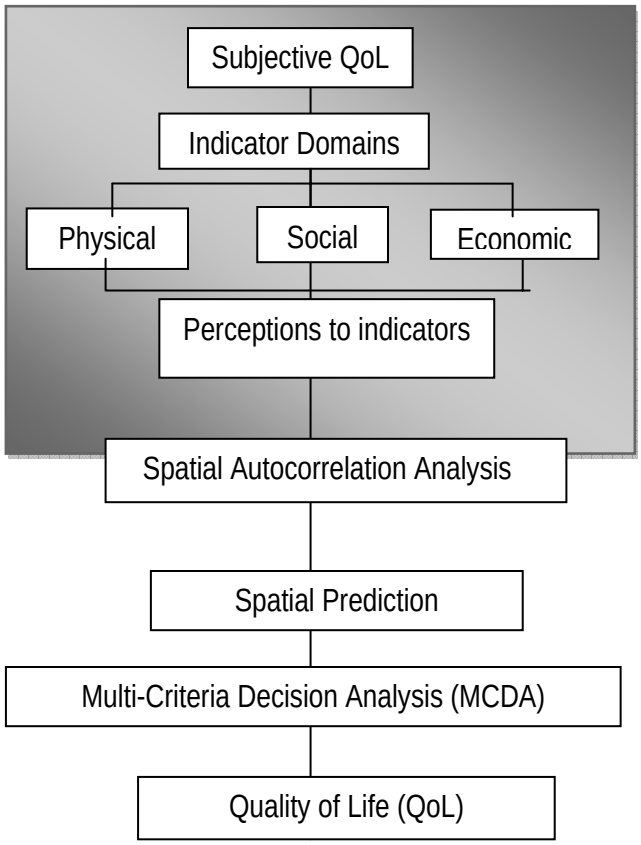


Figure 2: Pearl (2011) Model of Quality of Life

However, several other scholars have combined both subjective and objective approaches or use either for such measurement.

The model is further supported by Lee (2008) who emphasizes that QoL must be subjective and that the most appropriate method of exploring QoL is by directly asking peoples perception of their life. Subjective QoL is measured using perceptions of respondents towards specified indicators. Lee (2008) also affirmed that the conceptual model can support the voice of the society to be heard by policy makers and planners by providing useful information. He, however, warned that the QoL in

any geographic setting (i.e. cities, neighbourhoods, etc.) cannot be analyzed with single attribute instead multiple attributes must be used to measure quality of life. Campbell *et al.* (1976) on the other hand argued that both objective and subjective measures are necessary for QoL assessment. However, a critical look at their work indicates that these authors mainly dealt with subjective measures.

Malkina-Pykh and Pykh (2007) proposed a conceptual model that is based on a concept of Pressure-State-Impact-Response. Pressure shows the external factors that affect resident's QoL that can be measured using objective indicators. Health service and built environment are examples of pressure. State shows individuals' response that can be measured also using objective indicators. Education level and personal health are examples of state. The impact is the result of the pressure and the state and it is the overall life satisfaction (quality of life) that can be measured by subjective indicators. Examples of impact include satisfaction level of individuals with health service and built environment. The response shows socio-economic programmes that are developed to improve the individuals' development.

Costanza *et al.* (2007) however, define QoL with the integration of both objective and subjective measures. They explained that human needs will not be met unless opportunities (built, human, social, and natural capital and time), which stand for the objective measures, are provided through implemented policies of the government. With the human needs achieved, the subjective well-being measured in terms of happiness, utility, and welfare, will be greater.

2.3. Research Methods

With the aim of assessing and mapping of QoL in the study area using GIS approach, this section is divided into three part namely: input data comprising data collection and preparation for analysis, spatial prediction that involves modelling leading to the generation of interpolated maps, and weighted sum which explains the procedures that create the overall QoL map of Egor LGA (Fig. 3).

2.3.1. Input Data and Instrument of Data Collection

From the literature and local experience, the essential indicators for QoL assessment were identified and selected from three main domains, namely physical, social and economic. The three domains altogether comprised of 12 sub-indicators used in assessing the QoL of Egor LGA (Table 1).

Table 1

Indicators for Assessment of Quality of Life

Domains	Indicators	Definition of indicators
Physical	Street cleanliness	The hygiene or sanitation in the streets
	Nature of roads	The sufficiency of parking lots, tarred, untarred.
	Green Space	The availability of green spaces (defined as an urban open space for green spaces)
Social	Security	Safety at home & streets
	Governance	Deliverance of dividends of democracy
	Health care	Satisfaction level with heath care services
	Public transport facilities	Satisfaction level with public transport facilities
	Waste management	Satisfaction level with recycling bin
	Neighbourhood interactions	The interactions and/or communications within the neighbourhood.
	Power and water provision	Satisfaction level of power and water supply
Economic	Level of education	The general educational attainment of the residents
	Income	Satisfaction level with income
	Housing quality	The physical condition of houses

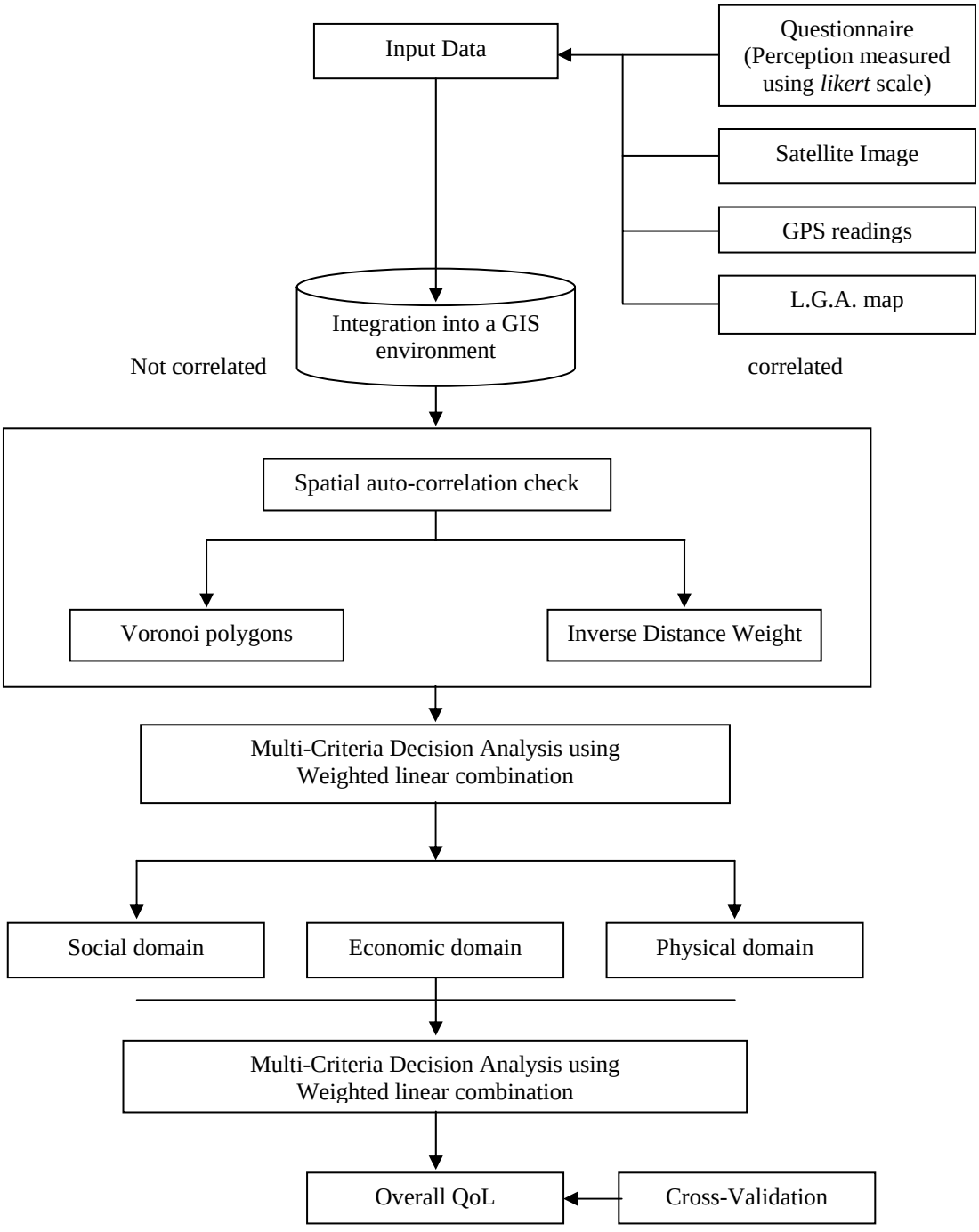


Figure 3: Work Flowchart Diagram

The study utilized structured questionnaire to obtain information on the above tabulated indicators. The questions were constructed on a five-point *Likert* scale (Tesfazghi, 2009) to measure their QoL assessment from extremely poor to excellent. The column of scale of priority is added to determine the relative importance of all the indicators in each domain (physical, social and economic) and for each domain itself. This provided the weightings used in mapping the overall QoL in Egor L.G.A. Personal information was asked at the beginning of survey for descriptive purposes. This process is summarised in Fig. 4.

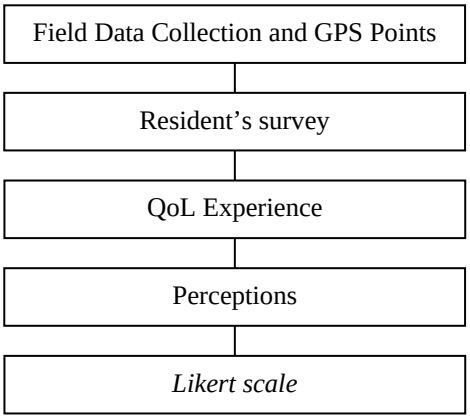


Figure 4: Field Data Collection and Preparation

The sampling frame of the study was the households of the LGA. Given the population of the LGA at 339,899 (NPC, 2006), the study estimated the LGA's total households at 48,557 using national average family size of seven people (Olajuyigbe and Fasakin, 2010). Thus, 2.5% of the total households in the LGA were sampled. This gives a sample size of 1,214. This is considered adequate in view of the homogenous nature of the population. To ensure adequate representation of the entire population, stratified systematic and purposive sampling techniques were used in the administering of the questionnaire. Firstly, the Egor LGA consisted of ten wards, and ten major streets were picked from the different wards. A pool was made up of the ten wards, from which five streets were randomly selected. Questionnaire was then administered in the various randomly selected five streets of each ward; an average of 5 copies of questionnaire was administered per street. On each street, a die of 1 and 2 was cast to determine the first house visited, and this was added to 2 to determine the next house visited and it followed in that systematic order. This method was adapted from (Olayiwola and Adeleye, 2006) as shown in the equation below:

$$Y = R + 2$$

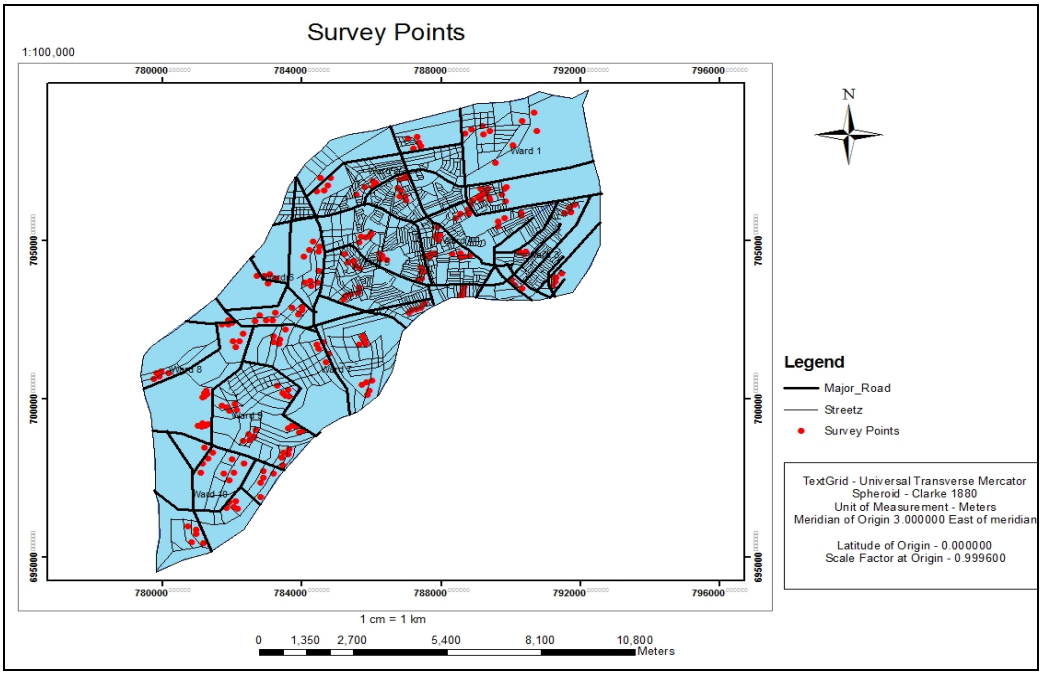


Figure 5: Survey Points in the Study Area

Global Positioning System readings was taken for all the houses sampled as this served as the survey points to which field measurement was stored in the GIS environment. The coordinates of the survey points were used to georeference the administrative map of the study area acquired for this study (Fig. 5).

2.3.2. Spatial Prediction and Modelling of QoL Procedures

The data collected during the fieldwork were entered into the computer. The GPS survey points (locations of respondents' residences) were used to input and store the responses for each respondent. These responses were represented in the spatial attribute tables in ArcGIS 9.3 Version. The weightings (scale of priority) acquired also in the survey were normalized to make a common scale for each indicator and domain of QoL. All the weightings were given subsequently. Based on the model adopted for the research, spatial auto-correlation check was performed on the prepared datasets using the Moran's I test, this was necessary in order to determine the method used in the mapping of the indicators. Hence, the indicators with positive correlation were mapped using the inverse distance weighting method. Also, the other indicators that had negative correlation were mapped using voronoi polygons. This was done for each of the domains under consideration. Hence, three maps corresponding to the three main domains; physical, economic and social indicators were produced. These maps were integrated to generate the composite map of QoL for the study area using the normalized weights (Fig. 6) as given by the respondents in all the wards. The twelve indicators as shown in Table 1 were used to model and assess QoL with the utilization of Multi-Criteria Decision Analysis. The weights used for the combination of the various mapped indicators were given by the respondents. The QoL model was cross-validated using leave-one-out (LOO) cross-validation method (Fig. 7). The cross validation was carried out recalling that the composite map of QoL was produced from 1,214 points. The quality of the overall QoL map was checked by removing 1 of the 1,214 points and running the prediction. The z-value at the removed point was recorded as the predicted value, while the value recorded from the field was the observed value. This procedure was repeated for every other point. The difference between the predicted and observed value gives the error value. This is shown in the equation below (Tesfazghi 2009):

$$P_{error} = P_{predicted} - P_{observed}$$

Where, P_{error} = Error of prediction at point P

The GIS technology used for this research was ArcGIS 9.3 version.

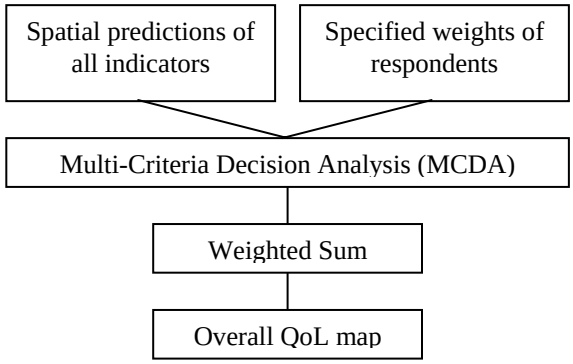


Figure 6: Weighted Sum Framework

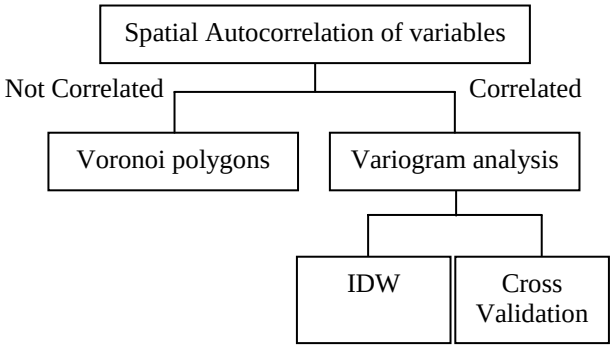


Figure 7: Procedures for Spatial Prediction models adapted from (Hengl, 2009)

3. Results and Discussion

3.1. Socio-economic Characteristics of the Respondents

The results of socio-economic characteristic analysis of the respondents as shown in Table 2 showed the gender sensitivity of the study in which 62.1% of the respondents were females while the male counterparts were 37.9%. It is a reflection of the fact that female population in Nigeria outnumbered male population (NPC, 2007). Table 2 revealed that most of the respondents were within the 41-50 years age group (30.9%). Significant proportions of the female respondents

were also in the 31-40 years (26.7%), 21-30 years (18.1%) and greater than 50 years (14.8%) age groups. The table also showed that 64.6% of the respondents were gainfully employed against 35.4 % respondents found to be unemployed. Significant proportions of the respondents attended vocational school (29.6%). Illiterate respondents constituted 13.6% while 23.9% of the respondents were university graduates. The foregoing socio-economic features of the respondents to a large extent provided insights to the quality of life of the respondents, which the study is investigating.

3.2. Determination of Spatial Prediction Method

Based on the model adopted for this study, Moran's I test was conducted on the indicators in order to determine the spatial prediction method applied. Table 3 showed the Moran's I results for the 12 indicators. The rows in red indicated the variables that met the 0.05 significance level set for spatial autocorrelation.

These indicators are the variables nature of roads with 0.005651, and security with 0.234164 p-values. These two spatially auto-correlated variables were interpolated using IDW (Figs. 8 and 9). The perception of nature of road was average while that of security was generally unsatisfactory.

The spatially not correlated indicators such as health care centre accessibility, recycling bin accessibility, neighbourhood interactions, level of education, income, housing quality and public transport were interpolated using the Voronoi polygon (Figs. 10, 11, 12, 13,14, 15, 16 and 17). As shown in these figures perception of health care was generally average, housing quality and income were disturbing, but in case of the latter, an overlay of the monthly income of the residents and their satisfaction level to the income at a large scale of 1:20,000 shows that satisfaction, which is crucial in assessing QoL, does not always have positive correlation with how much one earns. Some residents who earn N100,000 – N199,999 assessed their income as extremely poor, while some residents who earn <N20,000 assessed their income as above average.

Table 2
Socio-economic Characteristics of the Respondents

Description	Category	Number	Percentage (%)
Sex	Male	460	37.9
	Female	754	62.1
Age	<20	115	9.5
	21-30	220	18.1
	31-40	324	26.7
	41-50	375	30.9
	>50	180	14.8
Employment Status	Employed	784	64.6
	Unemployed	430	35.4
Education Level	Illiterate	165	13.6
	Primary School	175	14.4
	Secondary School	225	18.5
	Vocational School	359	29.6
	University Graduate	290	23.9
Monthly Income	<N20,000	310	25.5
	N20,000 – N49,999	454	37.4
	N50,000 – N99,999	282	23.2
	N100,000 – N200,000	149	12.3
	>N200,000	19	1.6

Source: Author's Fieldwork, 2012

Table 3
Result of Moran's I Test

Subjective Indicator	Moran's I test	p-Value
Street cleanliness	0.026587	0.023121
Nature of roads	0.309053	0.001651
Power and water provision	0.036854	0.036542
Governance	0.055241	0.196354
Security	0.234164	0.002270
Health care	0.032548	0.127865
Waste bin management	0.102546	0.256354
Neighbourhood interactions	0.045632	0.161423
Level of education	0.052364	0.183625
Income	0.103652	0.262541
Housing quality	0.102364	0.205342
Public Transport	0.103523	0.245423

Source: Author's Data Analysis, 2012

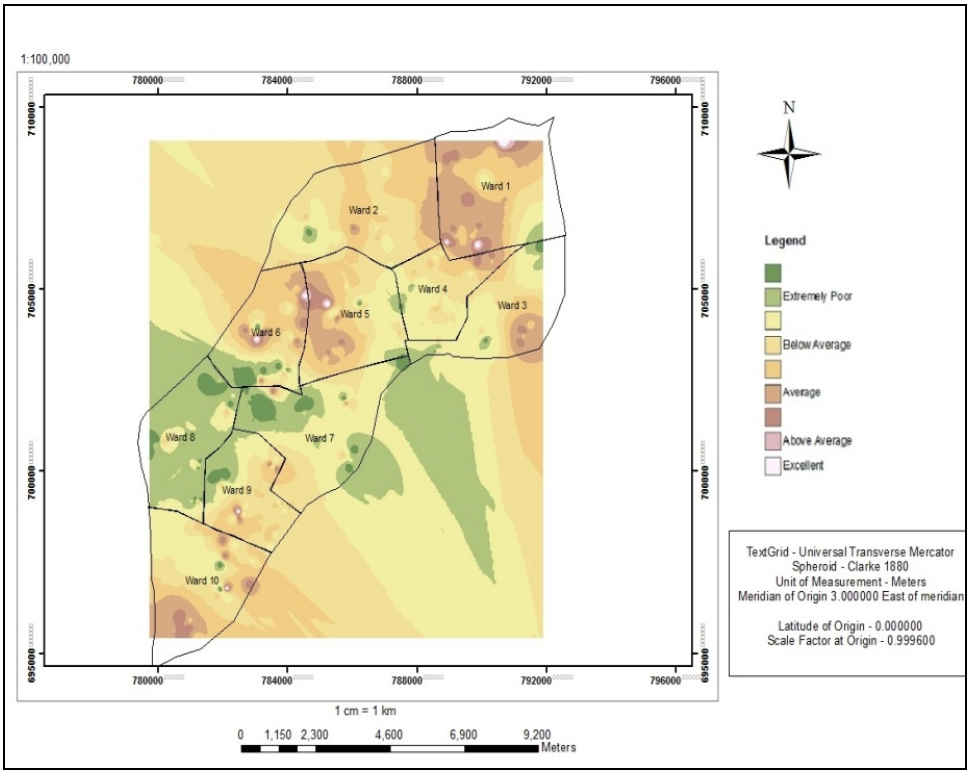


Figure 8: Perception of Nature of Road

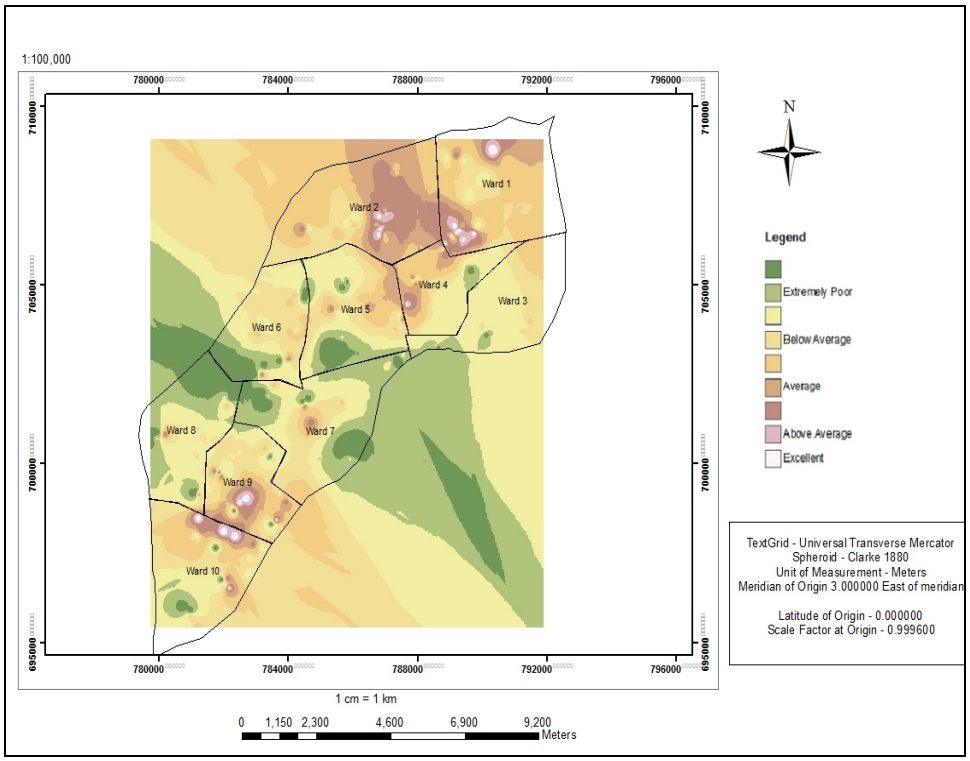


Figure 9: Perception of Security

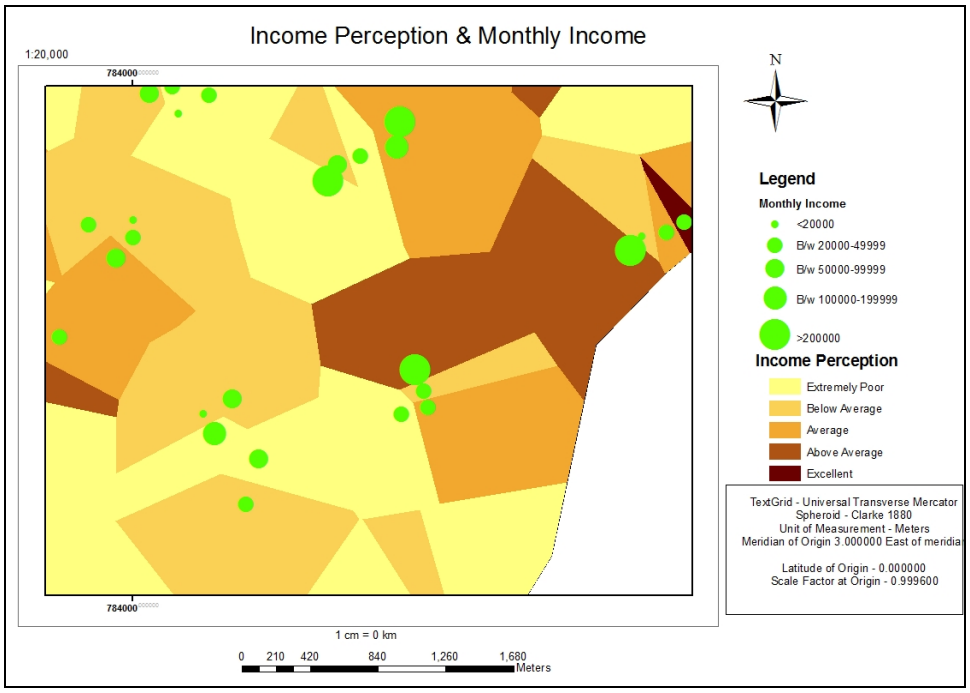


Figure 10: Perception to income and monthly income

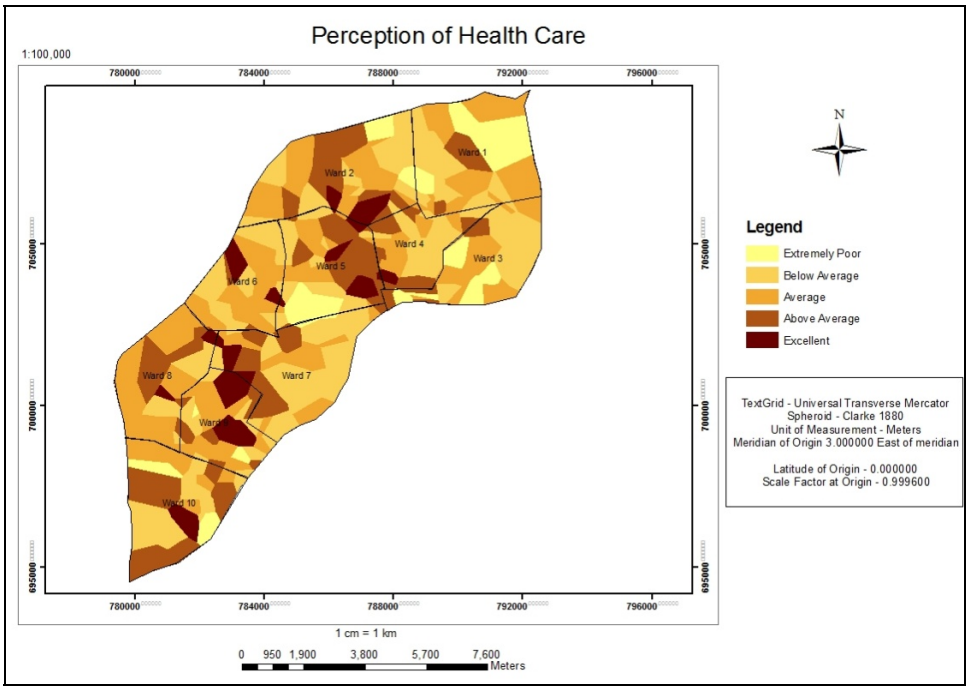


Figure 11: Perception of Health Care

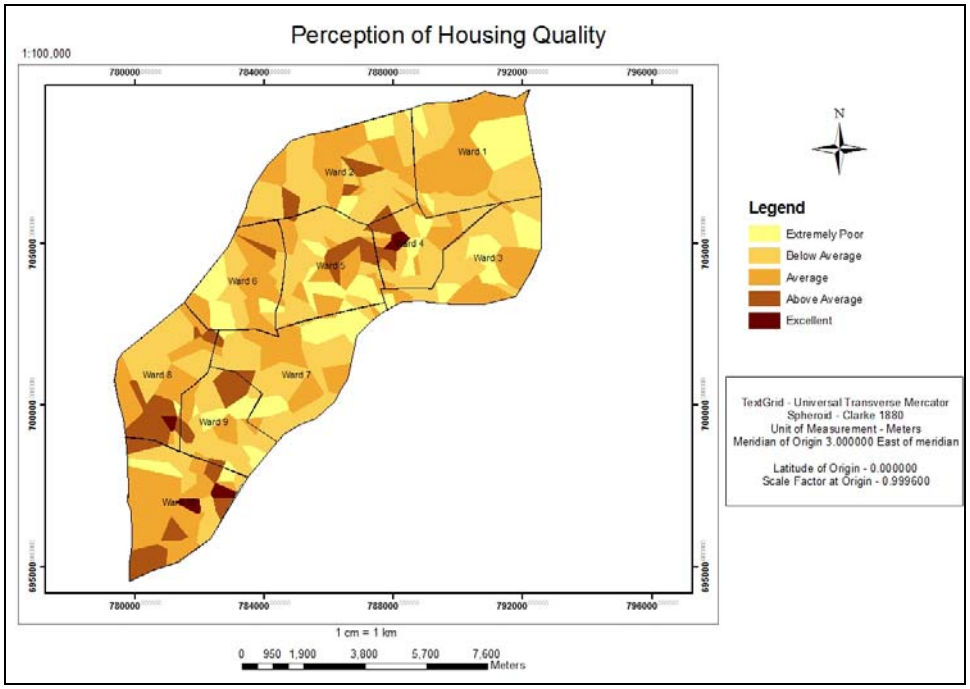


Figure 12: Perception of Housing Quality

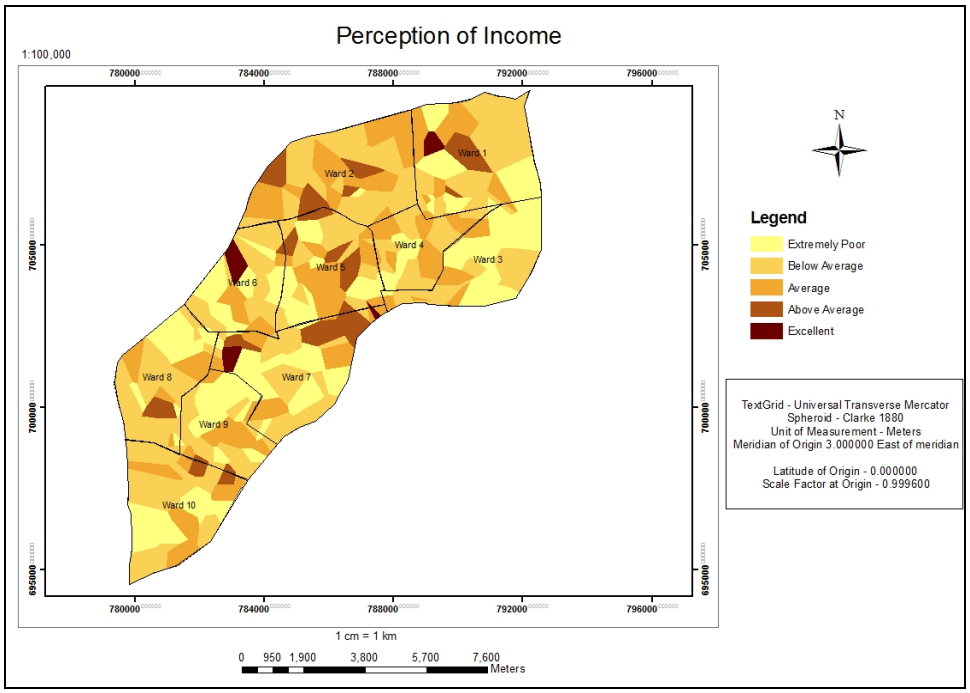


Figure 13: Perception of Income

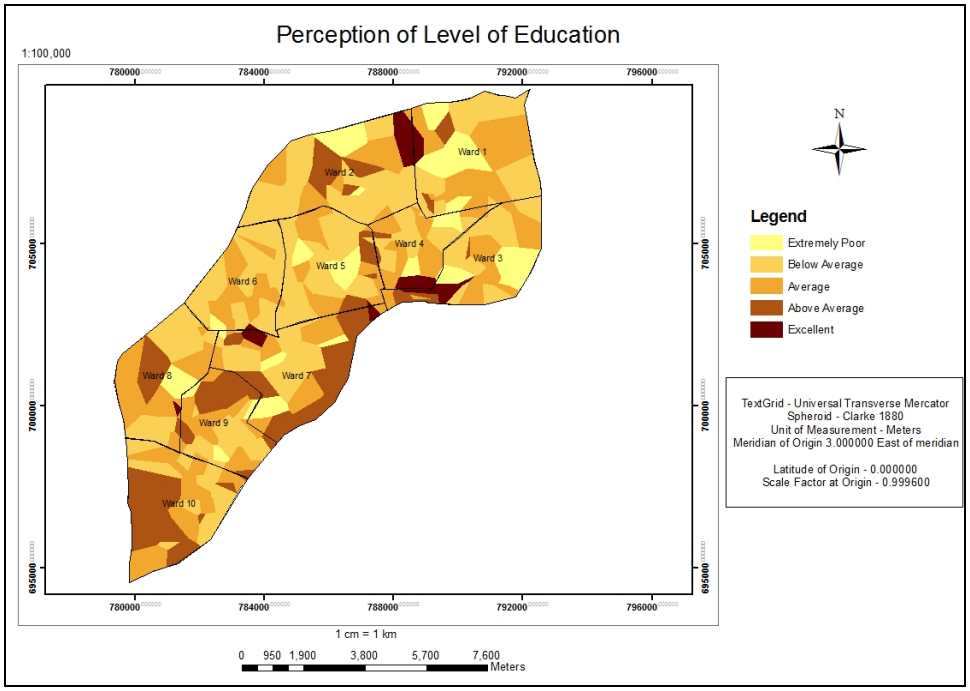


Figure 14: Perception of Level of Education

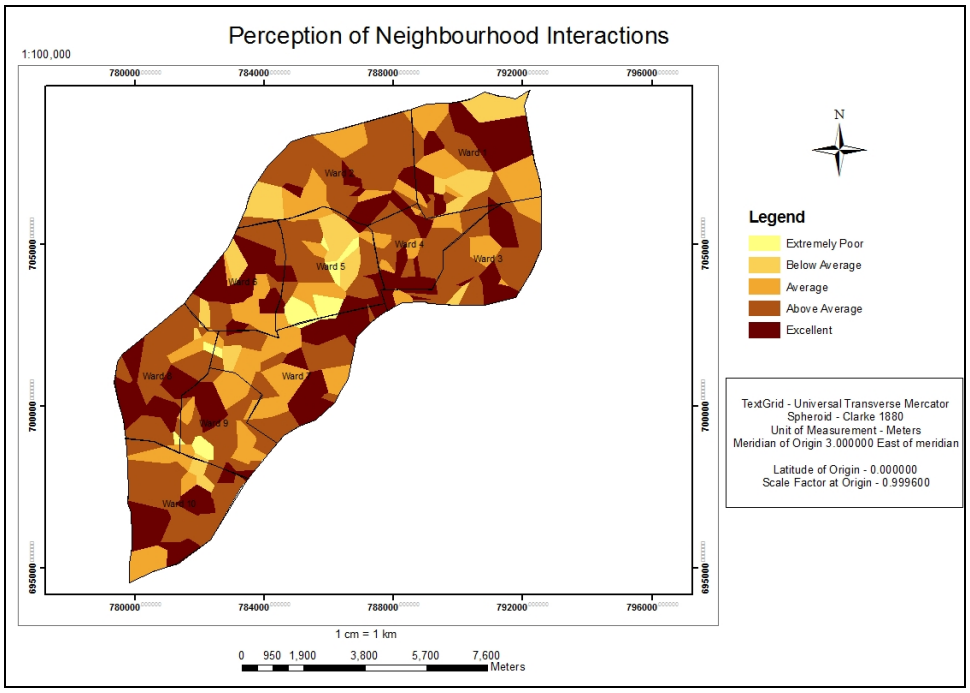


Figure 15: Perception of Neighbourhood Interactions

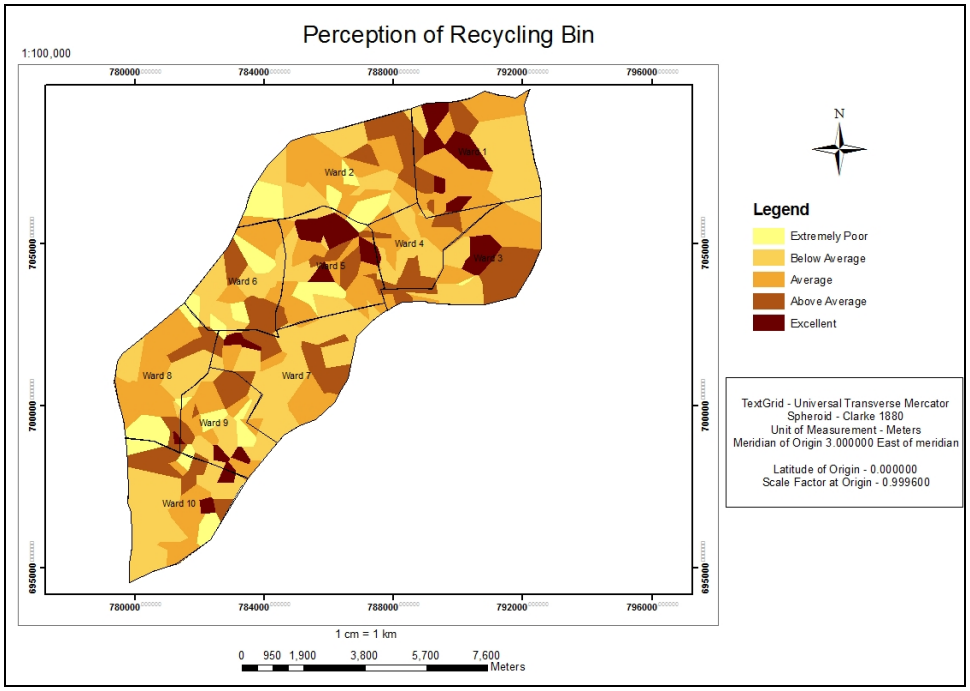


Figure 16: Recycling Bin Accessibility

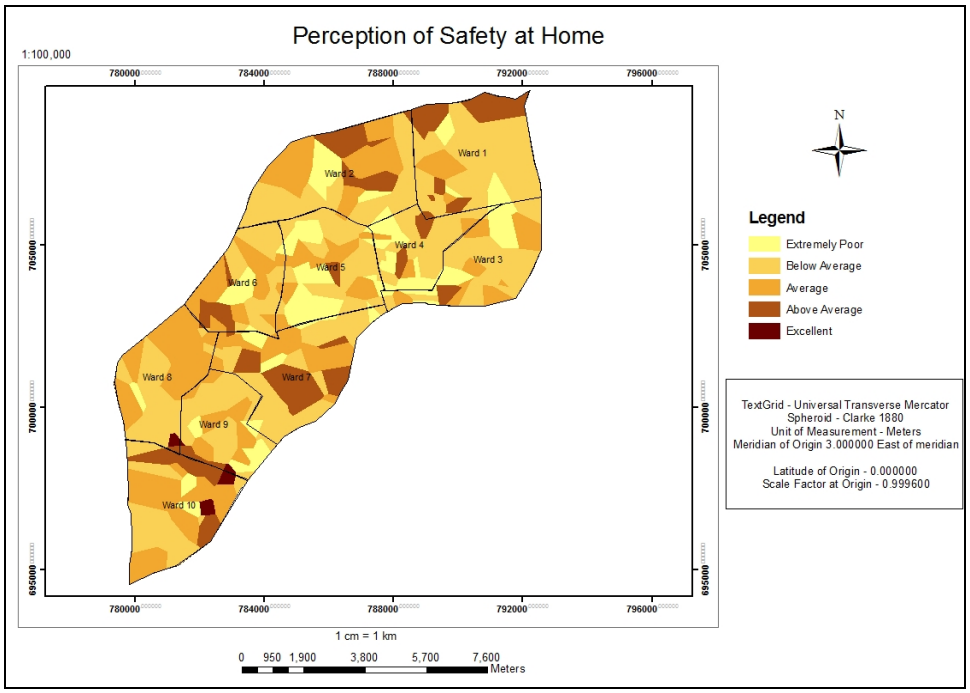


Figure 17: Perception of Safety at Home

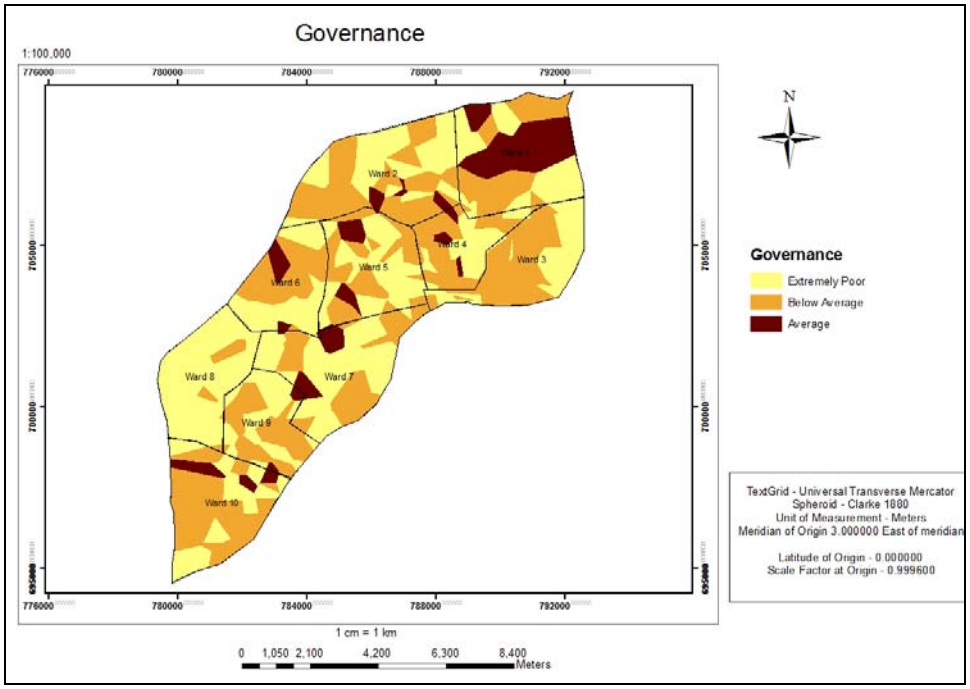


Figure 18: Governance as an indicator in the Social Domain

Level of education was unsatisfactory, neighbourhood interactions was satisfactory suggesting high level of interactions among the respondents which are characteristics of African societies. Also, the perception of recycling bin accessibility was found to be average. It confirms inadequate provision of dumpsites in the towns and cities of developing countries as reported by (Onibokun and Aguda, 1991; Aguda and Olayiwola, 2011). The perception of safety at home was predominantly below average. It indicates a high level of insecurity of life. Improper or absolute lack of landscaping in the communities often lead to incessant flooding that threatens lives and proper-

ties. In addition, most tenants lack the ability to settle their house rents. This also leads to insecurity of tenure.

From Fig. 18, the mapping and assessment of governance, as one of the indicators in the social domain, revealed that this indicator was only ranked average in ward 1, below average in nearly all of the ten wards and extremely poor in ward 8. This suggests that the respondents in ward 8 have been relatively deprived of good governance while the other wards also tend to be far away from enjoying good governance except in ward 1 where the respondents felt that governance was relatively the best in the LGA. This finding may be corroborated by the fact that LGAs as the third tier, particularly in Nigeria do not have wherewithal resources to cope with numerous development challenges (Adegboyega, 2008). Going by Fig. 19, it is obvious that the whole of the LGA is poorly serviced with electricity and water. This implies that the inhabitants of the LGA are prone and vulnerable to risk of water borne diseases as well as low level of socio-economic development.

The various mapped indicators were combined under their various domains (physical, economic and social domains) using the normalised weights. Table 4 below gives the different weight as stated by the respondents:

Table 4
Weights of Different Indicators

Domain/Indicator	Weights
Physical	
Street cleanliness	55.1
Car parking space	32.6
Green space	12.3
Social	
Safety at home	30.2
Safety at street	11.5
Health care centre accessibility	14.2
Recycling bin accessibility	12.6
Neighbourhood interactions	15.5
Public Transport Accessibility	16
Economic	
Level of education	16.3
Income	58.3
Housing quality	25.4

Source: Author's Fieldwork, 2012

The weights presented in the table above were used to map the perception of economic domain, physical domain and social domain (Figs 20, 21 and 22).

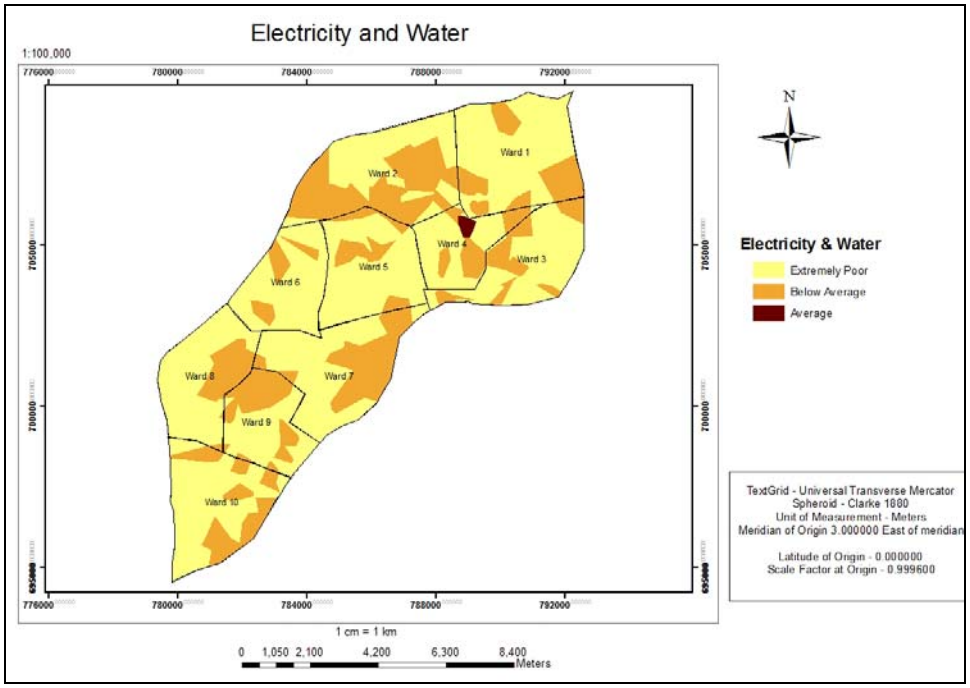


Figure 19: Electricity and Water Assessment

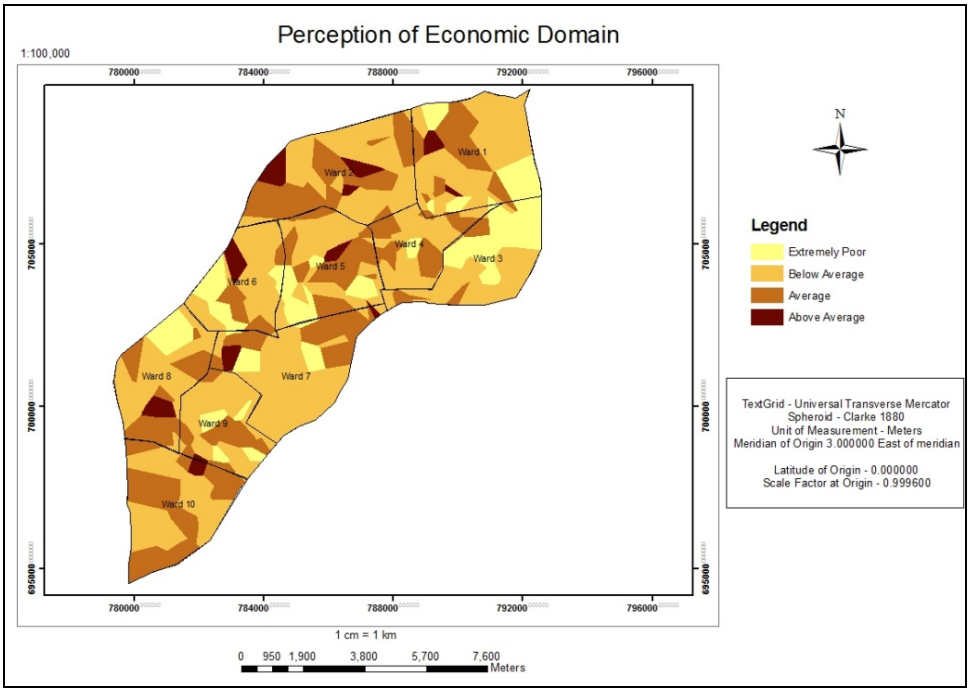


Figure 20: Perception of Economic Domain

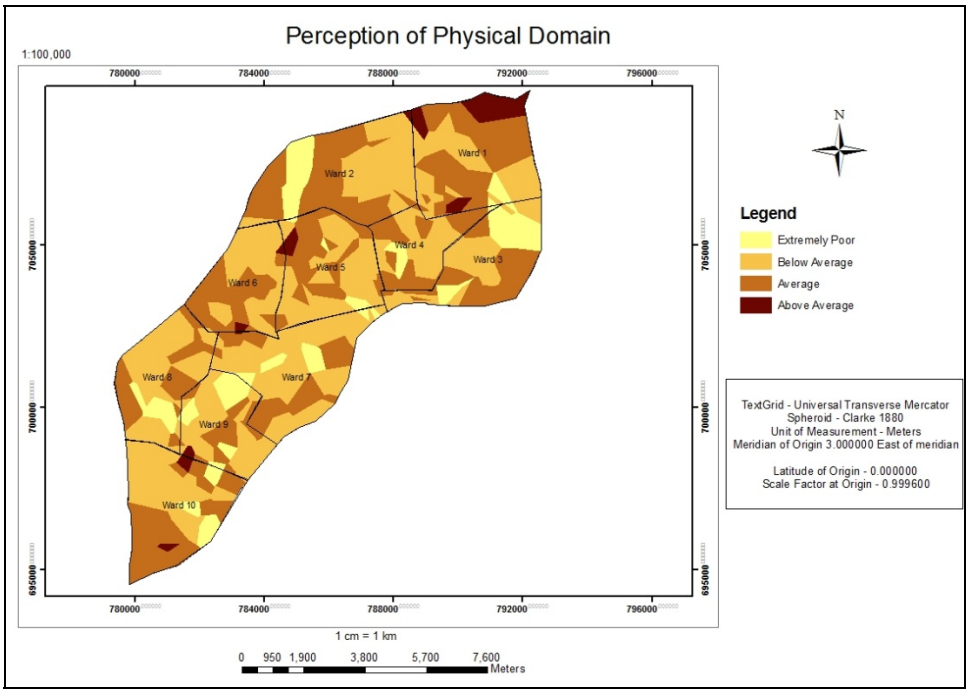


Figure 21: Perception of Physical Domain

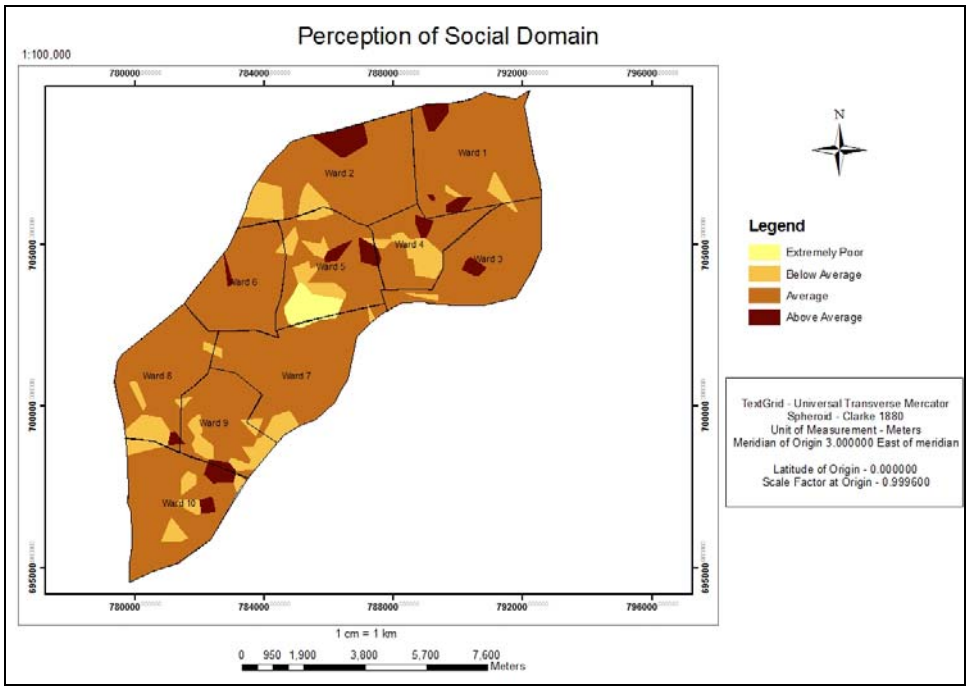


Figure 22: Perception of Social Domain

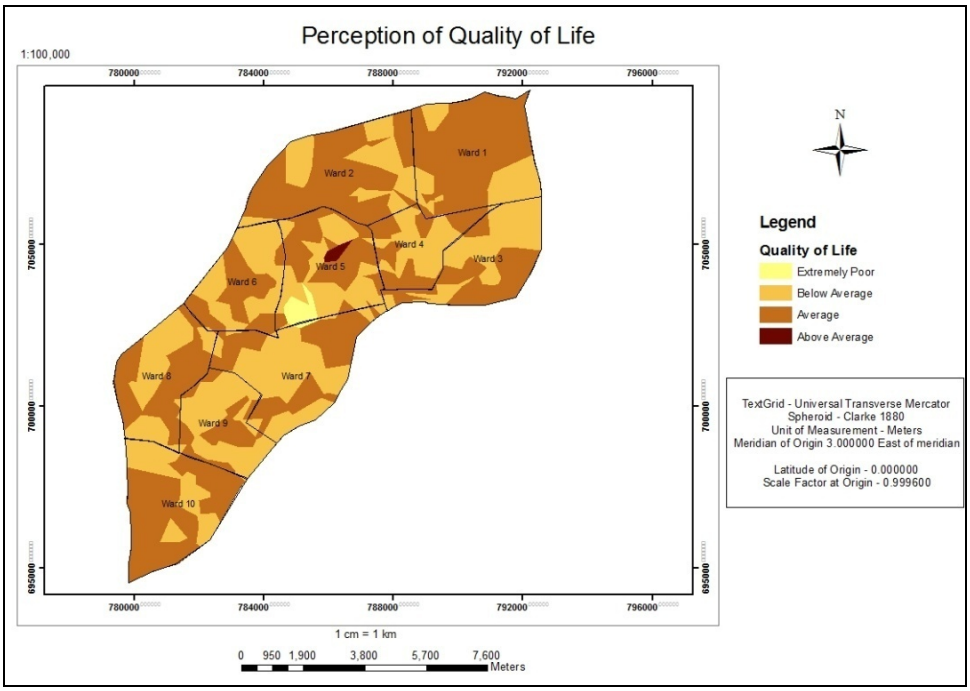


Figure 23: Composite map of Perception of Quality of Life

From these maps, showing the various domains of life, it is obvious that perception of social domain of life is very impressive, while economic and physical domains of life are very poor. This finding shows that, socially the residents of Egor LGA have a satisfactory quality of life, while economically and physically, the quality of life of the residents is less than satisfactory. Further, the three domain maps are also combined to obtain the overall QoL experience of the study area using weighted linear combination method of multi-criteria decision analysis, using the normalised weights as stated by the residents (Fig. 23). The weights are shown in the Table 5 below:

Table 5
Weights of different Domains

Domains	Weights
Social	29.1
Economic	49.1
Physical	21.8

Table 6
Spatial Variability of QoL in Egor LGA

S/N	Class	Area Size(m^2)	Percentage
1	Extremely Poor	16675075	17.94
2	Below Average	57174359	61.53
3	Average	13520825	14.55
4	Above Average	5558358	5.98
5	Excellent	0	0

Source: Author's Data Analysis, 2012

From Fig. 23, over the geographic space of the study area, the below average class is most predominant while the excellent class is not on the map. It is therefore established that, the QoL of the study area is below average. Specifically, the result of spatial variability of QoL as depicted in Table 6 showed that the QoL of 61.53% of the geographic space of Egor LGA was below average, 17.94% was extremely poor, 14.55% was average and 5.98% was above average. The class of excellent was not on the QoL model. Fig. 24 shows the cross validation of the QoL map. The green dots represent under-prediction, while the red dots represent over-prediction. From the cross-validation conducted, the highest under-prediction is -1.491, while the highest over-prediction is 0.927 with a mean of 0.072909. If the cross-validation residuals are small, and the mean is close to zero (Brivand *et al.*, 2008), then it means the prediction is relatively accurate. It suggests that the QoL prediction map produced is relatively of sufficient quality. The errors are shown in the map below;

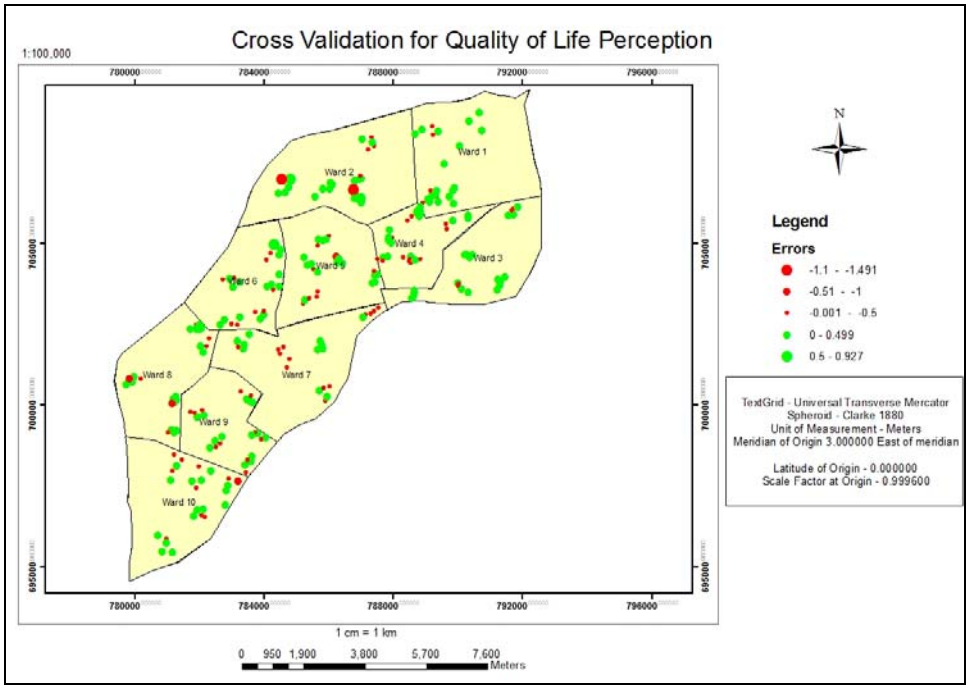


Figure 24: Map Showing the Cross Validation of the QoL Map

4. Conclusion

This study has been able to assess QoL using GIS approach in order to aid poverty alleviation decision-making process. The study revealed that very few people of Egor LGA exhibits average QoL, while others exhibit below average or extremely poor QoL. The research has shown that governance, electricity and water provision, income, and housing quality have relatively more

impact on the QoL of the people of Egor LGA. The implication is such that, there is urgent need for proper intervention in order to improve the QoL of this LGA. The study has also shown the relevance of participatory planning, as those being planned for can best determine the priority development areas. It is canvassed that any development intervention must strive to utilize scientific studies, as exhibited by this research, in order to have an in-depth understanding of the problem. Such efforts will definitely assist in the evolvement of sustainable solutions to human settlements' challenges.

References

Adegboyega, S.A. (2008), "Urban Sprawl Measurement in Egbeda Local Governmet Area, Ibadan, Nigeria", *Unpublished M.Sc Thesis*, Obafemi Awolowo University, Ile-Ife, Nigeria

Aguda, A.S. and Olayiwola, A.M. (2010), "Challenges to the Provision of Infrastructural Services in Nigeria's Urban Areas", *Proceedings of Humboldt International Conference on Urban Agriculture, City and Climate Change*, Alexander von Humboldt Foundation, Obafemi Awolowo University, Ile-Ife, Nigeria, pp. 184-190

Bivand, R.S.; Pebesma, E.J. and Gómez-Rubio, V. (2008), *Applied Spatial Data Analysis with R*, Springer, New York

Campbell, A.; Converse, P.E. and Rodgers, W.L (1976), *The Quality of American Life: Perceptions, Evaluations and Satisfaction*, Russell Sage Foundation, New York

Costanza, R.; Fisher, B.; Ali, S.; Beer, C.; Bond, L. and Boumans, R. (2007), "Quality of life: An Approach Integrating Opportunities, Human Needs, and Subjective Well-being", *Ecological Economics*, Vol. 61 Nos. 2 & 3, pp. 267-276

Costanza, R. and Maxwell, I. (1994), "Mapping the Quality of Life Experience in Alfama, Lisbon", *Ecological Economics*, Volume 9 No. 43, pp. 1-12

Das, D. (2008), "Urban Quality of Life: A Case Study of Guwahati", *Social Indicators Research*, Vol. 88 No. 2, pp. 297-310

Foo, T.S. (2000), "Subjective Assessment of Urban Quality of Life in Singapore (1997-1998)", *Habitat International*, Vol. 24 No.1, pp. 31-49

Hengl, T. (2009), *A Practical Guide to Geostatistical Mapping, 2nd ed.*, University of Amsterdam, Amsterdam

Lee, Y.J. (2008), Subjective Quality of Life Measurement in Taipei, *Building and Environment*, Vol. 43, No. 7, pp. 205-215

Leidelmijer, K.; van Kamp, I. and Marsman, G. (2002), "Leefbaarheid Naar een begrippenkader en Conceptuele inkadering (RIGO, RIVM)", *Rapportnummer* 81330

Malkina-Pykh, I.G. and Pykh, Y.A. (2007), "Quality-of-Life Indicators at Different Scales: Theoretical Background", *Ecological Indicators*, Vol. 8, No. 6, pp 854-862

Michalos, A.C. and Zumbo, B.D. (2000), "Criminal Victimization and the Quality of Life", *Social Indicators Research* pp. 245-295

Nigeria Population Commission (2007), *Official Gazette on the National and State Provisional Totals: 2006 Census*, Federal Government Printer, Lagos, Nigeria

Olajuyigbe, A.E. and Fasakin, J.O. (2010), "Citizens' willingness to pay for improved water supply in a medium-sized city in South West Nigeria", *Current Research Journal of Social Sciences*, Vol. 2, No. 2, pp. 41-50

Olayiwola, L.M. and Adeleye, O. (2006), "Land reform-experience from Nigeria", *Proceeding of 5th FIG Regional Conference on Promoting Land Administration and Good Governance*, International Federation de Geometres (FIG), Accra, Ghana, pp. 1-10

Onibokun, A.G. and Aguda, A.S. (1991), "More than Shelter: The challenge of proving affordable infrastructure services in the rapidly expanding African cities", Proceedings of Symposium on Shelter in Sustainable Urban

Development in Africa, *Shelter Afrique*, Gaborone, Botswana, pp. 78-82

Pearl, D.C. (2011), "Mapping the Quality of life experience in Alfama", *Unpublished Master Degree dissertation*, Portugal New University of Lisbon, Portugal

Tesfazghi, E.S. (2009), "Urban quality of life and its spatial distribution in Addis Ababa: Kirkos sub-city", *Unpublished Masters dissertation*, International Institute for Geo-information Science and Earth Geo-Information Science, Enschede, The Netherlands

United Nations (2010), *The Millennium Development Goals Report. MDG Report*, UN, New York

Zaid, Y.A and Popoola, S.A. (2010), "Quality of Life among rural Nigerian women: The role of information", *Library Philosophy and Practice*, Available at: http://www.webpages.uidaho.edu/~mbolin/zaid-popoola.htm (Accessed: 11 October 2012)