

## **Determinants of Profitability of Sawmill Industry in Ibadan metropolis Area of Oyo State, Nigeria.**

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### **Abstract**

The study examined the economic analysis and determinants of profitability of saw mill industry in Ibadan metropolis area of Oyo state, Nigeria. Multi-stage sampling procedure was employed to select eighty nine (89) saw millers in the study area. Detailed questionnaire was used to obtain relevant information from the respondents. Budgetary analysis was used to calculate the profitability while regression analysis was used to determine factors affecting the profitability of the sawmill. About forty seven percent (47%) of the respondents fell within the age range of 51 -60 years, seventy nine percent (79%) were males and seven three percent (73%) engaged in saw milling as the only source of livelihood. The result of the budgetary analysis showed that total variable cost (TVC) was ₦1,315,666.7, Total fixed cost (TFC) was ₦83,138.4 while the total cost (TC) was computed as ₦1,398,805.1 and total revenue(TR) was ₦1,950,653. The profit realized was ₦551,847.9 and the gross margin was ₦634,986.3 while the BCR was 1.40. The result of the regression analysis showed that number of trained sawyers ( $P<0.1$ ), source of capital ( $P<0.1$ ) and quantity of plank sold ( $P<0.05$ ) and type of conversion machine used ( $P<0.05$ ) increased the profitability of sawmill business in the study area. The study recommended that old/obsolete machineries should be replaced and respondents' proper training is paramount to an efficient saw milling operation.

**Key words :** sawmill ; profitability; forest ; timber.

**Introduction:** Forest is a major economic resource of great importance to the people and the Nation in general. It is a major source of livelihood for most Nigerians, particularly, Oyo state residents. The forestry sector is one of the main pivots on which the nation's welfare was built. Apart from its economic importance, the forest is a rich source ecological and cultural resource. Among the highest revenue generating sectors in the country, the forestry sub-sector contribute significantly to the socio-economic development of the nation ( Bolaji, *et al.*, 2023).The main products derived from the forest are trees (timber). Timber is the most economically important product of the forest. Globally, about 3.4 billion cubic meters of timber equivalent are provided from the forest yearly (Babatunde, 2019). Economic activities associated with forest resources has contributed to national economies and provided employment opportunities (Uzu *et al.*, 2022). People used timber in the construction of houses, barns, fences, bridges, furniture items and musical instruments. In contemporary times, wood is still widely used for constructional purposes. Pulp, paperboard, rayon, cellophane, photographic films, tannin, methanol, ethanol, wood adhesives and chemical derivatives are made from timber hence it is a valuable raw materials to industries (Babatunde, 2019). Sawmill is a critical industry whose performance has direct implications for both present and future generations. Timber industry has the potential to improve economic performance and increase state and household revenues. Amongst some popular micro-enterprises in the country such as block-making, carpentry, soap making and tailoring, sawmill industry is at the fore front of the economy advancement and growth (Ajibefun and Daramola, 2004) as cited by (Ogundari,

2010). A lot of people partake in the production of and marketing of timber because of its ability to generate quick return or profit with little risk in contrary to the secondary processing activities for export (Sambe *et al* 2016). Some notable tree species used for lumber in Nigeria and particularly in the study area include Gmelina (*Gmelina arborea*), Teak (*Tectona grandis*), Red apa (*Azelia Africana*), Ekki (*Lophira alata*), Opepe (*Nauclea diderichii*), Afara ( *Terminalia superb*) Mansonia (*Mansonia altissima*), Iroko (*Milicia excelsa*), Afromosa (*Pericopsis elata*), Obeche ( *Triplochiton scleroxylon*) (Eru (*Erythrophloeum spp*)). As evident, demand for plank is rising in almost every part of Nigeria without a balanced supply. Babalola *et al.*, (2018) stated that the conversion of timber to lumber of various grades or sizes is a major process that is needed for the end use of wood products which is a major economic activity of most small scale saw mills. In another studies conducted by Ohwo *et al* 2014, sawn wood processing and marketing contribute to sustainable livelihoods in both rural and urban part of the country. Availability of sawn wood has been discovered to be problem that can be attributed to the sawn wood production from the point of felling to the last stage of selling of wood. A research conducted by Akanni and Adetayo 2011 stressed out some problems affecting the improvement of the sawmill industries as low capital utilization, inadequate logging equipment, shortage of spare parts and skilled manpower coupled with poor condition of the machinery and tools. Apart from energy supply, another major factor limiting growth in sawmill industry is scarcity of economic timber resources (Larinde, 2010). These problems are also, peculiar to the sawmill industries in Ibadan metropolis area of Oyo state.

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Several studies have been carried out on cost and return analysis and technical efficiency of timber (Ogundari, 2011, Akanni and Adetayo, 2011, Babatunde, *et al.*, 2019 and Adegbenjo *et al.*, 2014), as a result an outstanding study would be of high necessity to estimate the cost and return of saw mill industry in the study area. Therefore, the objective of this study is to evaluate the economic analysis and determinants of profitability of sawmill industry in Ibadan metropolis area of Oyo state, Nigeria.

**Methods and Materials: The study area:** The study was carried out in Ibadan, Oyo state. Ibadan, the capital of Oyo State is located in the Southwestern part of Nigeria between latitude 7 0 23 ' and 7 0 54 ' North of equator and longitude 3 0 53 ' and 3 0 54 ' East of the Greenwich Meridian. The city is elevated at about 234 meters above sea level and it is situated on gently rolling hills running in a Northwest/southeast direction. It is the capital and most populous city of Oyo State, in Nigeria. It is the third-largest city by population in Nigeria after Lagos and Kano, with a total population of 3,649,000 as of 2021, and nearly 4 million within its metropolitan area. Ibadan enjoys the West African monsoon climate which has two major seasons (rain: March and October and dry: November and February season). Ibadan is found in the Guinea savannah, thus it is naturally a belt of a mixture of trees and tall grasses in the South, with shorter grasses and less trees in the North. Notable crops grown in the study area include but not limited to yam, cassava, cowpea, maize and vegetables. Also, sawmilling business is a viable business in the study area.

**Sampling Procedure and Sampling Size :** Primary data was used for this study and data was collected with the aid  
 $Profit = Total Revenue - total Cost \text{ i.e. } \pi = TR - TC \text{-----} 1$

where  $TC = TVC + TFC \text{-----} 2$

Gross margin ( $GM$ ) =  $TR - TVC \text{-----} 3$

where  $TR = P \cdot Q \text{-----} 4$

P= Price per plank, Q= quantity of planks sold.

TVC = total variable cost incurred in plank processing such as transportation cost, cost of log, cost of power used, labour, rent etc. TFC= total fixed cost incurred such as depreciated cost of machinery, cost of generating set and cost of lorry.

Benefit - Cost Ratio (BCR) is a measure of profitability. It was used to determine and to confirm the profitability of each sawmill operator. The formula is stated as;

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7)$$

Where Y= estimated revenue,

X<sub>1</sub>=age, X<sub>2</sub>= years of experience, X<sub>3</sub> = source of capital, X<sub>4</sub>= type of conversion machine used, X<sub>5</sub>= quantity of planks sold, X<sub>6</sub>= number of trained sawyers and X<sub>7</sub> = Power

**Results and Discussion: Socio-economic characteristics of saw millers in the study area:** Table 1 presents the socio- economic characteristics of the respondents in the study area. Age of the respondents showed that a good percentage (47%) of the respondents were found to be within the age range of 51 and 60 years of age, only very few (11%) fell within the age range of

of well - structured questionnaires / interview guide. Information such age, sex, household size, years of saw milling experience, source of capital, quantity of saw wood produced, prices per plank etc were enquired. Multi-stage sampling technique was used to select the respondents for this study. The first stage involved random selection of three out of the five local government area in Ibadan metropolis and these were Ibadan north, Ibadan north-east and Oluyole local government areas. This second stage involved the purposive selection of Bodija sawmill, new garage sawmill, Olorunsogo sawmill and Omi-Adio sawmills. This selection was based on their closeness or proximity and scale of operation. The third stage was the random selection of forty (40) saw mill operators from bodija being the largest saw mill in the area, followed by thirty (30) respondents from new garage sawmill, twenty two (22) respondents from Olorunsogo saw mills and eight (8) respondents from Omi-adio saw mills to make a sample size of one hundred (100) saw millers. This selection method is proportionate to sample size of the respondents in the study area. Out of the one hundred (100) respondents sampled for the study, only eighty nine (89) were retrieved and used for analysis.

**Data collection:Method of data analysis:** Descriptive statistics and budgetary analysis were adopted for the study. Descriptive statistics was used to analyse the socio-economic characteristics of the respondents and constraints faced by timber marketers while budgetary analysis as used by Babatunde *et al.*, 2017, Adegbenjo *et al.*, 2014 and Olapade-Ogunwole *et al.*, 2011 was used to analyse the profitability of timber marketing in the study area.

$$BCR = Total Revenue (Benefit) \div Total cost$$

A business enterprise can be termed profitable if BCR is greater than one [BCR > 1] (Adegeye and Dittoh, 1985).

Regression analysis: Regression analysis measures the degree of association of relationship between a dependent variable(Y) and some set of independent variables (X). The model for the regression analysis is given as :

31 and 40 years. This implies that most of respondents were aged people and this aligns the findings of Agbonlahor (2010) who reported that most of his respondents were between the age of 51 and 60 years and this directly affects their productivity and ability to take risk. In terms of sex of the respondents, the result showed that majority (79%) of the respondents were males while

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few (21%) of them were females. This is an implication that the drudgery nature of the work makes it suitable for men to engage in the business as compared to women. Further, about 73% of the respondents engaged in saw milling operation as the only source of income while the remaining 16% were traders. This implies that saw milling business is a very profitable and reliable source of livelihood in the study area. As regards respondents' level of education, majority (73%) of the respondents were literate while few of the respondents (27%) had no formal education. This is an indication that there is a good literacy level in the study area. This result aligns with the study of Akanni and Adetayo, 2011 where 75% of the respondents had formal education. Regarding working experience,

most of the respondents (62%) had more than ten years of working experience and this therefore indicates that they have been in the business for long. This result is in consonance with the findings of Agbonlahor (2010) where he affirmed that most of his respondents had more than ten (10) years of working experience and that saw-milling experience is very important for an improved productivity. Finally, majority of the respondents (90%) belong to sawmillers association while very few (10%) did not join the association due to individual opinion and some other factors. About 39% and 24% of the respondents joined the association for social and marketing education respectively.

**Table 1:** Socio-economic characteristics of the respondents

Socio-economic variables	Frequency	Percent
<b>Age</b>		
31 – 40	10	11.2
41 -50	23	25.8
51 -60	42	47.2
61 -70	14	15.7
<b>Sex</b>		
Male	70	78.7
Female	19	21.3
<b>Marital Status</b>		
Single	10	11.2
Married	61	68.5
Widow/ widower	8	9.1
Widow/widower	10	11.2
<b>Level of education</b>		
No formal educ	24	27.0
Primary	12	13.5
Secondary	35	39.3
Tertiary	18	20.2
<b>Years of experience</b>		
1 – 4	12	13.5
5 -9	22	24.7
>10	55	61.8
<b>Occupation</b>		
Sawmill business	65	73.0
Trading	14	15.7
Other	10	11.3
<b>Type of conversion machine</b>		
Circular saw	30	33.7
Band saw	15	16.9
Both	44	49.4
<b>Sources of logs</b>		
Govt forest reserve	14	15.7

Farms	45	50.6
Natural forest	30	33.7
<b>Number of Lorries</b>		
1	52	58.4
2	20	22.5
0	17	19.1
<b>Membership</b>		
Yes	80	89.9
No	09	10.1
<b>Benefit Derived</b>		
Price fixation	13	14.6
Loan facilities	20	22.5
Social interaction	35	39.3
Marketing education	21	23.6

**Budgetary analysis of sawmill industry in the study area:** The table presents the costs and return of sawmill industry in the study area. The profitability of sawmill enterprise was assessed using budgetary method. The total cost of all the respondents were calculated and total revenue was estimated to determine the profitability of sawmill industry. From the result of the analysis, the average monthly total cost of 89 respondents of the

sawmill operators/ marketers was computed using straight line depreciation method to calculate the total fixed cost. The total variable (TVC) cost was amounted to ₦1, 315, 666.7 total fixed cost (TFC) was ₦83,138.4, total cost (TC) amounted to ₦1, 398, 805.1 while total revenue (TR) was ₦1, 950, 653. The gross margin realized per month was ₦ 634,986.3 while the monthly net profit made from the business was ₦ 551, 847

Table 2: Budgetary analysis

Average Variable costs per month	(₦)
Cost of log	230,615
Cost of transportation	399,286
Cost of wages	135,197
Cost of rent	25, 567.2
Cost of diesel	395,000
Cost of electricity	33,990.7
Maintenance cost	65,760.2
Tax =	30, 250.6
<b>Total variable cost (TVC) =</b>	<b>1, 315, 666.7</b>
<b>Fixed Cost</b>	
Depreciated cost of machine =	17,450.1
Depreciated cost of generating set=	30,132.1
Dep. cost of lorry =	35, 556.3
<b>Total Fixed Cost (TFC) =</b>	<b>83, 138.4</b>
<b>Total Cost (TC) = TVC +TFC =</b>	<b>1,315666.7 + 83, 138.4 = 1, 398,805.1</b>

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Revenue = P.Q = 1, 950, 653

Profit ( $\pi$ ) = TR- TC = 1,950, 653 – 1,398, 805.1 = 551,847.9

Gross Margin = TR – TVC = 1,950, 653 – 1, 315, 666.7 = 634, 986.3

*Investment Analysis:* In order to further test for the profitability of the business the benefit-cost (BCR) analysis was calculated. The benefit/cost ratio showed that for every ₦1 invested in sawmill business, a profit of 40 kobo was made and this showed that the business is worthwhile and profitable. *Benefit-cost ratio* =

$$ATR/ATC = 1, 950,653/ 1,398,805 .1= 1.40$$

**Regression Analysis:** Table 3 showed the result of regression analysis on determinants of profitability of sawmill industry in the study area. Out of the seven dependent variables included in the model, only four were found to be positively related to profitability of sawmill in the study area. The coefficient of source of capital used in the business was positive and significant at 10% level, which showed that sawmill business requires huge capital for the smooth running of the business enterprise. This

supports the study of Akanni and Adetayo (2011) where it was discovered that sawmill business requires a huge capital outlay. The coefficient of type of conversion machine used was positive and significant at 5% level, indicating that highly efficient conversion machine is a requisite for a successful sawmill operation. Another factor having direct influence on profitability of sawmill was quantity sold. This result implies that some economic trees traded in the study area have higher market prices than others and as a result they increase the amount of profit accrued in sawmill business. The coefficient of number of trained sawyers was positive and significant at 5% level, showing the drudgery nature of the job and implying that more profit would be generated so long appropriate numbers of labour forces / trained sawyers are employed into the business. This aligns the research carried out by Kehinde *et al.*, 2010 where labour was reported as a determinant factor in sawmill operation.

Table 3: determinants of profitability of saw mill industry in the study area

Variables	Coefficient	Standard error	t-values
Constant	-4878413.4	5375143.7	-0.908
Age	64453.7	59864.3	1.077
Years of experience	651077.5	636695.3	1.023
Source of capital	632911.3	334374.7	1.893*
Type of machine	997279	479529.8	2.08**
Quantity sold	137.1	76.3	1.797*
No of sawyers	1218562.9	588746.0	2.070**
Power	116119.7	386638.4	0.30

Dependent variable: revenue

n = 89.

Adjusted R<sup>2</sup> = 0.75

\* - Statistically significant at 10% probability level

\*\* - Statistically significant at 5% probability level

\*\*\* - Statistically significant at 1 % probability level.

**Challenges Facing Sawmill Business in the Study Area:**

Tale 4 showed that a good percentage (46%) of the respondents in the study area indicated high capital outlay as challenges being faced in the business, another 19% of the respondents indicated power shortage as their own challenges, 12% accounted for those whose challenges

was shortage/ scarcity of economic trees in the forest while14% were those who stated that high transportation cost affected their business and very few (8%) of the respondents were affected by government policies guiding log cutting in the forest.

Table 4: Challenges Facing Sawmill business in the study area.

Challenges	Frequency	Percent
Power Shortage	17	19.1

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Capital Intensive	41	46.1
Government policy	7	7.9
High transportation cost	13	14.6
Shortage/ scarcity of logs	11	12.3
<b>Total</b>	<b>76</b>	<b>100</b>

**Conclusion:** Findings from this study showed that sawmill enterprise is a profitable and viable business in the study area. However, challenges such as source of capital, transportation and power need to be worked upon or sorted out in order to have a smooth running of the sawmill enterprise. It is recommended that the respondents should form cooperative society and group contribution in order to ease the burden of capital needed in the sawmill enterprise since it is mostly needed to carry out almost all activities in the sawmill enterprise. Also, sawmill owners are enjoined to get highly efficient conversion machine as it is very paramount to a successful sawmill enterprise. Sawmill business owners are encouraged to make deliberate efforts in regeneration of forest trees so as to promote forest conservation.

## References

- Adegeye, AJ; Dittoh, JS (1985). *Essential of Agricultural Economics*. Impact publisher, Nigeria Limited.
- Adegbenjo, A.E., Odeyale, O.C., Adebari, T.O., Adedokun, M.O. and Kareem, I.A. (2021). Economic analysis of major wood species sold in plank markets in Alimosho local government area of Lagos state, Nigeria. *Journal of Research in Forestry, Wildlife and Environment*, 13(3) : 82 – 90.
- Agbonlahor, MU (2010). Productivity dispersion and technical inefficiency in smallholder timber mills in Ogun state, Nigeria. *J. Hum. Soc. Sci. and Cre. Arts*, 5(1): 49 – 60.
- Akanni, KA ; Adetayo, AO (2011). Estimation of cost – return structure and technical efficiency in saw milling industry in Ijebu Division, Ogun state, Nigeria. *J. For. Res. Mgt.* 64 – 79.
- Babalola, A.A. , Adeyemi, H.O., Lawal, N.S., Adetifa, B.O. ,& Adama, K.O. (2018). Characterization of small scale lumber saw mills in a rural area in Nigeria. *Journal of Experimental Research*,6,(9) , 12 -21.
- Babatunde, TO; Babatunde, OO; Adejumo, AA; Okeleke, SO (2019). Cost and return structure in sawmill industry in Ijebu Ode, Ogun state, Nigeria. *J. Res. in For., W. Envnt.*, 9 (3), 12-18
- Babatunde, TO (2019). Profitability and value addition of sawmills industry in Ijebu division of Ogun state, Nigeria. *J. Res. For. W. Envnt*, 11, (2). ISBN : 2141 – 1778.
- Bolaji. K.A., Adebayo, D.O., Kabir, G.B., Ahmed, O. and Adesogan, D.B. (2024). Credit accessibility among plank entrepreneurs in Oyo state, Nigeria. *Journal of Research in Forestry, Wildlife and Environment*, 16 (1) : 1-10.
- Kehinde, AL; Awoyemi, TT; Omonona, BT; Jakande, JA (2010). Technical efficiency of sawnwood production in Ondo and Osun states, Nigeria. *J. For. Econ.* 16: 11-18.
- Larinde, SL (2010). Secondary processing and Nigerian saw mill industry: Issues, challenges and opportunities. In S. Kolade Adeyolu and S.O Bada (Eds) *Readings in sustainable tropical forest management*: 277-291.
- Ohwo, O.A., Ajewole, O.I. and Popoola, T. (2014). Spatial price transmission and market integration of *Grastanthera papaverifera* (A. Chev.) in urban and rural sawnwood markets in Delta state, Nigeria. *Journal of Agricultural, Forestry and Social Sciences*, 12 (2)
- Ogundari, K (2010). Estimating and analyzing cost efficiency of saw mill industries in Nigeria : A stochastic frontier approach. *China econ. Rev.*, 420 – 432.
- Ogundari, K; Ojo, SO (2006). An examination of technical, economic and allocative efficiency of small farms: The Case Study of Cassava Farmers in Osun State of Nigeria. *J. cen. Europ. Agric.*, 7 (3): 423 – 432.
- Olapade-Ogunwole, F; Olawuyi, SO; Akinniran TN (2011). Economic analysis of locust bean processing and marketing in Iwo local government, Osun state. *Int. J. App. Agric. Api. Res.*, IJAAAR 7 (1&2):54-63.
- Sambe, LN; Tee, NT; Dagba, BI (2016). Profitability analysis of timber trade in Benue state, Nigeria : Implication for poverty alleviation. *Asian J. Agr. Ext. Econ. Soc.* 11(3) : 1- 10.
- Sambe, LN; Ancha, PU; Jacob, DO (2022). Analysis of timber marketing in Lokoja metropolis, Kogi state, Nigeria. *Asian J. Econ. Bus. Acc.* 22(13): 59- 70.
- Uzu, J; Bettinger, P; Siry, J; Mei, B (2022). Timber Business In West Africa. *A review and outlook. International forestry review* 24 (2), 240-256.

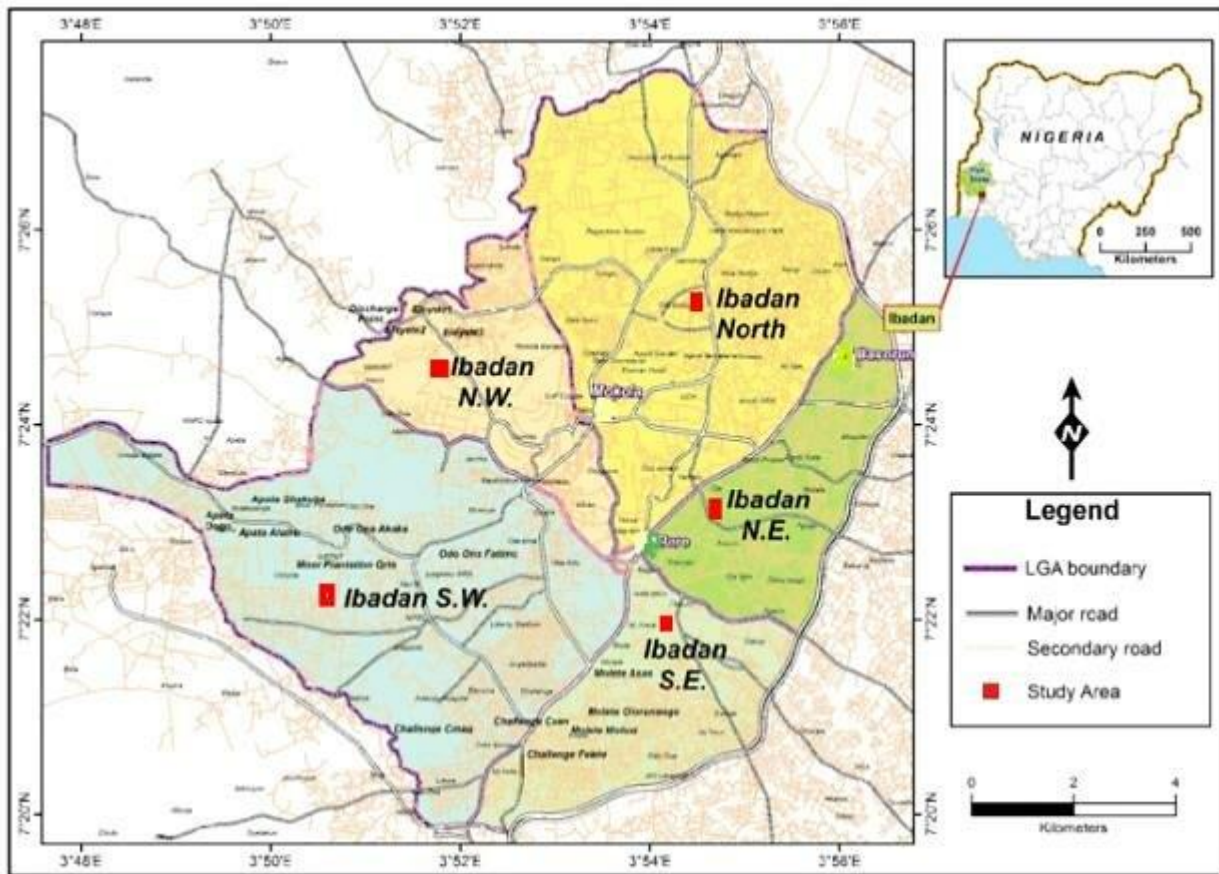


Figure 1: map of Ibadan metropolis: Source : Oyo state website

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