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ARTICLE

Upshot of Sprawl Incidence on Pattern of Land Use Changes and Building Physiognomies in Akure Region, Nigeria

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ABSTRACT

This study investigates the upshot of sprawl incidence on pattern of land use changes and building physiognomies in Akure and its environs. Using social survey research method (SSRM) to investigate the upshot, data were gathered via structured questionnaires on selected households in the region, involving Akure municipal and eight contiguous communities. Basically, the survey method involves interview, personal observation and photo-to-snaps to elucidate existing situation in the region. Average households' population in Akure municipal was estimated at 95,232 while 14,794 was estimated in the selected eight contiguous communities. From this, a sample of 1% was systematically selected, which amounted to 1100 sampled households. Findings show regular massive inflow of people into the city due to unguided expansions that have serious sway on land use determinant in the city and its contiguous communities. It also has significant influence on variation in building arrangements and facility distribution across the region. To mitigate this, the study advocates proactive efforts of stakeholders in urban management to employing inventive measures over private and public lands in logical manners. It also suggests the espousal of regional development programs to checkmate the rate of peoples' incursion into Akure, being the state capital. Local government headquarters and other major towns in the region should be reinforced with functional basic facilities to curtail the excessive influx into the city.

1. Introduction

Cities are epicentres of life, thereby attracting human influx that often leads to unprecedented growth. Urban growth is a worldwide phenomenon but the rate is faster in developing nations like Nigeria where growth is driven by unorganised expansion, rapid increasing population, increasing migration, and unchecked physical development. The aftermath result of these is incidence of sprawl in different parts of the nation. According to Banai and Thomas [1], sprawl is unintended consequence of lifestyle in suburban houses and auto-commute to work. They also considered it a waste of resources in matters attached with land, water, air, and energy; simply, because of its unregulated expansion that affected civic life, economy and society at large. From professional angle, Hayden [2] defines sprawl as a process of large-scale real estate development resulting in

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low-density, scattered, discontinuous construction, usually at the periphery of declining older suburbs and shrinking city centres. Bourne [3] and Owoeye [4] discussed sprawl as an extension or spread of development into valuable Greenfields and agricultural land areas. According to them, it involves increase in highway congestion, proliferation of new subdivisions of homogeneous low density, and single-family housing. It is a suburban area that is haphazardly developed, disorganized, poorly serviced with basic facilities, and largely unplanned for sustainable growth. According to Longman Dictionary [5], sprawl is the spread of city buildings and houses into areas with physical landscape; hence, the spread of urban congestion, urban outlook, activities and influence into contiguous suburbs of a city and its rural hinterlands.

Land use change, on the other hand, is urbanization-driven which has been recognized globally as urban problem present in most countries of the world. Balogun et al [6] posits that urban populations in developing countries increased by 40% between 1900 and 1975. They further predicted that the trend will continue to add approximately 2 billion people to the urban population of the presently less-developed nations for the next 30 years. In 2003, Arnfield [7] posited that the world was increasingly urbanized with 45% of the world's population were already living in urban areas since the year 2000. The United Nation Population Fund [8] projected 60% of the world's population to live in cities by the year 2025. Today, 55% of the world lives in cities with upward projection of 68% in 2050 [9]. Oduwaye [10], in his work titled "urban land use planning and reconciliation", anticipated 70% of world population living in urban areas by the year 2050 as induced by urban millennium initiation. These estimates show the inevitability of cities' unceasing sprawl with attendant alterations in land use patterns and building characteristics.

The growth trend of Akure is similar to this prognosis. Historic milieu of the city shows asymmetric increase in its population. Currently, the population has tripled what it was before it became the state capital and local government's headquarters in 1976. No doubt, this has brought ineffable changes on the physical landscape and structural development in the city. The thrust of this paper, therefore, is to investigate the upshots of sprawl prevalence in Akure on change pattern in land use and building characteristics with a view to providing essential information to solving problems associated with haphazard growth in the region.

2. Literature Underpinning

Sprawl in Nigeria is antedated to British colonization. According to Oduwaye [10, 11], the scenario in Nigeria is favoured by rapid rate of migration from rural landscape to urban areas, natural increase through birth, and ever changing socio-political and economic structure. Since urban explosion that was witnessed between 1970 and 1984, urban land use had been increasingly subjected to changes in different forms, sorts and types [11]. The explosion was triggered by the economic boom witnessed in Nigeria in that epoch before the downturn in the mid-eighties. According to Fabiyi [12], sprawl developments that featured prominently in the second epoch came in the form of shanties and ramshackle buildings when people migrated to cities in large numbers from the rural hinterland in anticipation to enjoy the benefits of urban economy. The effect was enormous as most Nigerian cities did not prepare for such upsurge of urban explosion that came thereafter which resulted in rapid human and environmental decadence.

Eludoyin, et al [13] employed land-sat image resolutions of 1986 and 2000 to assessed the spatio-temporal land use and land cover changes in Obio/Akpor Local Government area of Rivers State, Nigeria. The study revealed drastic reduction in farmland, mangrove, primary forest and sparse vegetation over time by 45.34%, 37.06%, 43.06% and 8.09% respectively while secondary forest, built-up area and water bodies increased by 5.88%, 74.55% and 3.43%, respectively. According to them, the primary forest has the probability of 18.6% to change to built-up area as the trend has the possibility to continue if not well managed. To avert this, the study recommended promulgation of laws to prevent unwanted expansion caused by illegitimate constructions of any form. It also encouraged public enlightenment whereby residents would be acquainted with the effects.

Adebayo [14], working on impact of urban land use changes on property values in metropolitan Lagos, acknowledged continual changes in the use of lands and buildings from lower order to higher order status in order to attain optimal productivity. Data obtained from sampled respondents for his study were analysed with the use of simple descriptive statistics; particularly frequencies, percentages and ratios. Result of his findings attested to remarkable changes in land use pattern from residential to commercial which had led to parallel changes in property (building) values in Lagos over time. But the consequence of the change has been devastating as conspicuously noticed in the area of traffic congestion, over stretching of infrastructural facilities, noise pollution, increase in housing demand, increase in crime rate, among others. He advocated for proactive measures on land use planning to manage the changes with less or no effect on the environment and residents. In similar

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studies, Oduwaye [10, 11] discussed nature of changes that accompany urban expansion and their implications on land use types; be it residential, commercial, industrial, educational, institutional, religious, circulation, parks or recreational land uses. With the application of factor analysis and principal components analytical techniques, he realized infrastructure and economic dynamics as major factors influencing land use in Lagos with high level of correlation between them. The consequence of this change was the significant distortion of Lagos Metropolitan Master Plan that led to the unforeseen physical land use problems in the city.

These submissions were corroborated in the work of Olofin [15] and Owoeye [16] who argues that urban sprawl poses serious challenges to food security as most agricultural lands used for food production are taken over by physical developments like building constructions and infrastructure provisions. Such developments lead to shortage of food production and supply which, consequently, encourage rural poverty. Oyinloye [17], Balogun et al [6], and Owoeye [4] observed that the rate of growth in Nigeria is much more rapid than it was in England and America some years back. While the growth in these two countries followed industrial revolution, that of Nigeria is motivated by socio-economic factors; most especially, the strong urge to enjoy improved amenities and quest for gainful employment opportunities in urban centres. This results in emergence of various socio-economic problems like housing shortage, joblessness, traffic congestion, high demand for transport facilities in urban centres, among others. It also results in shortage of food production, due to able bodies in rural areas migrating to cities in quest for greener pasture and urban life. Owoeye [4] specifically observed massive distortions in urban housing system; especially, at city centres where most residential buildings are being converted to commercial or mixed uses in an attempt to diversify source of income generation.

This scenario is not too different from China's experience where its cities have massively increased in size in recent decades. According to Smith [18], about 60% of its population are considered urbanised today with improved living standards of hundreds of millions. Counterintuitively, most of the cities are not dense enough yet faced with urban sprawl problems. The study reveals that China's unsustainable approach to urbanization has left millions of the country's 'floating population' in midpoint with their potential efficiency and productivity gains been diminished. The environmental impact of urban sprawl in China undermine the benefits of urbanization and has brought with it a range of negative economic and social consequences. For instance, sprawling cities lead to greater dependency on cars and longer commute time, which result in increased air and water pollution. Besides, the rapid conversion of rural to urban land poses a risk to food security by eating into the supply of arable farmland [18].

Earlier studies by indigenous urban geographers, like Omuta and Onoekerhoraye [19], identified two important features that marked the growth of Nigerian urban centres. The first is the intensification of land use with resultant modifications to the urban spatial structures within the already built-up areas of some cities. The second is the outward spread of the built-up areas of urban centers into rural hinterlands. According to them, intensification of land use in urban areas of Nigeria is a large feature of the pre-colonial urban centres. The process is an outcome of the pre-colonial pattern of land use in cities coupled with social changes and rapid growth after the establishment of British colonial rule. Subsequent studies further revealed that the growth viewed by the outward expansion of the built-up area contributed largely to the evolution of the contemporary land use pattern in most Nigerian rural areas and cities [6,4,20]. The continuous growth in this pattern leads to serious congestion in already built-up areas with physical expansion into peri-urban extension and contiguous rural neighbourhood.

As observed in cases cited in literatures, efforts were concentrated on the effect of sprawl on land use changes without much attention to serious alterations in housing situation as prompted by the incidence of sprawl at one time or the other. This study sees this as missing gap and a lunge area for enquiry as far as Akure region is concerned. The outcome is expected to provide essential information to solving problems associated with haphazard growth and rambling housing situation in the region.

3. Research Methods

3.1 Overview of The Study Area

The study looked at incidences of sprawl in Akure municipal and its contiguous communities over a period of 30 years (1985-2014). Akure, the capital city of Ondo State, is located on Latitudes $7^0 15^1$N - $7^0 28^1$N and Longitudes $5^0 6^1$E - $5^0 25^1$E. It spreads over an area of 15,500km^2 on fairly 370m above the sea level with a population of about 239,124 in 1991 and 360,268 in 2006 [21]. For this study, households' population was adopted, which was estimated at 95,232 for Akure municipal and 14,794 for the eight contiguous communities selected for the study. Figure 1 describe the geographical location of the study area in

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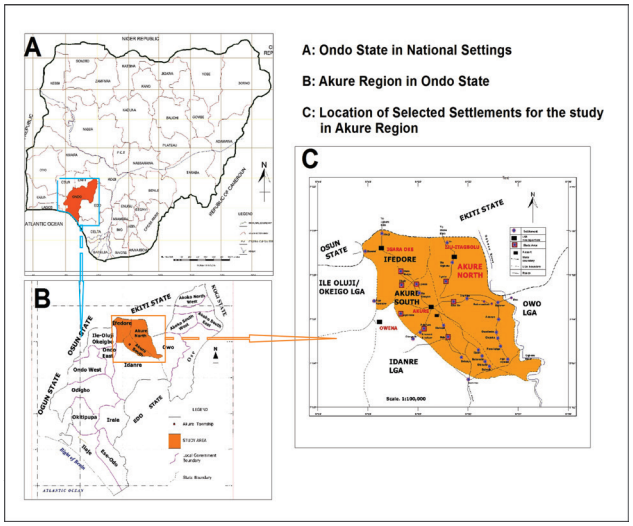

Figure 1. Locational Maps of the Study Area in National and Regional Settings

Source: Owoeye (2019)

As shown in the Figure, section 1c depicts the location of Akure and the eight contiguous settlements randomly selected within a range of 5-10km commuting radius away from Akure city centre. These settlements fall within the three Local Government Areas (LGAs) that constitute Akure Region; i.e. Akure South LGA (Ipinsa, Oda, Adofure and Aponmu), Akure North LGA (Igoba and Obaile), and Ifedore LGA (Ilara-mokin and Ibule-soro). The study investigated the outcome of Akure urban expansion, being the state capital, on these contiguous communities within the study period. The region possesses unified features that keep the inhabitants together, among which include language, socio-economic and cultural attributes. Thus, the study area has homogenous characteristics that qualified it to be called a region.

3.2 Research Data Base

Data assemblage for this study was principally done using Social Survey Research Method (SSRM). This method made use of questionnaire administration, photo-snaps, personal consultation and observation to evaluate existing situation in the region. These were supplimented with secondary information from government ministries and establishments where historical milieu of Akure city, base map and population data used for the study were obtained. The study area was subdivided into three precincts, namely: the urban core, the transition zone, and residential estates cum urban peripheries. A report on Integrated Household survey conducted by the Ondo State Bureau of Statistics [22] established 5persons per household (5pph) and 5households per building (5hpb) in urban areas of the state. With this, the total population of 476,159 projected for the three zones in Akure municipal and 73,972 in the eight contiguous settlements were estranged into 95,232 households in Akure and 14,794 households in the contiguous communities respectively. Consequently, a sample size of 1% was taken for questionnaire survey, which amounted to 952 in Akure urban and 148 in the contiguous settlements. These were randomly distributed to an adult in each building selected for survey in a sequential order of ten buildings intervals. Out of the total 1100 questionnaires distributed, 947 were retrieved in usable form; 818 in Akure municipal and 129 in the selected settlements. These were used in the analysis for the study through appropriate statistical tools. ANOVA test was conducted to validate existing interaction among the variables investigated in the study.

4. Results and Discussion

Result of findings on the effect and interaction of sprawl phenomenon with land use change and building physiognomies in the study area is presented and discussed under different subheadings as follow:

4.1 Descriptive Statistics on Land Use Pattern and Building Physiognomies in Akure Metropolis

The level of change in PURAQ (original purpose of land acquisition), BDGPUR (purpose of building) and ALTBDG (alternative uses of building) was determined using descriptive statistics as clarified in Table 1.

Table 1. Descriptive Statistics on Land Use Pattern and Building Physiognomies in Akure Urban

Variables	Frequency	Percentage
Original Purpose of Acquisition (PURAQ)		
-Residential	728	89.0
-Commercial	53	6.5
-Agriculture	27	3.3
-Institutional	9	1.1
-Others	1	0.1
Total	**818**	**100.0**
Building Purpose (BDGPUR)		
-Residential	553	67.6
-Commercial	54	6.6
-Industrial	7	0.9
-Institutional	5	0.6
-Mixed	198	24.2
-Others	1	0.1
Total	**818**	**100.0**
Alternative Uses of Building (ALTBDG)		
-Yes	390	47.7
-No	428	52.3
Total	**818**	**100.0**

Source: Field Survey (2016)

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From the table, the percentage of land area acquired for residential purpose was accounted for by 89.0%, while commercial was 6.5%, agriculture (3.3%), institutional (1.1%) and other land uses (0.1%). The table further reveals the original purpose for which buildings were constructed. About 68.0% were originally built for residential purpose while 24.2% were meant for mixed-uses and 6.6% for commercial purposes; only 0.6% was meant for institutional purposes. Investigation made on alternative uses of buildings in the area revealed that over 40.0% of land used for residential were shared with other land uses, aside the 24.2% that were originally allocated for mixed-uses. Examples of this clutter the city; especially, along Oyemekun, Adesida, Arakale and other major roads in the city, where most residential buildings are also used for commercial purposes, therefore, performing dual functions.

4.2 Kruskal-Wallis (H) Test on Patterns of Land Use Change and Building physiognomies in Akure

The chi-square (χ^2) value in H-statistical test was computed to assess the significant association between changes in land use pattern and building physiognomies in Akure metropolis as shown in Table 2.

Table 2. Kruskal-Wallis (H) Statistical Test of Land Use Change versus Building Physiognomies

Association	χ^2 Cal.	χ^2 Tab.	Df	P-value	Decision
BDGPUR vs. BDOWNER	15.081	9.488	4	0.005	S
BDGPUR vs. TENTYPE	8.104	9.488	4	0.088	NS
BDGPUR vs. PURAQ	272.855	9.488	4	0.000	S
BDGPUR vs. YLDAQ	29.678	9.488	4	0.000	S
BDGPUR vs. YBERECT	32.790	9.488	4	0.000	S
BDGPUR vs. BDTYPE	5.222	9.488	4	0.265	NS
BDGPUR vs. SZBPLOT	5.849	9.488	4	0.211	NS
BDGPUR vs. BDGCON	21.688	9.488	4	0.000	S
BDGPUR vs. WALMAT	33.610	9.488	4	0.000	S
BDGPUR vs. WALCON	5.983	9.488	4	0.200	NS
BDGPUR vs. RFGMAT	4.425	9.488	4	0.352	NS
BDGPUR vs. RFGCON	38.645	9.488	4	0.000	S
BDGPUR vs. NUMRM	12.275	9.488	4	0.115	NS
BDGPUR vs. SBDFIN	40.805	9.488	4	0.000	S
BDGPUR vs. BDMAINT	64.189	9.488	4	0.000	S
BDGPUR vs. ALTBDG	67.056	9.488	4	0.000	S

Notes: S = Significant, NS = Not Significant (at 0.05 alpha level). Grouping Variable: Building Purpose (BDGPUR)

Source: Field Survey (2016)

As shown on the table, sixteen variables that depict building physiognomies were examined out of which ten show significant relationships with BDGPUR at 0.5% alpha level. The remaining six variables, involving TENTYPE (tenure type), BDTYPE (building type), SZBPLOT (size of building plot), WALCON (wall condition), RFGMAT (roofing materials) and NUMRM (number of rooms per building) do not have significant relationship with BDGPUR. These were expunged from ANOVA test that was subsequently computed to validate the level of significant association between pattern of land use change and building physiognomies in the region.

The result of ANOVA test computed, as shown in Table 3, revealed that F-value of 7.022 is significant at 0.000 alpha levels with a mean score of 11.487. Therefore, the alternate hypothesis was accepted which affirm the existence of a significant association between changes in land use pattern and building physiognomies in the region as instigated by sprawl incidence emanated from Akure urban expansion. This corroborates findings in Owoeye and Omole [23] in their study on 'housing condition and environmental quality in the core of Akure'. In the study, it was strongly affirmed that longwinded and mismatched changes in land use often result in deterioration of housing condition and poor state of the environment with attendant consequences on residents' productivities and liveability.

Table 3. ANOVA Test on Land Use Variability and Building Physiognomies in Akure Metropolis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.865	10	11.487	7.022	.000[a]
	Residual	873.527	534	1.636		
	Total	988.393	544			

Notes: Predictors: (Constant), ALTBDG, MATWAL, SBGFIN, PURAQ, BDMAINT, BDOWNER, YLDAQ, CODROOF, YBERECT. Dependent Variables: BDGPUR (Building purpose)

Source: Field Survey (2016)

4.3 Upshots of Sprawl Incidence on Changing Land Use Pattern in Contiguous Settlements

The resultant effects of monumental expansion experienced in the city was noticed in the contiguous settlements. This was examined in eight (8) selected settlements surrounding the city using descriptive statistical tool as shown in Table 4 and Figures 4-9. As illustrated in Table 4; nearly all the respondents (97.7%) interviewed in those contiguous settlements noticed essential influence of Akure urban expansion on their communities while only 1.6% seems not to recognize any. Such upshots or impacts are either negative or positive. The

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negative impacts include lack of labour for farm work, as noticed by 62.0% of the respondents, conversion of rural lands to urban land uses (24.0%), congestion on few available facilities in the communities (7.0%) and increased crime rates (5.4%).

Table 4. Assessment of the Upshot of Sprawl Incidence on LUC in Selected Settlements

Variables	Frequency	Percentage
Affirmation of Sprawl Incidence		
- Yes	126	97.7
- No	3	2.3
Total	**129**	**100.0**
Negative upshots of Sprawl Incidence		
- Increased Crime Rate	7	5.4
- Conversion of lands to urban land uses	31	24.0
- Lack of labour for farm work	80	62.0
- Congestion on few available facilities	9	7.0
- Others	2	1.6
Total	**129**	**100.0**

Source: Field Survey (2016)

Figure 4 revealed areas of positive influence, which midpoints on increase in level of civilization (37.2%), high cost of living (25.6%), upturn in housing demand (20.2%) and urban facilities delivery (16.3%). Level of accessibility to urban services in those connecting settlements was equally investigated, with a view to ascertaining the availability, functionality and adequacy of essential services for good living of residents in those communities. As shown in Figure 5; the level of accessibility to electricity takes the lead as specified by 39.0% respondents, followed by roads (35.0%) and schools (14.0%). Only 9.0% has access to clear communication network and 3.0% to water supply, with particular reference to places like Obaile, Ilara-mokin, and Igoba which are the closest locations to Akure among the communities investigated.

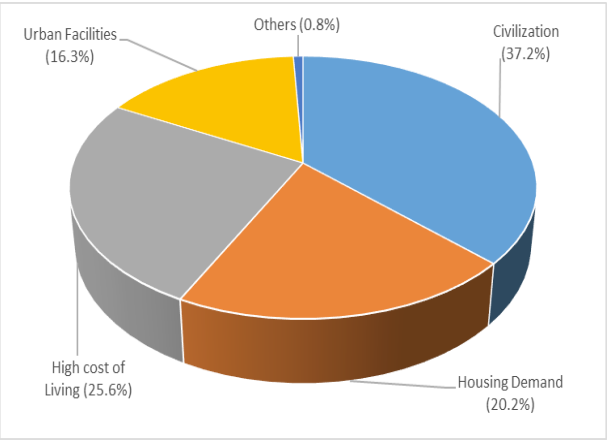

Figure 4. Specific Areas of Sprawl Influence

Source: Field Survey (2016)

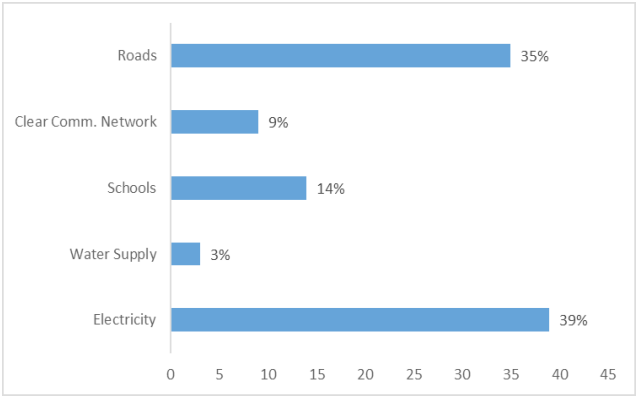

Figure 5. Accessibility to Urban Services

Source: Field Survey (2016)

Findings revealed astronomical upsurge in housing rents and land prices in Akure city due to ungainly population expansion. Invariably, this has increased the demand for housing units and lands for both residential and commercial purposes in the connecting settlements. Although, this scenario favours land owners and landlords of buildings as their level of income increased tremendiously, but daily upsurge in uncoordinated use of lands as evident in harphazard developments in these communities may inevitably result in series of planning glitches if not properly checked. It therefore becomes necessary to investigate housing characteristics in terms of physical condition, types and facilities delivery in the suburbs to ascertain the level of influence. Pictorial representations of existing status are shown in figures 6-9.

Figure 6. Representation of Physical Condition of most newly constructed buildings in the connecting settlemets

Source: Field Survey (2019)

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Figure 6 illustrates typical examples of newly built houses in Ipinsa community. As shown in the figure, the buildings were yet to be completed with necessary fittings (like windows, ceilings, plastering, wiring, plumbing and other household fittings) before they were occupied. Reasons for this includes increase in house rent, series of intimidations mounted on tenants by landlords and various other difficulties faced in securing accommodation at the city centre, which prompted some individuals to move into their uncompleted buildings. Some, because of frustration, often construct ramshackle structures on their plots of land and occupy it with their family, regardless of non-provision of basic facilities, security and space.

Figure 7. Ondo State Staff Development Training Institutes at Ilara-Mokin

Source: Field Survey (2019)

Figure 7 is a training institute built to train the administrative staff of the state government. It was located in Ilara-mokin (Akure suburb) as regional development scheme to upgrade the suburb and decongest the state capital.

Figure 8. The Akure-Obaile Road Dualisation Project

Source: Field Survey (2019).

Figure 8 shows road dualisation project along Akure-Obaile axis. This was initiated to ease tight vehicular movement generated by high traffic along the route. Most government workers and individuals working in Akure who could not secure accommodation in the city reside in this community. Hence, they ply the road daily thereby generating high traffic flow on daily basis. The extension of the road therefore becomes necessary to ease vehicular movement along the axis. The project was completed and commissioned in 2017.

Figure 9. Sunshine Housing Estate at Ibule-soro along Akure-Ilesha Road

Source: Field Survey (2019)

Figure 9 is the Sunshine Estate that was originally constructed by the Ondo State Government (ODSG) to provide residential services, like site-and-service and affordable rent, for people who could not secure accommodation or purchase plot of land in the city centre. But observation and personal interviews with respondents revealed that people could not secure the properties due to exorbitant price placed on them. Currently, the structures are being used by the Federal University of Technology, Akure (FUTA) as Centre for Entrepreneurship and mini-campus for the Pre-degree program (a business and academic venture). Definitely, the current use is at variance with the original purpose of acquiring the land and for which the construction of the property was made.

5. Conclusion and Policy Recommendations

The study examined the upshots of sprawl incidence on changing land use pattern and building physiognomies in Akure and its connecting settlements between 1985 and 2014. It assessed the physical condition, types and pattern of building arrangements as well as facilities delivery with a view to providing essential information towards

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solving problems associated with haphazard development in the region. Findings from the study show evidently the various upshots of unguided urban expansion on irregular alterations in pattern of land uses and slapdash housing development in the region. Most of these alterations are at variance with original purpose of land acquisition (PURAQ), building purpose (BDGPUR) and alternative uses of building (ALTBDG). The effect overflow into Greenfields and agricultural land areas in the suburbs and connecting settlements of the city. On this note, nearly all respondents interviewed in those communities acknowledged the effect on their areas, ranging from physical to socio-economic livelihood of residents. Even within Akure metropolis, the effects are conspicuously perceived in the area of haphazard housing development and poor state of the environment with attendant consequences on residents' productivities and livelihood. This calls for prompt attention of relevant stakeholders which is expected to begin with the process of land acquisition and allocation for various uses. Consequently, engagement of proactive measures to monitor both private and public lands across the region through effective zoning strategy should be encouraged. The Development Control Department in the Ministry of Physical Planning and Urban Development should be reinforced with strong tools to function in this regard; particularly, in the area of active monitoring of developments at sites and enforcement of planning standards for sustainable growth.

No doubt, the administrative status of Akure has encouraged regular inflow of people into the city. The impact of this on the city and its contiguous communities has been very great and well noticed. Hence, the implementation of regional development schemes will go a long way to curb this scenario. Local government headquarters and other major towns around the city should be upgraded and reinforced with functional basic facilities to curtail the incessant inflow of people from towns and villages into the state capital. This is one of the basic principles adopted in urban development policy framework in developed countries to curtail their sprawl phenomenon.

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Conflict of Interest

The author declares no conflict of interest regarding the publication of this article.

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