

Investigation on Infrastructure in Peri-Urban Communities of Developing Nations: A Focus on Akure, Nigeria.

¹OLAMIJU ISAAC OLUWADARE, ²FASAKIN JULIUS OLUBUNMI
³OLAJUYIGBE AYO EMMANUEL, ⁴OYINLOYE MICHAEL AJIDE

^{1,2,3,4} Department of Urban and Regional Planning, School of Environmental Technology,
Federal University of Technology, P.M.B. 704, Akure, NIGERIA.

E-mails: ¹ioolamiju@futa.edu.ng; ²bunmif_4u@yahoo.com; ³olajuyigbe03@yahoo.com,
⁴micnicjide@yahoo.com

Abstract: Non-functioning infrastructure, uncontrolled physical growth, poor building and environmental conditions are remarkable in peri-urban communities of developing nations. This paper therefore examines: the management of infrastructure; building and environmental situations in 11 peri-urban communities in Akure, Nigeria. Data were sourced primarily using the questionnaire instrument and field observations. The study utilized simple random sampling technique to select 30% of 3,207 dwellings in the communities giving a total sample size of 962. Empirical analysis shows that, individuals, families and Development Associations (DAs) are substantially involved in the provision and management of infrastructure with limited government coordination. Building and environmental conditions in the communities are very unsatisfactory. A management-cum-institutional framework for effective coordination of activities of all stakeholders is suggested for sustainable peri-urban development in the city.

Keywords: Akure; Developing Nation; Infrastructure; Nigeria, Peri-urbanization.

1. Introduction

Synonyms of peri-urban areas include: urban fringe, metropolitan fringe, rural-urban fringe, urban-rural interface, the near urban, urban tract, peri-metropolitan, ex-urban, urban hinterland, semi-urban and even sub-urban (Buxton et al, 2006). Peri-urbanization originates from the French word *périurbanization*; used to describe spaces between the city and the countryside, that are shaped by the urbanization of former rural areas in the urban fringe both in a qualitative (e.g. diffusion of urban style) and in a quantitative (e.g. new residential zones) senses (W.J, 2015). Griffiths (2010) defined peri-urban as the rural-urban transition zone where urban and rural uses mix and often clash. In developing countries, peri-urban areas can be broadly characterized as a mosaic of heterogeneous land

uses and people but with lack of infrastructure and a deteriorating environment (Olujimi and Gbadamosi, 2007). Most peri-urban areas are sprawled and dispersed development outside of compact urban areas along the periphery of cities, along highways, and along arterial roads connecting a city, due to ad hoc approaches in planning and decision making (Sudhira et al, 2007). Urbanization trend in developing nations has been responsible for influx of population to peri urban zones with its consequent stress on existing infrastructure. This problem is compounded by the actions of individuals, traditional family landowners and landlords associations who are members of Development Associations. These individuals and groups of people are responsible for the management of infrastructure in their various communities.

The management of infrastructure in peri-urban communities of Akure is undertaken without any consideration for collective decision making from the larger community. In the study area, there is a lack of operational coordination among the various individuals, families and Development Associations (DAs). Government involvement in infrastructure provision and management is minimal and in some instances absent. UN Habitat (2003) reported that this trend is detrimental to the larger community by creating environmental degradation, urban sprawl, slum, and diverse natural disasters; and these account for lack of electricity by 50% of residents in Africa while about 30% of the houses are not accessible due to poor street layout.

It is now obvious that provision of infrastructure need a coordinated system of supply and management; through the cooperative efforts of all stakeholders in order to ensure a balanced city form and image. Oyesiku (2002) observes that, in physical planning, a rational decision about the use of land is necessary so as to ensure that, services are available, accessible, convenient and efficient. The paper, therefore, examines the role of individuals and families in the provision and management of infrastructural facilities such as roads, drainages and electricity in peri-urban communities of Akure and its resultant effects on both the building and immediate environment.

2. A Summary of Existing Literature

The provision and management of infrastructure in Nigeria are largely in the hands of the public sector (Adewusi and Akinbogun, 2010). Soyido (1998) reported that the reduction of infrastructure investments over the years coupled with the other factors endemic to the Nigerian public institutions, such as, wastages, mismanagement, fraud, lack of maintenance policies and inept leadership have led to the collapse of most infrastructure in Nigeria urban areas.

Mabogunje (1999) observes that, Nigerian cities are dirty, most insanitary, minimally aesthetically pleasing, least safe and secure and most poorly managed in the world. Adewusi and Akinbogun (2010) concluded that the state of infrastructural facilities in Nigeria is dismal: roads are in very advanced state of disrepair and the maintenance of drainages is completely neglected resulting in poor economic development, frequent accidents, environmental hazards, discouragement of investors and decline in quality of life among the citizenry. FRN (1992) reports that infrastructure in most Nigerian cities are grossly inadequate, erratic and unreliable.

The Asian Development Bank (1997), notes that, peri-urban areas in large and medium cities in Latin America, Asia and Africa are likely to experience huge population growth in the coming years. The effect of this growth is stress on already inadequate infrastructure and aggravated poverty of the population. In Latin America, cities of Mexico and Sao Paulo are losing population in their most important central areas, while distant suburbs (*Peri-urban areas*) experience strong demographic increases (Salas, 1994; Torres, 2002). Haroldo (2008) observes that peri-urban areas in Latin America are not only typically ill-regulated and distant from key employment hubs, but also present appalling sanitation conditions and significant environmental problems, including deforestation and pollution of rivers and streams. The author concluded that in order to tackle peri-urban issues, the quality of government information systems and their data on low income settlements must substantially increase.

In Ghana, the supply of water in the peri-urban zones of Accra is hampered by narrow diameter of pipelines which could not carry the amount of water demanded (Yankson and Gough, 1999). Owusu and Asamoah (2005) concluded that most peri-urban areas of Kumasi do not have basic infrastructure to support sustainable living; this has been attributed to: lack of infrastructure policy and poor funding of infrastructure by SHGs among others.

In Kenya, community-run small-scale water systems play a critical role in supplying and improving access to water services in peri-urban and rural areas. This is largely because municipally-owned water services providers currently supply only 25 per cent of the country's population and 39 per cent of the population within their service areas (World Bank, 2011).

Meera, Purushothaman & Brook, (2003) concluded that most Indian cities experience infrastructure provision in the form of widened highways in the city core; while the infrastructure problems of peri-urban communities around the cities are not being addressed. For instance most un-tarred roads become blocked during the rains as well as the clogged up sewers, which are not being attended to by any government agency.

In Akure, the focus of government in infrastructure development is on the city core at the expense of the peri-urban areas. Individuals, families and development associations are left uncoordinated by appropriate government agencies to provide infrastructure for roads, drainages, water and electricity. This trend has been responsible for poor street layout, drainage system and associated flooding hazards (Olamiju, 2014).

In summary, the trend in peri-urban communities in Latin America, Africa and Asia is similar: infrastructure problem is very rife; government neglect of infrastructure development is acute; problem of long commuting distance due to poor land use planning are prevalent and; stress on available infrastructure owing to rapid urbanization is ubiquitous.

3. Data and Methods

3.1 Research Locale:

Akure is the local government headquarter of Akure South Local Government Area (ASLGA) and the capital city of Ondo state of Nigeria. It is the major town in ASLGA which, situates 204 kilometres east of Ibadan, capital

of Oyo state; 186 kilometres west of Benin, capital of Edo state and; 311 kilometres north-east of Lagos (see figure 1).

Since the creation of Ondo state in February 1976, the population of Akure has been growing at an alarming rate. Akure had a population of 38,852 in 1952 which increased to 71,106 in 1963 giving rise to a growth rate of 5.5% per annum (Olanrewaju, 2004). According to the 1991 census count, the population of Akure was 239,124 which was projected by the National Census Board to 269,207 in 1996. The current estimated population of Akure at the annual growth rate of 3.18 is 413,060 (NPC, 2006).

Basically, Akure has an agrarian economy with prevalent low productivity. DPA (1980) observes that, the major industrial activities in Akure are saw-milling and furniture making. Due to its weak economic base, there is high unemployment, low per capita income and poor standard of living, all affecting negatively, the ability of the populace to support urban utilities, municipal services and community facilities.

The land use pattern in Akure is a replica of most traditional *Yoruba* cities which have the Oba's palace, the city market, and the traditional place of worship at the centre of the town. The share of population living in Akure urban areas increased from 20.2 per cent in 1971 to 23.7 per cent in 1981 and to 26.1 per cent in 1991 (Okoko, 2004). Population growth, rise in household income, subsidization of infrastructure investments like roads, ineffective land-use, excessive growth, social problems in central cities and poor land policies are taken to be the main causes of sprawl in Akure (Tofowomo, 2008).

This study looks at private residential layouts in Akure located at the peri-urban zones - a transitional environment of mixed land uses between the city's continuously built up area and its rural hinterland where economic and social activities are directly affected by the expansion of the city (Nwafunpe, 1994). Akure has expanded beyond its original extent in 1980 when a Master Plan was prepared (Figure 1). Figure 2 is the street guide map of Akure

showing the peri-urban zones (the direction of the city's expansion) as identified for the purpose of this study. The zones contain

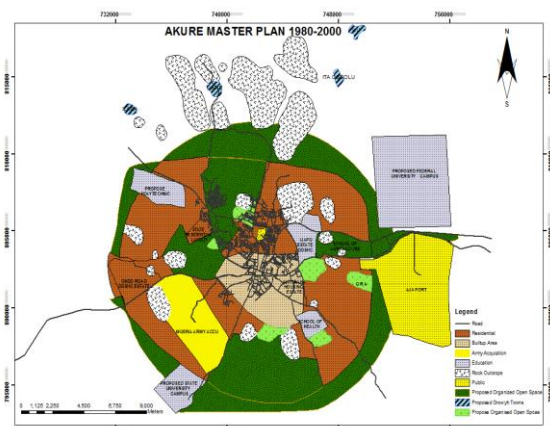


Figure 1: Akure Master Plan (1980-2000)
Source: DPA, 1980 (digitized in AutoCAD by the authors)

Peri-urban zones are usually characterized by infrastructure under severe stress as a result of rapid growth in population, inadequate supply of housing units, and improper coordination of physical development (Olujimi and Gbadamosi, 2007). In addition, DPA (1980) reveals that, the existing layouts in Akure were developed contrary to planning regulations, lacking essential facilities such as schools, clinics, play areas, markets, library, places of worship, police post and postal agencies

residential layouts from which samples of houses were taken.

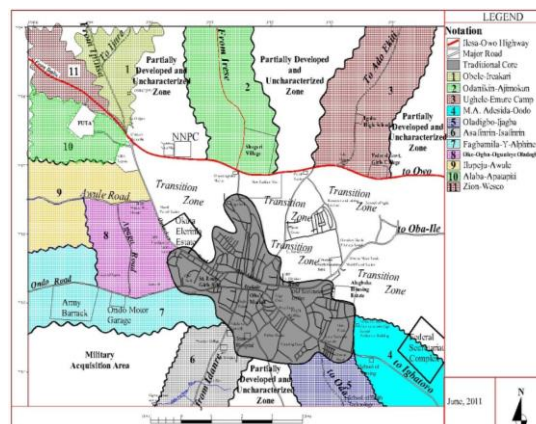


Figure 2: Peri-urban Zones in Akure, Nigeria.
Source: Authors' Fieldwork, 2017

among others. This situation explains the planlessness of land use in Akure and the prevalence of private administration of modern day residential layouts.

3.2 Data Base Description:

Data was collected through the instrumentality of a structured questionnaire. The simple random sampling technique was used to select 30 percent of houses from 11 peri-urban communities due to homogeneity characterizing the study area (See Table 1).

Table 1: Sampling in Peri-Urban Zones of Akure

Peri-Urban Zones	Population, (NPC, 2006)	Total Number of Buildings	30 Percent of Buildings
Obele-Ireakari	1,642	59	18
Odanikin-Ajimokun	15,400	550	165
Ughele-Emure Camp	4,835	173	52
Adesida-Oodo	5,052	180	54
Oladigbo-Jigba	1,125	40	12
Asafinrin-Isafinrin	1,958	70	21
OkeOgba-Ogunleye	7,951	286	85
Familugba-Yeosta	24,360	870	261
Ilupeju-Ifelere	2,143	77	23
Alaba-Apatapiti	21,840	780	234
Zion-Wesco	3,480	124	37
Grand Total	89,810	3,207	962

Source: Authors' Fieldwork, 2017

A smaller sample of 5 percent was considered valid and reliable by Ojo (2005), while a 7 percent sample was used by Fasakin (2000) to obtain acceptable results in the study of commercial motorcycles in the transport system in Akure. Houses and people were selected in the sample corridors at regular intervals during the field survey. Table 1 shows sampling in peri-urban zones in Akure. Out of the total number of 962 questionnaires administered, 959 of them were retrieved in useable form giving a 99.97% response rate.

4. Discussion of Results:

4.1 Provision of Infrastructure and Basic Services in Peri-urban Communities of Akure

From Table 2, it is obvious that, 43.6% of respondents thought that, individual landlords were responsible for the provision of infrastructural facilities, while 26.8% admitted that, the families who own residential layouts in the communities were responsible. Twenty-five percent (25%) of respondents said that Development Associations (DAs) were accountable, while only 4.1% held that, it is the government that provides infrastructure in the communities.

Table 2: Sources of Provision of Infrastructural Facilities in Peri-urban Communities of Akure, Nigeria

Source	Frequency	Percent
Individuals	418	43.6
Family Members	257	26.8
Development Associations	240	25.0
Government	39	4.1
Total	959	100.0

Source: Field Survey, 2017

It is apparent that, the involvement of individual landlords and families as well as youths', tenants', and landlords' associations is substantial. An immediate implication of this is a resort to self-help provision of infrastructure that is not coordinated by planning agencies. Interactions with the Development Control Department (DCD) in Akure, confirmed the prevalence of individuals in the provision of infrastructural facilities in the layouts over other sources. In contemporary Nigeria, poverty, corruption in government, lack of environmental consciousness and adequate technology are potent factors responsible for inadequate provision and management of infrastructural facilities in peri-urban communities. Ipso facto, a huge proportion of individuals and families providing infrastructure has led to residential disorderliness in the city. These individuals lack the required environmental education to guide their development efforts. While government at the local or state level provides infrastructure, corruption and lack of requisite technology could also contribute to substandard facility provision. With a master plan prepared in 1980 which lapsed in 2000, Akure lacks good frameworks and policies to guide infrastructure development. The city keeps on expanding haphazardly at the mercy of unprofessional and uncoordinated developers, with un-tarred roads, substandard electricity, haphazard water supply and poor drainage. Efforts of DAs compliment those of individuals in the

provision of infrastructural facilities. At present, there exists no coordinating agency for the supervision of the providers of infrastructure in Akure. Adeniyi (2011) concluded that the absence of land use information to guide rational urban development, has led to adoption of personal discretion in city development.

A meager 4.1% of respondents attributed the provision of infrastructural facilities to governments. Some government parastatals such as Power Holding Company of Nigeria (PHCN), Water Corporation and Local Government Councils occasionally visit residents to collect rates on facilities put in place by citizens. This may have accounted for the few who felt that government has anything to do with facility provision and management in the city.

4.2 Management of Infrastructural Facilities in Peri-urban Areas of Akure

Table 3 shows the structure of management of infrastructural facilities in peri-urban areas of Akure where 41.3% of respondents stated that individual property owners in the communities are responsible for the management of roads. About 6.1% said family land owners are answerable, while 37.3% and 15.3% attributed facility management to DAs and government respectively. Cumulatively, over 75% of respondents held that individuals, families and DAs are mostly responsible for the management of roads in the communities.

Table 3: Management of Infrastructural Facilities in Peri-urban Areas of Akure.

Infrastructure	Managers/Providers								Total	
	Individuals		Families		Development Associations (DAs)		Government			
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Road	396	41.3	58	6.1	358	37.3	147	15.3	959	100
Drainage	421	43.9	61	6.4	376	39.2	101	10.5	959	100
Water Supply	468	48.8	103	10.7	108	11.3	280	29.2	959	100
Electricity	352	36.7	52	5.4	348	36.3	207	21.6	959	100

Source: Field Survey, 2017

Construction and management of roads are capital intensive. It is however implausible that the onus of road maintenance should shift to individuals and families. The net result is rapid deterioration and even disappearance of poorly constructed roads in residential neighbourhoods in the communities.

As for drainages, water supply and electricity, over 43.9%, 48.8% and 36.7% of individuals in the communities are responsible for facility management respectively. The proportions of respondents stating that families are responsible for the management of these facilities are 6.4%, 10.7%, and 5.4% respectively; while 39.2%,

11.3% and 36.3% attributed management to DAs.

A typical road/drainage facility in the study area is shown in Plates 1 and 2. The drainage facility in Plate 1 varies in quality, width and depth from one building to the other. At certain places, the drainage is covered while at some other places it is left open. In Plate 2, there is no drainage facility on both sides of the road. A building was constructed across the road causing an abrupt dead-end street. This trend is as a result of poor land use planning and lack of coordination of infrastructure provision and management in the city.



Plate 1: A Typical Road/Drainage Facility in Peri-urban Communities in Akure, Nigeria
Source: Authors' fieldwork, 2017



Plate 2: Abrupt Dead-end Road due to Poor Road Layout.
Source: Authors' fieldwork, 2017

The results show clearly that, individuals, families and DAs are mostly involved in the

management of infrastructural facilities in peri-urban areas of Akure, while the

involvement of government is limited. The minimal involvement of government is partially due to the operation of few public residential estates (3 in number) to which government is more committed. Government does not see its social responsibility in managing community facilities for social and good governance. Due to this fact, there has emerged a city form, characterized by an array of unplanned areas and pockets of well planned and maintained estates.

5. Environmental and Building Conditions in the Study Area

The impact of roads and drainages were considered in the assessment of environmental and building conditions in the study area. For building condition, variables such as age of building; type of toilet facility; location of bathroom and kitchen in the building; and type of access to the building were considered, (see Table 4); while the environmental condition was treated based on the waste disposal method, sources of domestic water supply, type of drainage facility, and type of landscape around buildings, (see Table 5).

5.1 Environmental Condition and Urban Basic Services in Akure:

From Table 5, it is evident that about 12.2% of respondents use dustbin/controlled tipping for disposing solid waste; while 13.7% dispose refuse through burning. About 50.9% and 23.2% dispose their wastes in dunghills and stream/drainages respectively. From the data presented, it is evident that air/environmental pollution and flooding hazards cannot dissociate from the communities. This trend was documented by Dauda and Osita (2003), Oso and Taiwo (2004), who concluded that considerable percentage of urban waste in Nigeria are deposited along streets, roads/road sides, unapproved dump sites, water ways, and drainages or in open sites. The resultant effect of these 'management' options do not only reduce scenic resources, and environmental friendliness; dump sites are a form of nuisance and breeding ground for mosquitoes, pests and disease outbreaks such as cholera, diarrhoea etc. (Ulloa et al, 2003; Mosler et al, 2006; Okoya and Ogunkoya, 2009; and Oyelola et al, 2009)

Table 5: Existing Environmental Conditions in the Study Area

Waste Disposal Method	Freq.	%
-Dust bin/controlled tipping	117	12.2
-incinerating/burning	131	13.7
-Nearby Bush/dunghill	488	50.9
-Stream/drainage	223	23.2
Total	959	100.0
Water Supply Sources	Freq.	%
-Public tap	50	5.2
-Closed well	148	15.4
-Open well	246	25.7
-Rain	338	35.2
-River/Stream/Pond	177	18.5
Total	959	100.0
Drainage Type	Freq.	%
-Concrete Block	142	14.8
-Concrete Cast	40	4.2
-Piped	23	2.4
-Earth	450	46.9
-None	304	31.7
Total	959	100

Landscape Condition	Freq.	%
-Planted with Grass and Trees	94	9.8
-Paved	288	30.0
-Bare	430	44.8
-Overgrown with Bushes	147	15.4
Total	959	100

Source: Authors' Fieldwork, 2017

The source of water supply is another variable crucial to the health of residents in the study area. Table 5 shows that residents' sources of water supply include: public tap, 5.2%; closed well, 15.4%; open well, 25.7%; rain, 35.2%; and river/stream/pond, 18.5%. Most residents in the communities got water for domestic uses (including drinking) from open wells, rainfall and river/stream which the WHO/UNICEF (2006) classified as unprotected sources. This trend is dangerous to the health of residents as they are vulnerable to scourge of sicknesses and diseases due to use of poor and sub-standard facilities (Health Canada, 2008).

The availability and type of drainage facility is another determinant of environmental condition in the study area. Table 5 shows that 14.8% and 4.2% of respondents respectively identified concrete block and concrete cast as the type of drainage facility available in the study area; while piped and earth drainages were identified by 2.4% and 46.9% of respondents respectively. A considerable number (31.7%) of respondents said there was no form of drainage facility in their communities. Summarily, less than 20% of respondents adjudged that drainage facilities in the study area are in good condition. The remaining 80% opined that this facility is either very bad or not available. The implication is that the area would be

susceptible to erosion and flooding hazards which degenerates the environmental landscape.

The type of landscape around buildings was examined as they are fashioned by the character of roads and drainages in the community. A few (9.8%) of buildings were planted with grass and trees; while 30.0%, 44.8% and 15.4% of building surroundings are respectively paved, bare and overgrown with bushes. It is obvious that paved surfaces increase the volume and speed of runoffs; bare surfaces are susceptible to erosion and; bushes around buildings are breeding grounds for mosquitoes and other dangerous insects and pests. It is therefore apparent that less than 10.0% of buildings in the study area are safe and liveable. The reason for this situation can be found in the words of Ofomata (1984) that the people are passive and apathetic to plans aimed at combating soil erosion; they are unwilling "to adopt the procedures deemed necessary to heal the land". The author later concluded that the main reasons for the observed failures of past attempts to combat erosion in residential communities included: lack of communication between the Government and the people; inadequate knowledge of the environment, and exploitative excesses of the people (Ofomata, 2000).

shows that buildings in the study area are relatively old. Majority (45.6%) of respondents use pit latrine; 30.2% defecate in surrounding bushes; just 12.8% uses water closet systems in their houses; while a meagre 6.0% uses bucket latrine. Respondents without any form of toilet

5.2 Building Condition:

From Table 4, the mean age of buildings in the study area is 35years. Buildings above the age of 40years constitute about 36% of the total number of buildings. This trend

facility in their building constitute about 5.4%. This phenomenon shows that over 40% of respondents will end up using surrounding bushes as toilets, thus denigrating the environment.

Bathroom is another crucial housing facility; its availability and location of in a building has its impact on the general environmental condition of that building and the community at large. From Table 4, about 41.1% of respondents have their bathroom located within the buildings, while 34.3% have their bathrooms located outside their buildings. Buildings without bathroom constitute about 24.1%. The implication is that since bathrooms outside the building have no soak-away-pits, the building environment is messed up with bath water constituting blot on the landscape and defaming the environment.

Only 24.7% of respondents have their kitchens located within buildings;

51.7% cook outside their buildings while 23.6% use the building lobbies and verandas for cooking. It is pertinent to note here that those who cook outside use firewood as source of energy, while those who cook at lobbies and verandas use kerosene stove. The implication is that about 50% and 20% of respondents experience air pollution within and outside the building environment respectively. No safe place!

From Table 4, based on the type and condition of housing facilities in the study area, 3.7% of buildings were considered as 'very good'; 43.9%, 'good'; and 12.5%, 'fair'; while 47.6% and 1.3% as 'poor' and 'dilapidated' respectively. This shows that about 60% of housing in Akure are very poor and dilapidated. This trend shows a rapidly degenerating housing condition which is not decent and unfit for sustainable living condition.

Table 4: Residential Building Conditions in Akure

Age of building	Freq.	%
-Below 10 years	128	13.3
-10 – 19 years	106	11.1
-20 – 29 years	130	13.6
-30 – 39 years	252	26.3
-40 years and above	343	35.7
Mean=35		
TOTAL	959	100.0
Type of Toilet Facility	Freq.	%
-Water closet	123	12.8
-Bucket Latrine	57	6.0
-Pit Latrine	437	45.6
-Bush/dunghill	290	30.2
-None	52	5.4
TOTAL	959	100
Location of Bathroom	Freq.	%
-Indoor (self-contained)	151	15.8
-Indoor (Shared)	243	25.3
-Outdoor (Covered)	127	13.2
-Outdoor (Open air)	202	21.1
-Not Available	236	24.6
TOTAL	959	100.0
Location of Kitchen	Freq.	%
-indoor (Self-contained)	122	12.7
-Indoor (Shared)	115	12.0
-Outdoor (Covered)	272	28.4
-Outdoor (Open air)	223	23.3
-Lobby/Veranda	227	23.6
TOTAL	959	100.0
Condition of Building	Freq.	%
-Very good	36	3.7
-Good	335	34.9
-Fair	120	12.5
-Poor	456	47.6
-Dilapidated	12	1.3
TOTAL	959	100.0

Source: Authors' Fieldwork, 2017

6. Conclusion

Individuals, families and Development Associations have been identified, in this paper, as the sources of provision and management of infrastructural facilities in peri-urban communities of

Akure. The facilities examined included roads, drainages, electricity and piped water supply. The sanitary condition of buildings and the environment were equally examined as they reflect the state of infrastructure in any society. Eleven peri-urban communities were identified and samples were taken from

each based on the number of buildings in them. The simple random sampling method was employed to interview 959 respondents using a structured questionnaire. Results from the data collected show that, individuals and families are majorly responsible for the provision and management of infrastructural facilities in peri-urban communities of the city. The building and environmental conditions in the study area is adjudged to be very poor, which have been responsible for urban sprawl, environmental pollution, deterioration, and general urban decay.

This paper recommends that, for effective provision and management of infrastructural facilities in peri-urban communities of Akure, there is a need for government to see both as a social responsibility. Consequently, government should at least increase its involvement to: 100% on road and drainage because of the huge capital outlay involved and for the sake of uniformity and aesthetics; 60% on water and 80% on electricity provision for the purpose of Private-Public-Partnership; leaving the rest to individuals and CBOs (see Table 3). There is need for a calculated coordination of activities of citizens to concord with development proposals (if any) for the city. This recommendation becomes critical as more than 95% of residential layouts in the peri-urban communities of Akure are owned and controlled by private individuals (Olamiju, 2014).

Specifically, each community in the study area should form a Peri-urban Development Committee (PDC) to be registered with the State Ministry of Physical Planning and Urban Development. Members of the Committee should include selected members of building owners and tenants headed by a Development Control Official from the State Ministry of Housing and Urban Development. The function of this Committee shall be to guide and coordinate the activities of individuals and families embarking on any infrastructural facility development in line with set standards for facility provision and

management. This may call for the review of the city master plan and relevant development regulations for Akure.

In addition, there is the need for provision of quality housing and hygienic environment. To achieve this, extensive redevelopment and upgrading programmes through the provision of urban basic services are essential in the communities. Priority should be given to provision of portable water, solid waste disposal facilities, and proper maintenance of drainages. Sanitary inspections should be regularly carried out on provision of household facilities with the enforcement of environmental sanitary laws. Adequate funding should be given to Waste Management Authority for effective service as well as improved health facilities in the communities. Public enlightenment and Environmental Education (EE) would be necessary to keep the people well informed about the importance of healthy and hygienic environment.

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