An Assessment of the Impact of Tree Shade on Rental Value of Residential Property in Maiduguri, North – Eastern, Nigeria

Oyewole Mustapha BELLO and Awoamim Joseph YACIM, Nigeria

KEY WORDS: Valuations, Rental Value, Hedonic Model, Residential Property, Tree Shade

SUMMARY

Residents have preference for areas that are conducive to both their social and economic well being. Tree shade has been found to provide certain benefits that enhance the well being of residents such as shading of privacy, adding aesthetic value to residential property including addition to the rental value of property among other things. This study is set out to find a way of assessing the contribution of tree shade to the enhance value of residential property in Maiduguri metropolis, using the hedonic models (multiple regression techniques). The city was stratified into three (3) namely; traditional area, Government Reservation Area (GRA) and urban periphery. Systematic sampling technique was used in the administration of questionnaires of which the first house was randomly selected and every 25th house was subsequently selected. The household head in each of the selected houses was served with the questionnaire. On the whole, a total of 474 household heads were served with questionnaires out of which 372 were returned. Analysis was however, done for the whole city of Maiduguri. The study found out that tree shade contributes significantly to the value of residential property in Maiduguri at 0.05 level of significance. The study recommends the use of a valuation model which will incorporate those structural and environmental attributes which in most cases are explicitly left out when using traditional valuation methodology. Also, there is the need for policy makers in the areas of environmental protection and management to create awareness on the benefits of tree planting in the study area.
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1.0 INTRODUCTION

Dwellings constitute a subset of the environment. The environment itself has a number of varying components that makes dwellings habitable to man. These components usually referred to as environmental externalities, supports the entire eco-system and they may have positive or negative impact on the environment depending on their nature and characteristics. Over the years, considerable attention has been made on studies to explore the possible effects of environmental externalities on rental value of residential property; such as the studies of Morales, 1980; Anderson & Cordell, 1985, 1988; Dombrow et. al., 2000; Thériault et. al., 2002 on trees. The studies of More et al., 1988; Bolitzer & Netusil, 2000; Luttik, 2000; Lutzenhizer & Netusil, 2001; Crompton, 2001; Nicholls, 2005 on urban parks, forests or open spaces. Other studies on environmental externalities include Lansford & Jones, 1995; Luttik, 2000; Afolayan, 2006 on effects of water bodies, trees and Bello, 2007, 2008 on waste.

Tree shade is one of the environmental externalities that exert positive influence on the residential environment because of its role in providing comfort to residents, especially in areas with harsh weather or climatic conditions. All over the world, tree shade has a wide range of benefits it confers on the environment which includes: shading, privacy, conservation of wild life habitat, noise abatement, wind reduction, soil protection and beautification to mention a few (Morales, 1980; Anderson and Cordell, 1988; Miller, 1997; Summit et. al, 1998). In this wise, Wolf (2001) noted that the beauty of trees is appreciated by nearly everyone, and urban forests (trees) provide more benefits than just aesthetics. Thus, in a developing country like Nigeria, trees are planted to prevent desert encroachment especially in the northern part of the country (NEST, 1991; Uchegbu, 1998; Adebayo, 2007), trees are also planted to serve purposes such as medicinal, animal feed, edible fruits meant for human consumption, fuel wood and to provide shade or add to the habitability of residential environment (Lee, 1972; Musa, 1997; Uchegbu, 1998; Ogundele, 2006). Households use tree shade for the purpose of rest and protection from the scourging influence of the sun and heat. Thus, if household preference / habitability in Maiduguri is influenced by tree shade, are the people willing to pay more rent for residential property that have tree shade in the environment? Anderson and Cordell (1988) stated that
though most of the benefits of tree shade are difficult to translate into economic terms, yet some of them may be captured in the property values for land on which the trees stands. The study pointed out that important differences between the properties include not only tree cover; but size, special features, location within the subdivision and so forth. Appropriate comparable evidence of past sales / rentals, are often difficult to obtain in determining the market value that trees can add using the traditional valuation methodology. This is because assessing the contribution of trees using the traditional valuation techniques does not accommodate the needed structural and environmental attributes and since these attributes cannot be built into the techniques whatever value arrived at in the end may be misleading. With these views, it is therefore, imperative for valuation experts in developing countries like Nigeria to investigate the use of modern valuation techniques which allow monetary estimates to be assigned to the values of residential property with tree shade. Valuation experts in the developed countries used the hedonic model to sort out the different contributions to the total rental or sales value that is made by each of these factors, attributing a share of the variation of trees (Morales, 1980; Anderson and Cordell, 1988). In this regard, the objective of this paper is to assess the influence of tree shade on rental value of residential property in Maiduguri metropolis.

Much research work has been done in the developed nations in assessing the impact of trees, vegetation and environmental quality on property value (Morales, 1980; Anderson et. al; 1988; Martins et. al, 1989 and Thériault, et. al, 2002). In Nigeria, the little efforts made while incorporating the neighbourhood components in assessing property value is by Arimah (1996) and Bello, (2007 and 2008) in the area of land based waste and Afolayan (2006) in the area of water bodies. Thus this study is undertaken with a view to fill the gap that exists.

2.0 LITERATURE REVIEW

Various empirical studies were done in the assessment of values that trees and other environmental components add to residential properties (Des Rosiers, Bolduc and Theriault, 1999). These studies used different methods ranging from the simple traditional valuation techniques to modern valuation techniques like the hedonic models. Looking at these studies the work of Peter (1971) reported that trees contributed 19% to the value of property. The work of Payne (1973) was reported by Anderson and Cordell (1988) where Payne used traditional valuation techniques by comparing houses to find the effect of trees on the value of a residential property in Amherst, Massachusetts; the study concluded that the trees add an average of 7% to the value of residential property. Payne and Strom (1975) estimated the value of residential plots in Amherst, Massachusetts and found out that plots with trees are 30% higher than those without trees.

There are other studies where the use of valuation techniques that could incorporates
property, socio-economic and environmental attributes was explored to assess the premium that trees can add to residential property. Morales, et. al. (1976) used hedonic model to conduct a study of residential properties sold in Manchester, Connecticut. Four independent variables were used namely: location, house size, date of sale and tree cover, respectively. The study found out that tree cover could raise the sales value by 6% to 9%. In another study by Morales (1980) using factor and Multiple Regression Analysis (a form of hedonic model) to assess the contribution of trees to residential property value in Manchester, Connecticut, of which properties with and without trees were selected, the study discovered that good tree cover added $2,688 (6%) to the market value of sampled homes. Seila and Anderson (1982) in their study found out that new residential properties could command a premium of 7% if there are trees planted within the neighbourhood. Though, this study introduced age as a precondition, the major issue is that the benefits of trees could propelled residents to pay a premium for what they enjoyed. Anderson and Cordell (1985) undertook a study of 800 single-family residential properties that were disposed between 1978-1980 year periods in the city of Athens, Georgia, the study also found that trees adds between 3% to 5% premium to the total sales value. In another study carried by Anderson and Cordell (1988), in Athens, Georgia, USA where residential properties were surveyed using the hedonic model, the study found that, the increase in market value is because of the influence of trees which is within 3.5% and 4.5%.

On the same subject, Martins et al (1989) used the ISA formula method and Predictive Modeling, a form of regression analysis to predict what trees contribute to residential property value in Austin, Texas. The International Society of Arboriculture (ISA) (1988) formula method used in the study found out that the value that trees contribute to the sales price of homes is 13% while the predictive modeling found out that the value that trees contribute to sales prices of homes is 19%. Garrod and Wills (1992) in their work found that deciduous trees increase property prices located near them, while spruce conifers decrease property price. In the study above, it is noted that tree species is important to residents in boosting what they pay for the residential properties as rent.

Luttik (2000) also used the hedonic model to analyze effect of environmental externalities on residential property values in the Netherland. Several variables were considered in the study such as location, accessibility to services, traffic noise, distance to green area, open space, presence of schools. The study concluded that a property in Leiden, Netherland that had a water view had a 10% premium added on its value, and that there was a 7% premium on properties that are landscape with trees and other greenery. Dombrow, et. al. (2000) used the presence of mature trees to conclude that trees add about 2% of property values in that specific market segment. The work of Thériault, et al (2002) used the multiple regression analysis to assess the marginal contribution of mature trees on house value and location choices in Quebec.
and found out that the appreciation of benefits is about 3% premium value. The study also found out that properties located in poorer locations could have minimal or no increase in value occasioned by trees and that the socio-economic attribute of residents is also important in adding to the value of properties. This study is an indication that neighbourhood environmental conditions, socio-economic status of residents’ plays vital roles in eliciting preference for properties with tree shade.

Recently, Sydor (2005) conducted a similar study in Athens, Georgia, and concluded that any increase in the number of tree cover could result in an increase of up to $3,240 of the residential property value. A recent study by Anderson and West (2006) shows that neighbourhood characteristics should not be ignored in carrying out a study of this nature. The study found out that property prices increase with proximity to neighbourhood parks and golf courses. On the contrary, decreases with proximity to neighbourhood parks would result to decrease in value. This current empirical study deploys the use of hedonic model to assess the contributory value of tree shade to residential property with some modifications in the choice of variables to suit our peculiar environment.

The Hedonic Price Model is an indirect valuation methodology. Court (1939) was the first to start work on hedonic model for automobile industry. The technique according to Lancaster (1966) is derived from consumer theory that said goods themselves should not be regarded as direct objects of utility; but the intrinsic characteristics of those goods. The work of Lancaster was further developed and applied for real estate property by Rosen (1974) and later expanded by Freeman (1979). Rosen (1974) stated that the value of a heterogeneous product such as a property consists of different attributes. This product can be estimated by what people are willing to pay for them (Garrods and Wills, 1992; Clark & Dieleman, 1996). In this regard, if dwellers are aware of the amenity effect of tree shade, this will be capitalized into the property prices and should reflect a location premium that reduces with distance from tree shade. The hedonic approach provides - through regression techniques - a methodology for identifying the contribution to the price by the different homogenous attributes (Sheppard, 1999). Studies abound on the functional form of the model. Rosen (1974) and Freeman (1979) said economic theory did not show which form is the most appropriate. While, it is not the concern of this study to determine which is appropriate, the linear regression is used in this study.

3.0 The Study Area and Research Methodology

Borno State was created in 1976 during the then Gen Murtala Mohammed era as the head of states with Maiduguri Metropolitan Council as it headquarters. Maiduguri is located on longitude 13° 10' E and latitude 11° 50' N (Google Earth, 2008), it is known to be underlined by sediments of the Chad Basin and semi – arid climate characterized by long dry season short rainy
season of June – September each year (Papka, 1984). The raining season is usually characterised by a heavy north – east trade wind which over the years have cause havoc to buildings. Maiduguri has an estimated population of 521,492 (FRN, 2007).

The metropolis has a climate which is hot and dry for a greater part of the year. It is characterised by a low rainfall, predominance of harmattan, low atmospheric moisture content and Sudan vegetation of short, tussock and shrubby short grasses. Vegetation cover is sparse leaving bare surface in between.

The mean temperature for most part of the area is 37° C. The highest temperatures of about 43° C are normally in April and May, while the minimum temperatures of about 31° C are usually recorded in December. There is remarkably high annual range of monthly temperatures. For example, Maiduguri shows a mean temperature of 31.8° C in August and 40.8° C in April and mean minimum temperature of 21.1° C in January and 30.1° C in June. Generally, there is marked dry season of between 8 to 9 months and a wet season of about 3 to 4 months. There is a high concentration of trees in Maiduguri metropolis with a distance of 10metres between the trees in the city.

The population of this study included the residents / occupiers and the residential properties they are occupying in Maiduguri Metropolitan Council. The population of Maiduguri is put at 521,492 based on the 2006 census figures. According to Dauda and Osita (2003) an average household in Maiduguri consists of 7 people. If this is so, dividing 521,492 with 7 will give a total number of 77,499 households. By using the formula developed by Kothari (2004), the sample size was determined as follows:

\[
    n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 (N - 1) + z^2 \cdot p \cdot q}
\]

where:

- \( n \) = sample size
- \( Z \) = value of standard deviation at a confidence level taken from table of normal curve as 95.5%
- \( P \) = sample proportion (q = 1 – p) taken as 5%
- \( N \) = size of population from sample frame which is 77,499 and
- \( e \) = acceptable error taken at 0.02 in this study

Using the Kothari formula above, the sample size of 474 was determined. This represents the total number of questionnaire which was distributed in the entire Maiduguri Metropolitan Council on the household heads of the sampled residential property. For the purpose of this study, a combination of stratified and systematic sampling techniques was used in the administration of questionnaire. Firstly, the city of Maiduguri was stratified into three namely:
traditional area, GRA and urban periphery. Secondly, the systematic sampling technique was employed in the distribution of questionnaire. Kothari (2004) said an element of randomness is introduced when using the systematic techniques, hence, the first house was randomly selected and every 25th house was subsequently selected. The household head in each of the selected houses was served with questionnaire. On the whole, a total of 474 household heads were served with questionnaire out of which 372 were returned.

Questionnaires for this study were administered between the months of March 2009 and May 2009. The hedonic model, in linear form, was used to assess the influence of tree shade on rental value of residential property in the study area. The paired sample T test was used to test the difference between the rental value of residential properties with tree shade and those without tree shade in the study area. The regression equation for the model used to assess the influence of tree shade on rental value is as stated below:

\[
RENTV = b_0 + b_1 \text{PLOTS} + b_2 \text{AGEP} + b_3 \text{NUMSR} + b_4 \text{NUMBR} + b_5 \text{NUMBT} + b_6 \text{NUMGC} + b_7 \text{TREES} + b_8 \text{NUMHT} + b_9 \text{NUMHE} + e
\]

Where: RENTV = the rental value of residential property  
\(b_0 \ldots b_9\) = regression coefficients  
PLOTS = plot size  
AGEP = age of residential property  
NUMSR = number of sitting room  
NUMBR = number of bedroom  
NUMBT = number of bathroom  
NUMGC = number of garage / carport  
TREES = presence of trees around residential property  
NUMHT = number of hours spent per day under tree shade  
NUMHE = number of hours electricity is supplied per day  
e = error term.

4.0 DATA ANALYSIS AND DISCUSSION OF RESULTS

The harsh hot arid weather of Maiduguri greatly influences residents’ desire to live in a property that is located close to a tree. This is to enable them take rest, cook and even sleep under trees. It is therefore necessary to examine the rent they are paying per annum to assess whether this environmental goods (tree shade) has any significant impact on the rental value paid for properties in the metropolis. In carrying out this assessment, the SPSS 16.0 was used to run regression as this public good (tree shade) cannot be easily priced. In this wise, independent variables were regressed against the rental value paid per annum to assess the level of significance of these variables on the rental value of properties per annum.
An assessment of the impact of tree shade on rental value of residential property in Maiduguri, North – Eastern, Nigeria, (7171)
Oyewole Mustapha Bello and Awoamim Joseph Yacim (Nigeria)

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Analysis of Variance (ANOVA) that was used to test the overall significance of variables falls within the region of rejection. Hence the null hypothesis ($H_0$) that tree shade does not have any significant impact on the rental value of residential property in Maiduguri in the model was rejected.

The results of the impact of tree shade on rental value of residential property in Maiduguri metropolis from the table below shows that greater numbers of independent variables are significant.
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Table 3.00: Regression Coefficients of Influence of Tree Shade on Rental Value of Residential Property in Maiduguri Metropolis.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-11195.785</td>
<td>15708.390</td>
<td>-.713</td>
<td>.476</td>
</tr>
<tr>
<td>PLOTS</td>
<td>1.061</td>
<td>.372</td>
<td>.082</td>
<td>2.848</td>
</tr>
<tr>
<td>AGEP</td>
<td>-730.396</td>
<td>172.902</td>
<td>-.111</td>
<td>-4.224</td>
</tr>
<tr>
<td>NUMSR</td>
<td>-12049.486</td>
<td>15108.062</td>
<td>-.021</td>
<td>-7.98</td>
</tr>
<tr>
<td>NUMBR</td>
<td>11241.501</td>
<td>2532.598</td>
<td>.180</td>
<td>4.439</td>
</tr>
<tr>
<td>NUMBT</td>
<td>1673.082</td>
<td>3253.098</td>
<td>.022</td>
<td>.514</td>
</tr>
<tr>
<td>NUMGC</td>
<td>30487.563</td>
<td>2532.700</td>
<td>.472</td>
<td>12.038</td>
</tr>
<tr>
<td>TREES</td>
<td>16580.528</td>
<td>3659.515</td>
<td>.150</td>
<td>4.531</td>
</tr>
<tr>
<td>NUMHT</td>
<td>3028.926</td>
<td>1058.782</td>
<td>.083</td>
<td>2.861</td>
</tr>
<tr>
<td>NUMHE</td>
<td>4227.495</td>
<td>833.702</td>
<td>.159</td>
<td>5.071</td>
</tr>
</tbody>
</table>

Source: Analysis of Surveyed Data, 2009

From table 3 above, the result shows that seven variables are significant. The variables are: plot size (PLOTS) with a value of 1.061, age of property (AGEP) with a value of -730.396, number of bedrooms (NUMBR) with a coefficients of 11241.501, number of garages / carports (NUMGC) with a value of 30487.563, presence of tree shade (TREES) with a value of 16580.528, number of hours spent under tree shade per day (NUMHT) 3028.926 and number of hour(s) electricity is supplied per day (NUMHE) with a value of 4227.495. The variables are highly significant at 0.05 levels, an indication that they have positive impact on the rental value of residential property in Maiduguri metropolis. The variables that are not significant in the study are number of sitting rooms (NUMSR) and number of bathroom (NUMBR). Probably residents do not place a high premium on these two variables. The model that explains the influence of tree shade on rental value of residential property in Maiduguri metropolis is hereby given below:

\[ RENTV = b_0 + b_1 PLOTS + b_2 AGEP + b_3 NUMSR + b_4 NUMBR + b_5 NUMBT + b_6 NUMGC + b_7 TREES + b_8 NUMHT + b_9 NUMHE + e \] \[
\]

Hence the model that is formulated for this study is as follows:

\[ RENTV = -11195.785 + 1.061b_1 - 730.396b_2 + 11241.501b_4 + 30487.563b_6 + 1658.528b_7 + 3028.926b_8 + 4227.495b_9 \] \[
\]
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Table 4.00: Zero – Order, Partial, Part Correlations Coefficients and Collinearity of Influence of Tree Shade on Rental Value in Maiduguri

<table>
<thead>
<tr>
<th>Model</th>
<th>Zero – order</th>
<th>Partial</th>
<th>Part</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLOTS</td>
<td>.401</td>
<td>.148</td>
<td>.074</td>
<td>.815</td>
<td>1.226</td>
</tr>
<tr>
<td>AGEP</td>
<td>-.165</td>
<td>-.217</td>
<td>-.110</td>
<td>.978</td>
<td>1.022</td>
</tr>
<tr>
<td>NUMSR</td>
<td>.058</td>
<td>-.042</td>
<td>-.021</td>
<td>.975</td>
<td>1.025</td>
</tr>
<tr>
<td>NUMBR</td>
<td>.591</td>
<td>.227</td>
<td>.115</td>
<td>.410</td>
<td>2.442</td>
</tr>
<tr>
<td>NUMBT</td>
<td>.603</td>
<td>.027</td>
<td>.013</td>
<td>.360</td>
<td>2.781</td>
</tr>
<tr>
<td>NUMGC</td>
<td>.806</td>
<td>.535</td>
<td>.312</td>
<td>.438</td>
<td>2.285</td>
</tr>
<tr>
<td>TREES</td>
<td>.581</td>
<td>.232</td>
<td>.118</td>
<td>.617</td>
<td>1.620</td>
</tr>
<tr>
<td>NUMHT</td>
<td>.353</td>
<td>.149</td>
<td>.074</td>
<td>.805</td>
<td>1.243</td>
</tr>
<tr>
<td>NUMHE</td>
<td>.569</td>
<td>.258</td>
<td>.132</td>
<td>.685</td>
<td>1.459</td>
</tr>
</tbody>
</table>

Source: Analysis of Surveyed data, 2009

To determine the degree of independence of these variables, Pearson’s product of moment correlation coefficients were obtained and presented in table 4.00 above. This was presented in form of zero – order matrix, where it reveals a very significant relationship between the independent variables and rental value of residential properties in Maiduguri. In the zero – order matrix, it is only age of property (AGEP) that has a negative sign an indication that, the older a property is without regular periodic maintenance, the lower the amount of rent paid per annum for the property. The other significant variables have positive sign, which means that the more or higher the number of these variables the more influence they may have on the rental value of residential property in Maiduguri Metropolitan Council.

The Variance Inflation Factors (VIF) of all the variables in the model is below 3.0, which shows that there are no problem of multicollinearity among the variables used in assessing the contributions of tree shade to rental value of residential property in Maiduguri.

4.1 Comparison of Rental Value of Property With Tree Shade and Property Without Tree Shade

The contribution of tree shade to rental value in Maiduguri Metropolitan Council is further subjected to comparison to determine the marginal increase that tree shade adds to residential property. The properties were selected in the three (3) strata of traditional area, GRA and urban periphery respectively. In doing this, a total of five (5) 3 – bedroom bungalows were
randomly selected from the three strata bringing the total to fifteen (15) pairs of residence (see table 6).

### Table 6.00 Rental Value of Residential Property with and without Tree Shade

<table>
<thead>
<tr>
<th>S/no</th>
<th>Traditional Area Rent P.A. (₦) 3-Bedroom</th>
<th>GRA Rent P.A. (₦) 3-Bedroom</th>
<th>Urban Periphery Rent P.A. (₦) 3 Bedroom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tree</td>
<td>No Tree</td>
<td>Tree</td>
</tr>
<tr>
<td>1</td>
<td>80,000</td>
<td>75,000</td>
<td>300,000</td>
</tr>
<tr>
<td>2</td>
<td>100,000</td>
<td>90,000</td>
<td>250,000</td>
</tr>
<tr>
<td>3</td>
<td>130,000</td>
<td>130,000</td>
<td>200,000</td>
</tr>
<tr>
<td>4</td>
<td>50,000</td>
<td>40,000</td>
<td>350,000</td>
</tr>
<tr>
<td>5</td>
<td>120,000</td>
<td>100,000</td>
<td>230,000</td>
</tr>
</tbody>
</table>

**Source:** Field Survey, 2009

When using the comparative method of valuation, it is imperative for valuers to take into account the similarities and dissimilarities of properties. This study took into account age, location, design or layout plan, number and arrangement of rooms, time of letting including facilities provided in the properties among other things during the selection of properties used in testing the significant difference between the rental value of properties with and without tree shade in the study area.

### Table 7.00: Paired Samples Correlations of Rental Value of Property with and without Tree Shade

<table>
<thead>
<tr>
<th>Pair</th>
<th>RENT OF PPTY WITHOUT TREE &amp; RENT OF PPTY WITH TREE</th>
<th>N</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>15</td>
<td>.985</td>
<td>.000</td>
</tr>
</tbody>
</table>

**Source:** Analysis of Surveyed Data, 2009

### Table 8.00: Paired Samples Test for Rental Value of Property with and without Tree Shade

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>T</th>
<th>Df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>Property Without and</td>
<td>-1.36667E4</td>
<td>16417.18032</td>
<td>4238.89773</td>
<td>-22758.19809</td>
<td>-4575.13524</td>
<td>-3.224</td>
</tr>
</tbody>
</table>


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Source: Analysis of Surveyed data, 2009

Tables 7 and 8 clearly show the result of the paired samples t test at 95% confidence level which tested the difference between rental value of properties with tree shade and those without tree shade. The result shows that properties with tree shade command higher value than properties without tree shade. The level of significance is below 0.05. The study of Anderson and Cordell (1988) noted that if a tree-shaded house sells for $5,000 more than its treeless but otherwise identical twin, the tree would be “worth” $5,000. In this study the difference between properties with tree shade and those without tree shade in monetary terms having regards to the study of Anderson and Cordell (1988) ranges between ₦5,000 – ₦50,000.

5.0 Policy Implications and Conclusion

The study had identified a number of significant variables that influences the rental value of residential property in Maiduguri metropolis. These variables are: plot size, age of property, number of bedroom, number of garage, presence of tree shade, number of hours spent under trees and number of hour’s electricity is supplied per day.

Empirical assessment shows that tree shade has impact on the rental value people pay for residential property using the hedonic model. Since tree shade is difficult to be priced when using the traditional valuation methodologies, there is need for Nigerian Estate Surveyors and valuers to acquaint themselves with the use of this model where all the needed structural and environmental variables are incorporated to arrived at a concise rental or capital value for the property. There is also the need to incorporate the teaching of hedonic model in the curriculum of Universities and Polytechnics offering estate management to abreast upcoming surveyors of current issues relating to determination of values where both structural and environmental attributes are incorporated to arrive at a concise opinion of value when carrying out valuation of property that requires such application.

6. References

An Assessment of the Impact of Tree Shade on Rental Value of Residential Property in Maiduguri, North – Eastern, Nigeria. (7171)
Oyewole Mustapha Bello and Awoamim Joseph Yacim (Nigeria)

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