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Development of a CAMA Model That Can Partition Property Value into Land Value and Building Value in Awka, Anambra State, Nigeria for Effective Land Value Taxation and Sustainable Land Use

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Abstract

Urban expansion has brought in its stead land speculation, artificial land scarcity, exorbitant land prices and consequent urban sprawl in the cities. This necessitates a move towards making land available for developers who are keen on immediate development and curbing the anomalies on land use. This study developed a model that can partition property value into land value and building value in Anambra State Nigeria with a view to proffering a solution to 'code rate' method of determining tax payable for properties for a sustainable land use and development**.**. The paper has identified sales comparison approach for estimating values of vacant land and abstraction, allocation and contribution approaches for land in built up urban areas. In order to determine land value, the study adopted a variant of contribution value approach to suit the study area. Survey design was used to generate data on land and building variables which were used to arrive at land values, building values and property values with the aid of excel spreadsheet.. A computer assisted mass appraisal (CAMA) model was developed for low and high density areas of the study area. The study discovered that property value can be effectively partitioned into its component values and up to 40% of property value accrues to land. Land value variables, when compared to building value variables are very significant in the overall property value, hence the cogent need for its taxation. This will guarantee equitable taxation of the components according to their contribution in the overall property value while discouraging speculation, urban sprawl and to achieve sustainable land use.

Keywords: Computer Assisted Mass Appraisal (CAMA), Model, Land Value, Building Value, Sustainable Land Use, Land Value Taxation

1. Introduction

Most human activities that determine the existence of man are embedded on land and as a result every man is desirous to own land and better still develop it. Land is a scarce resource and its renewal or increase is usually an uphill task. Therefore it must be judiciously and efficiently managed in a sustainable manner for the use and good of all. It is for this reason that different countries the world over have evolved land tenure systems to protect various "interests" in land and for effective land governance and management (Atilola, 2010). To put a break or hold to monopolies of landlords and make land available for public purpose, the Federal Military Government of Nigeria brought into existence the Land Land Use Act Cap L5 L.F.N. 2004. It aims to make land easily and cheaply accessible to the people especially in urban areas where land prices practically go through the roof as well as discourage land speculation and perpetuity in land ownership, hence the 99 years Certificate of Occupancy issue to land users (Abiama, 2011)

On the contrary, land has become increasingly difficult for people to secure for development in our urban areas. Artificial scarcity of land on the free market is created which drives up the price of land in general thus discourages intending developers, favors speculators who sit on vacant or underutilized land in the hearts of our cities and towns. Developers move further out of the urban area to get affordable land thus creating a vacuum between their improvements and the developed areas creating urban sprawl, squatter settlement that presents a scattered and untidy environment.

As a result of urbanization and rural-urban migration in Awka Capital Territory (10 kilometre radius from Amawbia Junction through Old Onitsha/Enugu Road), there is increased demand for thus driving the prices of vacant land up. In recent times residential structures are seen springing up in Amansea, Isuaniocha, and Nise which are villages near Awka. This development is as a result of very high land prices in Awka and their immediate environs. Erecting structures though not a bad action has resulted in scattered development, urban sprawl and residential areas that lack the most basic amenity- road.

There is need to tax land out of the hands of speculators so as to encourage land use while discouraging urban sprawl, sparse development and urban blight. The problem envisaged in achieving this is separating the property value into its various components- land and building for effective taxation for a large number of developed properties. Anambra State government through APLUC (Anambra State Property and Land –Use Charge) taxes land and buildings by use of **code rates**. It is against this background that the study developed a CAMA model that can partition residential property values into its various components for equitable land value taxation and sustainable land use.

2. Study Area

Anambra state is one of the six states in South East Geographical zones of Nigeria. It has a total land mass of 4,416 of km and situates on the Eastern side of River Niger. The state has 177 communities (towns) in 21 Local Government Areas which comprises of three major towns namely, Awka, its capital city, the commercial town of Onitsha and the industrial city of Nnewi. According to 2006 national population census it has a population of 4,177,828 made up of 2,117,984 males and 2,059,844 females (NPC,2010). According to National Bureau of statistics (2006), Anambra State is the 2nd most urbanized state in the country having 62% of its total population living in urban areas. Though most Anambra population is rural, the state is experiencing rapid urbanization and because of its relatively small land mass, the is virtually becoming one huge urban area. Consequently it has one of the highest population densities in Africa at 947 persons living within every square kilometer (UN- Habitat, 2009). However as with every other state, rural-urban migration poses serious burdens for the state's resources.

The study areas are residential properties in two residential layouts in Awka

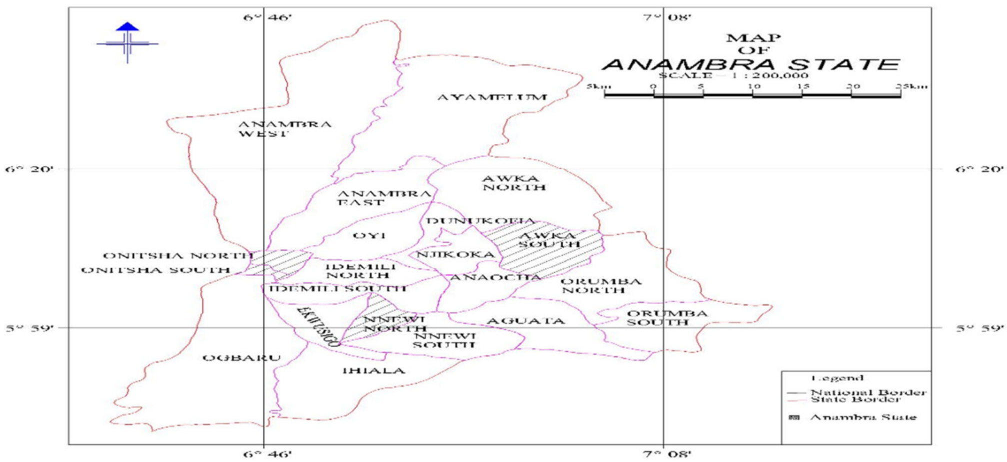


Fig 1: Map of Anambra State showing the study area

Source: Department of Surveying and Geoinformatics, Nnamdi Azikiwe University, Awka.

2.1 Brief Description of Study Areas.

Awka

Awka is the capital of Anambra State whose region covers six Local Governments which include Awka Capital Territory, Awka South Local Government area, accounting for more than half of the land area. Others are Awka North, Njikoka, Anaocha, Dunukofia and Orumba North Local Government Areas. Urban growth has been rapid as the three towns of Awka, Amawbia and Okpuno have grown to merge with each other, forming a conurbation. Awka has grown into an urban centre both by natural increase and by immigration. The city had essentially remained more rural than urban in scope until it became a State Capital. The influx of population made up mainly of returnee civil servants from Enugu, employees of federal ministries and parastatals, student population of Nnamdi Azikiwe University and others increased its urban nature speedily. Awka town comprises two distinct sectors, namely the built up older portion that is overcrowded and unplanned with poor road system and the developed part with a good number of open land surrounding the houses. The land use is distributed over residential, industrial, commercial, administrative and agricultural.

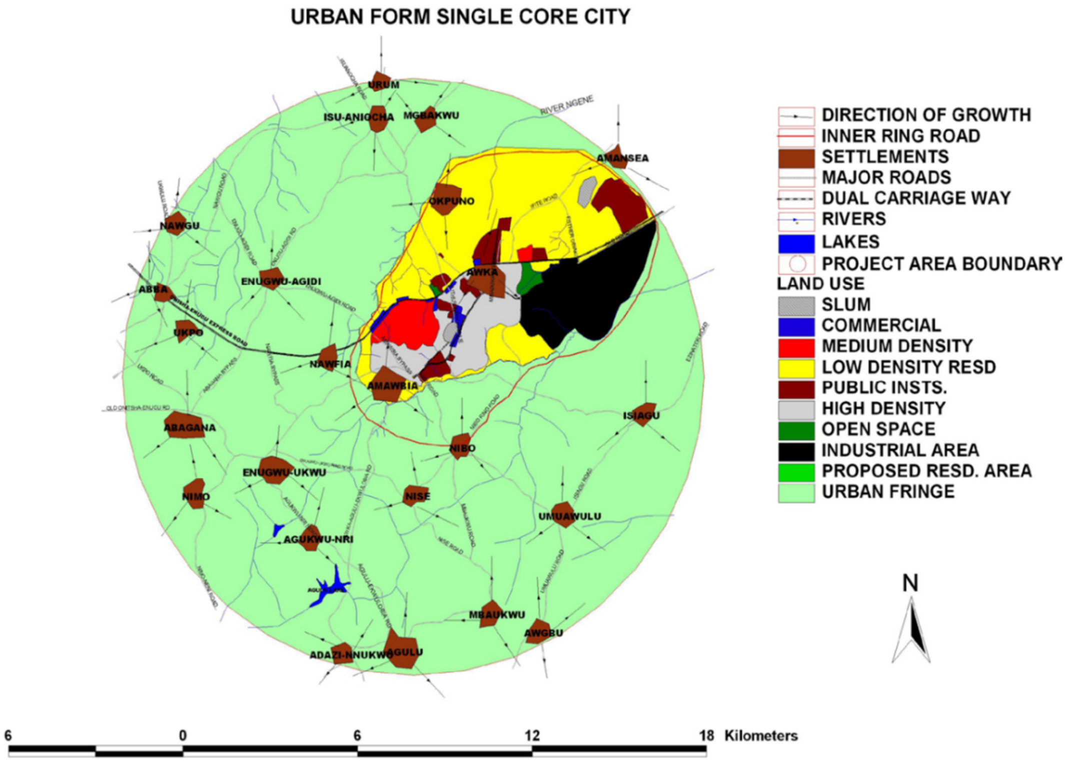


Fig 2: Existing Land Uses in Awka
Source: Adapted from UN Habitat, 2009

3. Land Value Taxation

The revenue earned from land is a type of earning surplus achieved without any efforts and can be then considered as a suitable basis for taxes **(**Dadkhah , Mostafapour, Alibeygi , Sepehr 2014). In many countries, the increases in the population and the revenues have raised the demand for land and results in landowners receiving surplus on their land regardless of their insignificant shares in the increase.

Land value taxation, a reform to an entrenched institution (property taxation) is, where land value, if not the only element of real property taxed, is taxed more than improvement value (Dye & England, 2009). Within such a tax system, land speculation is theoretically discouraged as property owners face a sizable tax regardless of how they improve their property. Therefore, landowners are encouraged to develop their parcels in a way that generates the most utility because their taxes are fixed to land value and do not increase based on improvements they make to the property.

This tool splits the standard property into its two components of land values and building values. Separate knowledge of land and building value is useful for several reasons. First, depreciation allowances in the tax code make it necessary to separate depreciable value (building) from non-depreciable value (land). Second, real estate assessors use sales prices of properties to estimate the current market value of neighboring properties for which no recent sale prices are available. Land values of neighboring parcels are generally much more highly correlated than building values, and knowledge of land values increases the precision of real estate assessment. Thirdly, wherever adopting higher property tax rate on land than on buildings is being considered, a separate knowledge of land and building values is required. The tax rate is increased on the land part of the property and decreased on the building. The increased tax on land has a negative capitalization effect, resulting in land being priced closer to its true market value.

The user of land ought to pay the amount of its worth at best use; but the owner, facing no cost of production, need not receive all that is paid. On the long run, land owners would get less of the increments in land values and the public would get more. Socially created values would then be channeled into government use rather than private uses. Taxes could be related more closely to the cost of governmental services.

However opponents of land value taxation are of the opinion that the unearned increment in land value has been capitalized in the purchase price paid by the owner, thus they question the fairness of imposing a heavy tax on present land values for which owners have paid. The answer is that land value is not a one-off transaction, its value continues to increase way after the first transaction between buyer and seller and it is this increment that land tax wants to capture.

In summary, the principle of land value taxation is focused on equity and benefit principle on the part of the public and owners of property respectively.

3.1 Land Value Tax Estimation

The estimation of land value in areas that are substantially built up requires the separation of observable property value into unobservable land value and improvement value (Plassman and Tideman, 2000). Before one can tax land values separately from improvement values, however, one needs to develop the appropriate concept of land value for tax purposes (Bell, Bowman and German, 2009). The issue of separating the two components of property value is still a policy issue to achieving land value taxation. One view is that the value of raw land-land in its natural state-is the appropriate value for land taxation (Mills, 1998); another is that the value of the site-including streets, sewers, lighting, and the general state of development of the area, though not the structures on the specific site-is the appropriate value (Lindholm, 1969). The latter view underlies the basic principle of land value taxation, thus is taken by many land value proponents. Along this premise, Bell, Bowman and German (2009) opined that land should be valued for tax purposes at its current highest and best use, not its value in some natural state.

For vacant land, the preferred approach to valuation is the sales comparison, or market data, approach. It is grounded in the substitution principle of valuation – land of similar utility will yield similar prices in a competitive, open marketplace (Wuensch, Kelly, and Hamilton 2000). This approach uses actual market transactions for vacant land with appropriate adjustments for size, shape, corner influence, location, and topography (Eckert 1990).

The most common approach to valuing land for tax purposes in urban areas with insufficient vacant land sales is the depreciated replacement cost approach to valuation – often referred to as the abstraction, or extraction, method of valuing land (Eckert 1990, Wuensch, Kelly, and Hamilton 2000). Abstraction emphasizes the substitution principle for improvements, implying that one would not pay more for a structure than it would cost to replace it. The technique starts with the market value of the entire property and subtracts the depreciated cost of replacing the improvements. This approach to valuation is grounded in the principle of substitution [Eckert 1990, Wuensch, Kelly, and Hamilton 2000). It is based on the notion that, a property's value is directly influenced by the cost of acquiring a similar asset with similar utility. The residual is then allocated to land. Abstraction method presents with difficulty when faced with economic obsolescence and depreciation increase.

A second approach to valuing land when there is few land sales is the allocation approach, which attributes, or allocates, a percentage of total improved parcel value to land. This approach also seems to rest upon the substitution principle of value. The land percentage is derived from market evidence and applied to individual parcels. The approach implies that if land typically accounts for a given percent or ratio of total value, then the percent or ratio is the likely land share of value for a given property.

Market value of land may be estimated more accurately using the contribution value approach. The approach is based on the assumption that differences deemed important in even similar properties within the same location will translate into different prices that the buyer will be willing to offer. The contribution value method emphasizes the principle of contribution, which says that value is related to effective market demand for the housing services or utility provided by various property attributes or variables, rather than by their cost. Some features of a property may add either more or less than their replacement costs, as evaluated by the typical buyer.

The notion of market value seems to be more closely aligned with the principle of contribution to value – that is, how much does each characteristic of site and improvements contribute to the market value of the particular parcel? The most appropriate analytical tool for addressing the question is a statistical model that explains the sales price of individual properties as a function of the land and improvements attributes.

This study took a cue from the literature to depart from the current practice of applying code or prescription rates on property values to determine land value by APLUC. It instead adopted a variant of contribution value method that suits the study area to partition property values into land value and building values.

3.2 Computer Assisted Mass Appraisal

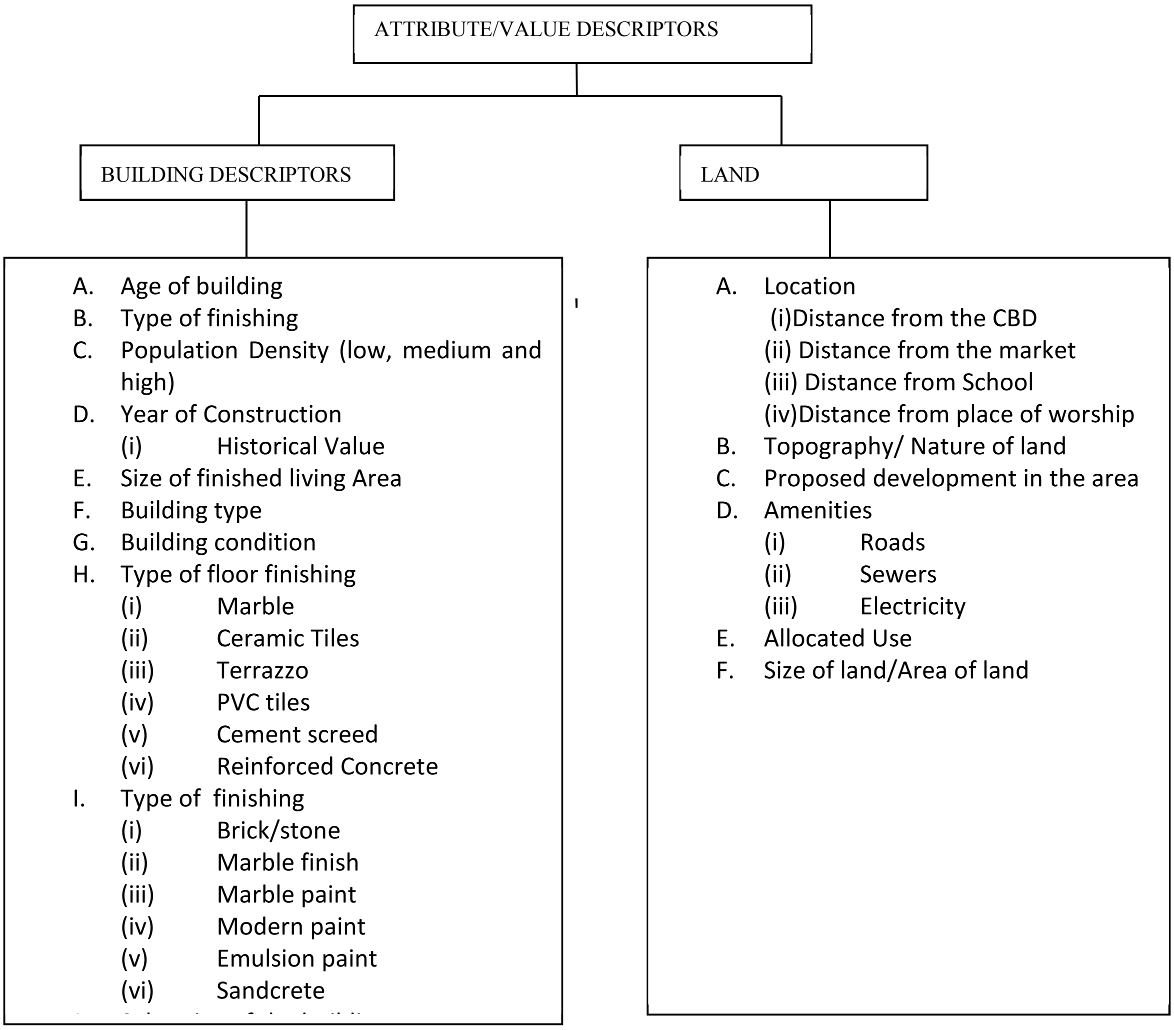
Mass appraisal is the systematic appraisal of groups of properties as of given date using standardized procedures and statistical testing. Single-property appraisal, in contrast, is the valuation of a particular property as of a given date. The basic principle of Mass appraisal is the same as that of single-property. This is because both involve basically the appraisal of many properties as of a common date, but mass appraisal techniques emphasize models (equations, tables, and schedules). Mass appraisal, unlike single-property appraisal, requires the development of a valuation model capable of replicating the forces of supply and demand over a large area and appraisal judgments relate to groups of properties rather than to single properties. Model construction can be viewed as a two - step process: (1) specification of the basic model structure and (2) Model calibration.

Computer-assisted mass appraisal (CAMA) is the term applied to computer software that incorporates automated valuation methods (AVMs). The more common AVMs used in CAMA systems are the traditional cost method, comparable sales method, multiple regression analysis, adaptive estimating procedure (AEP) (also referred to as feedback), and the transportable cost-specified market (also called market-calibrated cost).CAMA models use regression analysis or other statistical methods to measure the separate contributions of each different attribute to total value (Bell, Bowman and German, 2009). They pointed out that that for all properties sold and unsold, the computer program can multiply each attribute value by its estimated effect, add them all up, and produce an appraisal of the total value of the property.

Mass appraisal analysis begins with classifying properties to their various use classes based on highest and best use, which in most cases equates to current use. Model in valuation or appraisal is a representation in words or an equation of the relationship between value and variables representing factors of supply and demand. Firstly the supply and demand factors that influence value, for example the plot size will be identified by the valuer/appraiser and this will help specify the model. Then, the model is calibrated. That is, the adjustments or coefficients that best represent the value contribution of the variables chosen are determined.

3.2.1 Value Descriptors of a CAMA Model of a Residential Property

Value descriptors that make up a generic valuation model for a residential property are the characteristics of the property. They are such things as the size, land use, neighborhood etc. They can be classified into two groups, Building Descriptors and Land Descriptors.



4.0 Data Used

The data was drawn from two sources, primary and secondary data. Primary data were collected from the following sources: Anambra State Housing Development Corporation (ASHDC), Awka, Anambra Property and land Use Charge Office, Awka, Professional Estate Surveyors and Valuers and Practicing Estate Surveying and Valuation Firms.

Interviews (oral and telephone) were conducted to probe for further information especially from the Estate Surveyors and Valuers and Tax Officials.

Secondary data on residential buildings and land was collected from property registers of Anambra State Property and Land Use Charge (APLUC) in Anambra State, Textbooks, journals and maps .

One low and high density areas each from the study areas made up the sample of properties for the study. G.R.A Onitsha and Fegge were chosen as the low and high density areas respectively for Onitsha while G.R.A Agu-Awka and New-Era are the low and high density areas for Awka. Twenty properties each from these areas giving a total of eighty properties were chosen for the study. Medium density properties were excluded because it was noticed that there is a very slight margin between the property values in the medium density areas and high density areas thus will not give room for better representation .

5.0 Data Analysis

In analyzing the data, a number of processes were followed, which are identification of variables (with the aid of past literature and questionnaire), quantifying the variables and development of a basic CAMA model.

The variables for land are; Location factor, Land Area and Price per plot in the neighborhood (PPIN)

Variables for building are; Finished Area, Building condition, Age of property, Property Type, No. of Floors, Nature of Development, Floor Finish, Land Use Density, Type of Finishing and Construction Cost.

Some of the variables which are qualitative in nature (e.g floor finish, nature of development etc) were ranked to obtain a quantitative data thus:

Table 1: Ranking of Variables

VARIABLES	RANKING CRITERIA	RANK
1. Building Condition	**Condition**	
	Very good	5
	Good	4
	Fair	3
	Poor	2
	Very Poor	1
2. Property Type	**Type**	
	Detached family house/Semi detached family house	8
	Bungalow	7
	1 storey	6
	2 storey	5
	3 storey	4
	4 storey	3
	5 storey	2
	Tenement	1
3. Nature of Development	**Condition**	
	Improved	3
	Not fully improved	2
	Not improved	1
4. Finishing	**Type of Finish**	
	Marble	7
	Brick/Stone	6
	Marble & Paint	5
	Texcote	4
	Modern Paint	3
	Emulsion Paint	2
	Sandcrete	1
5. Floor Finish	**Type Of Finish**	
	Marble	6
	Ceramic tiles	5
	Terrazzo	4
	PVC tiles	3
	Cement screed	2
	Reinforced concrete	1
6. Location Factor	**Density**	**Grade**
	Low	1
	Medium	0.8
	High	0.7

After ranking, variables of sample properties were ran and transformed in an Excel Spreadsheet to obtain land, building and property value.
To obtain land value a linearised plot value of each property was worked out. The plot linearised value is multiplied with the price per plot in the neighborhood and the location factor to arrive at the land value thus;
Plot LV=LA/Standard Plot Size in the Neighborhood
Land Value = Plot LinV*PPIN* Loc.Fac ……..equation 1
LA represents Land Area; Loc. Fac is Location Factor; Plot LinV is Plot Linearised Value; PPIN- Price of Property in the Neighborhood.
For building values, variables like floor finishes, property type, building condition, nature of development, were quantified and subsequently weighted. The weighted values were arrived at by dividing each value by its maximum component value. For example, % Type of finishing was obtained by dividing the ranked value for the property by 6 (maximum value for floor finish). Age LV was obtained by dividing the building condition by age of the building. Their values helped obtain a quality class (in an excel spreadsheet) which is the multiplying factor that was applied on the cost of construction, Loc.fac. and finished living area to obtain the building value thus;
Quality Class (QC) =No. of Flrs.*% Typ of Fin (TF). *Age LV * % Nat. of Dev (ND) * % Flr.Fin (FF) * %Ppty .Typ (PT). ……..……*equation* 2
Where Typ. of Fin - Type of finish; Nat. of Dev - Nature of Development; No. of Flrs- Number of Floors; Ppty. Typ- Property Type; Flr. Fin- Floor Finish.
Building Value = No. of Flrs. * Fin lvgArea.*Loc.Fac*Sqrt Fin. lvg.area*QC*Cost of Cons……equation 3
Fin lvg. area represents Finished living area; Cost of Cons. is Cost of Construction; Loc.fac is location factor; sqrt fin.lvg area is Square root of finished living area.
This gives a basic Property Value model of structure:
Property Value=Land Value + Building Value…………….equation 4
Land Value=Property Value - [(No.of Flrs * %Typ. of Fin .* Age LV * %Nat. of Dev.* %Ppty .Typ. * %Flr.Fin)*Fin.lvg area*Loc.Fac*SQRT Fin.lvg area*Cost of Con.] ……..equation 5

5.1 Computation of Land Value
Land values were computed from the variables that affect it. Table 2 shows Land value computation for properties in one of the study areas.

Table 2: Land Value Computation for G.R.A Agu-Awka

S/N	LAND AREA A (M^2)	LOCATION FACTOR B	PRICE OF PROPERTY IN THE NEIGHBORHOOD (PPIN) (₦) C	PLOT LINEARIZED VALUE D=A/NBHD plot size	LANDVALUE (LV) (₦) E=D*C
1	912	1	12000000	1.013333	12160000
2	906	1	12000000	1.006667	12080000
3	1736	1	12000000	1.928889	23146667
4	1268	1	12000000	1.408889	16906667
5	928	1	12000000	1.031111	12373333
6	903	1	12000000	1.003333	12040000
7	1002	1	12000000	1.113333	13360000
8	5203	1	12000000	5.781111	69373333
9	1204	1	12000000	1.337778	16053333
10	967	1	12000000	1.074444	12893333
11	911	1	12000000	1.012222	12146667
12	909	1	12000000	1.01	12120000
13	821	1	12000000	0.912222	10946667
14	1014	1	12000000	1.126667	13520000
15	1003	1	12000000	1.114444	13373333
16	1908	1	12000000	2.12	25440000
17	1112	1	12000000	1.235556	14826667
18	1462	1	12000000	1.624444	19493333
19	1104	1	12000000	1.226667	14720000
20	909	1	12000000	1.01	12120000

To obtain Land Value (LV) for property 1, the following was done:
LV = $Plot\ Lin\ V * Loc.Fac * PPIN$
LV= 912/900 (NBHD plot size)* 1*12000000
LV= ₦12, 160,000

5.2 Computation of Building Value

Some building value variables which are qualitative in nature (floor finish, property type etc) were ranked as shown in Table 3

Table 3: Qualitative Building Variables and their ranking for G.R.A Agu-Awka

S/N	TYPE OF FINISH	BUILDING CONDITION	NATURE OF DEVELOPMENT	FLOOR FINISH	PROPERTY TYPE
1	SANDCRETE 1	FAIR 3	IMPROVED 3	CEMENT SCREED 2	BUNGALOW 7
2	EMULSION PAINT 2	GOOD 4	IMPROVED 3	TERRAZZO 4	BUNGALOW 7
3	MARBLE &PAINT 5	GOOD 4	IMPROVED 3	TERRAZZO 4	BUNGALOW 7
4	MARBLE &PAINT 5	GOOD 4	IMPROVED 3	TERRAZZO 4	1 STOREY 6
5	TEXCOTE 3	VERY GOOD 5	IMPROVED 3	TERRAZZO 4	BUNGALOW 7
6	SANDCRETE 1	VERY POOR 1	NOT FULLY IMPROVED 2	REINFORCED CONCRETE 1	DETACHED/SEMI DETACHED FAMILY HOUSE 8
7	TEXCOTE 3	VERY GOOD 5	IMPROVED 3	TERRAZZO 4	BUNGALOW 7
8	EMULSION PAINT 2	GOOD 4	IMPROVED 3	PVC TILES 3	BUNGALOW 7
9	EMULSION PAINT 2	GOOD 4	IMPROVED 3	TERRAZZO 4	1 STOREY 6
10	EMULSION PAINT 2	POOR 2	IMPROVED 3	CEMENT SCREED 2	BUNGALOW 7
11	SANDCRETE 1	POOR 2	IMPROVED 3	TERRAZZO 4	DETACHED/SEMI DETACHED FAMILY HOUSE 8
12	EMULSION PAINT 2	GOOD 4	IMPROVED 3	CERAMIC TILES 4	BUNGALOW 7
13	SANDCRETE 1	POOR 2	IMPROVED 3	PVC TILES 3	DETACHED/SEMI DETACHED FAMILY HOUSE 8
14	TEXCOTE 3	VERY GOOD 5	IMPROVED 3	CERAMIC TILES 5	1 STOREY 6
15	TEXCOTE 3	GOOD 4	IMPROVED 3	TERRAZZO 4	BUNGALOW 7
16	TEXCOTE 3	VERY GOOD 5	IMPROVED 3	CERAMIC TILES 5	DETACHED/SEMI DETACHED FAMILY HOUSE 8
17	EMULSION PAINT 2	GOOD 4	IMPROVED 3	CERAMIC TILES 5	DETACHED/SEMI DETACHED FAMILY HOUSE 8
18	TEXCOTE 3	GOOD 4	IMPROVED 3	CERAMIC TILES 5	1 STOREY 6
19	MODERN PAINT 4	GOOD 4	IMPROVED 3	TERRAZZO 4	BUNGALOW 7
20	SANDCRETE 1	POOR 2	IMPROVED 3	CEMENT SCREED 2	DETACHED/SEMI DETACHED FAMILY HOUSE 8

Subsequently these building variables were transformed in the excel spreadsheet to compute their corresponding quality class. Then the quality class was used to determine building values. Table 4 and 5 shows, Quality Class and Building Value computation respectively for one of the study areas.

Table 4: Quality Class Computation for G.R.A Agu-Awka

S/N	FLA	TF	BC	AGE	ND	FF	NF	PT	% TF	AGE LV	%ND	%FF	%PT	QC
1	547.2	1	3	10	3	2	1	7	0.143	0.3	1	0.33	0.875	0.013
2	389	2	4	10	3	4	1	7	0.286	0.4	1	0.67	0.875	0.067
3	1326	5	4	10	3	4	1	7	0.714	0.4	1	0.67	0.875	0.167
4	644.4	5	4	10	3	4	1	6	0.714	0.4	1	0.67	0.75	0.143
5	418	3	5	5	3	4	1	7	0.429	1	1	0.67	0.875	0.250
6	561.2	1	1	15	2	1	1	8	0.143	0.067	0.67	0.17	1	0.001
7	609.8	3	5	9	3	4	1	7	0.429	0.556	1	0.67	0.875	0.139
8	3581.7	2	4	15	3	3	1	7	0.286	0.267	1	0.5	0.875	0.033
9	620.2	2	4	10	3	4	1	6	0.286	0.4	1	0.67	0.75	0.057
10	724	2	2	15	3	2	1	7	0.286	0.133	1	0.33	0.875	0.011
11	547.7	1	2	10	3	4	1	8	0.143	0.2	1	0.67	1	0.019
12	502.5	2	4	10	3	2	1	7	0.286	0.4	1	0.33	0.875	0.033
13	228.6	1	2	15	3	3	1	8	0.143	0.133	1	0.5	1	0.010
14	272.8	3	5	7	3	5	1	6	0.429	0.714	1	0.83	0.75	0.191
15	492.6	3	4	10	3	4	1	7	0.429	0.4	1	0.67	0.875	0.1
16	526.3	3	5	11	3	5	1	8	0.429	0.455	1	0.83	1	0.162
17	278.4	2	4	12	3	5	1	8	0.286	0.333	1	0.83	1	0.079
18	654	3	5	6	3	6	1	6	0.429	0.833	1	1	0.75	0.268
19	594.5	4	4	13	3	4	1	7	0.571	0.308	1	0.67	0.875	0.103
20	515.4	1	2	14	3	2	1	8	0.143	0.143	1	0.33	1	0.007

Thereafter most of the variables which are weighted to obtain their percentage mean values are multiplied to obtain the quality class (QC). For example the quality class for property 1 was obtained thus;

QC= %Typ. of Fin. *Age LV * %Nat. of Dev * %Flr.Fin * %Ppty. Typ. * Fin.lvg area* Loc.Fac* SQRT Fin.lvg area

QC= 0.143*0.30*1*0.33*0.875

QC= 0.01238735

Table 5: Building Value Computation for G.R.A Agu- Awka

QC	LOC.FAC	FIN.LVG AREA	SQRT FLA	COST OF CONST./M^2	BUILDING VALUE (₦)
0.0125	1	547.2	23.39231	24,000	3840081
0.066667	1	388.96	19.72207	24,000	12273753
0.166667	1	1326	36.41428	24,000	193141357
0.142857	1	644.4	25.38503	24,000	56084971
0.25	1	418	20.44505	24,000	51276181
0.001058	1	561.2	23.68966	24,000	337641.58
0.138889	1	609.8	24.69413	24,000	50194933
0.033333	1	3581.7	59.84731	24,000	171484076
0.057143	1	620.2	24.90381	24,000	21182189
0.011111	1	724	26.90725	24,000	5194892.7
0.019048	1	547.7	23.40299	24,000	5859574.1
0.033333	1	502.5	22.41651	24,000	9011437.7
0.009524	1	228.6	15.11952	24,000	790016.72
0.191327	1	272.8	16.51666	24.000	20689643
0.1	1	492.6	22.19459	24,000	26239337
0.162338	1	526.3	22.94123	24,000	47041438
0.079365	1	278.4	16.68532	24,000	8847988.4
0.267857	1	654	25.57342	24,000	107517980
0.102564	1	594.5	24.38237	24,000	35680786
0.006803	1	515.4	22.70242		1910339.4

The Building Value (BV) for property 1 is computed thus;

BV= $QC * Loc.factor * Finished\ living\ Area * SQRT\ of\ Finished\ Living\ area * Cost\ of\ Construction$

BV = 0.01238735*1*547.2*23.39231*24,000

BV=₦3, 805,482.

Computation of Property Values

Property Values for the properties are computed by summing up the land values and building values. This is shown in table 6

Table 6: Computation of Property Values for G.R.A, Agu-Awka

S/N	LAND VAL.	BLD. VAL	EMV	%LAND VAL	% BLD VAL
1	12160000	3840081	16000081	76%	24%
2	12080000	12273753	24353753.4	50%	50%
3	23146667	193141357	216288023	11%	89%
4	16906667	112169942	129076609	13%	87%
5	12373333	51276181	63649514.5	19%	81%
6	12040000	675283.16	12715283.2	95%	5%
7	13360000	50194933	63554932.6	21%	79%
8	69373333	171484076	240857409	29%	71%
9	16053333	42364378	58417711.1	27%	73%
10	12893333	5194892.7	18088226	71%	29%
11	12146667	11719148	23865814.8	51%	49%
12	12120000	9011437.7	21131437.7	57%	43%
13	10946667	1580033.4	12526700.1	87%	13%
14	13520000	20689643	34209642.5	40%	60%
15	13373333	26239337	39612670.1	34%	66%
16	25440000	94082875	119522875	21%	79%
17	14826667	17695977	32522643.4	46%	54%
18	19493333	107517980	127011313	15%	85%
19	14720000	35680786	50400786.1	29%	71%
20	12120000	3820678.8	15940678.8	76%	24%
				868%	1132%
				Average percentage of land value 43%	Average percentage of Building value 57%

For property 1 the Property Value (PV) is computed thus;

PV= LV+BV

PV= 12,160,000 +3,840,081

PV= ₦ 16,000,081

A further analysis shows that the percentage of land value in the overall property value is 43%, showing that it has a great contribution in the property value. The same pattern was seen in the other study areas. This shows that if land value is not taxed for vacant land a good proportion of revenue from it is thrown away. Government thus looses revenue by neglecting this avenue (land value) for increasing its tax base.

5. Conclusion

Computation of land and building value shows that both values can be obtained separately and can be distinct. The distinction is such that both can be separate from each other. The study has thrown up challenges, especially in trying to use scientific means (excel worksheet) and not intuition or 'code rate' to arrive at land, building and property value and then linking them in a multiple regression model for evaluation. When the property has no structure on it then the property value is the land value alone. With the partitioning of property value into land and building, tax them will not be based on code rate but based on proportion or contribution of each component to the property value. When land value is determined in built up areas, its value will apply to vacant lands for effective taxation. This will go a long way to discourage speculation, exorbitant land prices, scattered development, urban sprawl while encouraging dense development and sustainable land use.

References

Abiama, G.D (2011) Land ownership, housing Costs and the prosperity paradox. A paper presented at the first Nigeria land rights symposium, Niger Delta University, Amassoma, Bayelsa State, Nigeria.

Bell, M. E., Bowman, J.H. & German J.C. (2009). Assessment requirements for a separate tax on land. *In land value taxation: Theory, evidence and practice.* Dye R.F. and England R.W. (ed.). Cambridge, MA: Lincoln institute of land policy.

Dadkhah, H., Mostafapour M.A., Rezaei, H., AliBeygi, H. & Sepeh, M. (2014). Land Value Taxation: A Modern Pattern of financing (Dynamic modeling of Tehran municipality) *International Journal of Research in Issue 4*, Vol. 3 (May 2014) . Available online on: http://rspublication.com/ijrm/2014/may14/6.pdf

Eckert, J.K (1990) Property Appraisal and Assessment Administration. Chicago, Association of Assessing Officers

Federal Government of Nigeria Land Use Decree No.6, 1978.

Lindholm, R. W. (1965) *Property taxation, U.S.A.* Proceedings of a symposium sponsored by the Committee on Taxation, Resources and Economic Development (TRED) at the University of Wisconsin, Milwaukee, U.S.A.

National Bureau of Statistics (2006). Poverty and livelihood in Anambra State. Abuja, Nigeria: .

National Population Commision Nigeria (2006). Data for national development. *http://www.population.gov.ng/index.php/censuses*

Plassmann, F. & Tideman, T. N. (2000). A Markov chain Monte Carlo analysis of the effect of two-rate property taxes on construction. *Journal of Urban Economics 47* (2):216-247. 152

United Nations Human Settlements Programme UN-HABITAT(2009). Structure plan for Awka and satellite towns, http://www.unhabitat.org/pmss/getElectronicVersion.aspx?nr=2687&alt=1 retrieved 22:05 2015

Wuensch, J, Kelly, F. & Hamilton, T. (2000). Land value taxation views, concepts and methods: A Primer, Lincoln Institute of Land Policy - *Unpublished Working Paper.*