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Impacts of Land Cover Change within the Rural Urban Fringes of Port Harcourt

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ABSTRACT

Urban sprawl which is the extension of the built up area into the suburbs and rural areas has impacts on the livelihood of residents and environment. This paper examined Urban sprawl and land use dynamics within the fringes of Port Harcourt. The study covered six Local Government Areas that surrounds the Port Harcourt metropolis which are Oyigbo, Eleme, Etche, Okirika, Emohua and Ikwerre Local Government Areas of Rivers State. It is a longitudinal study which utilised both primary and secondary sources of data. The primary data were obtained using multispectral Landsat imageries. The imagery of 2000, 2010 and 2021 respectively were acquired using Landsat 5 TM, Landsat 7 ETM+ and Landsat 8 OTI/LIRS respectively at a resolution of 30m. 400 questionnaires were administered to residents of the six (6) LGAs. Findings indicates that from the year 2000 to the year 2021, Eleme LGA lost 41.13% of the natural environment to the built environment, Emohua lost 9.91%, Etche lost 7.75%, Ikwerre lost 13.13%, Okirika lost 21.07% and Oyibo lost 41.13% to the built environment as a result of urbanization. It puts causes of urban sprawl as lower land value, improved infrastructure, rise in standard of living, lack of urban planning, lack of laws to regulate urban planning. It was recommended that social amenities should be provided in the rural areas, agriculture which is the basic occupation of the rural dwellers should be made more lucrative and policies to ensure vertical growth rather than just horizontal growth should be put in place.

Keywords: Built-up; Sprawl; Rural; Urban; Port Harcourt; Urbanisation.

1.0 Introduction

As cities get bigger, they expand around their Peripheries, this spread is tagged sprawl. But sprawl is more specific in nature, it is defined as 'uncoordinated growth': the expansion of a community without a real concern for consequences of poor environmental conditions or environmental impact. Gordon and Richardson (1997), define urban sprawl as leapfrog development.

Urban sprawl is also known as 'horizontal spreading' or 'dispersed urbanization'. The uncontrolled and disproportionate expansion of an urban area into the surrounding countryside, forming low-density, poorly planned patterns of development is described as urban sprawl. Sprawl is a name for a number of conditions, in a nutshell it is the spreading out from a city and its suburbs to more rural land in the periphery urban area, the conversion of rural land into built up land (Manisha, 2021)

Port Harcourt was established in 1912 by the British colonial government because of the locational requirement for a rail and a port; and like many cities in Nigeria, Port Harcourt has experienced steady growth over the past two decades (Brown & Wachukwu, 2015; Obinna et.al, 2010). Although urban growth is perceived as necessary for a sustainable economy, uncontrolled or sprawling urban growth causes various problems. Urban growth does not only rapidly consume valuable rural land resources at the urban fringe; it also results in landscape distortion, environmental pollution, traffic congestion, pressure on infrastructure and neighbourhood conflicts. Port Harcourt city have been experiencing explosive growth recently due to the continuous urban development and as a result of rural - urban migration.

2.0 Study Area

The greater metropolitan area comprises the old city and its immediate hinterland. Greater Port Harcourt is located within latitudes 6º58´N to 7º6´N and Longitude 4º40´E to 4º55´E. It falls almost entirely within the lowland swamp forest ecological zone and is flanked in the east, west and southern limits by mangrove swamp forest (Braide *et al*., 2004; Chindah, 2004).

The research area is bounded in the North by Imo State, South by Asari Toru/Degema/Bonny LGAs, in the West by Ahoada East/Abua Odual LGAs, and in the East by Abia State, Omuma/Ogu Bolo/Tai LGAs (See Figure 1).

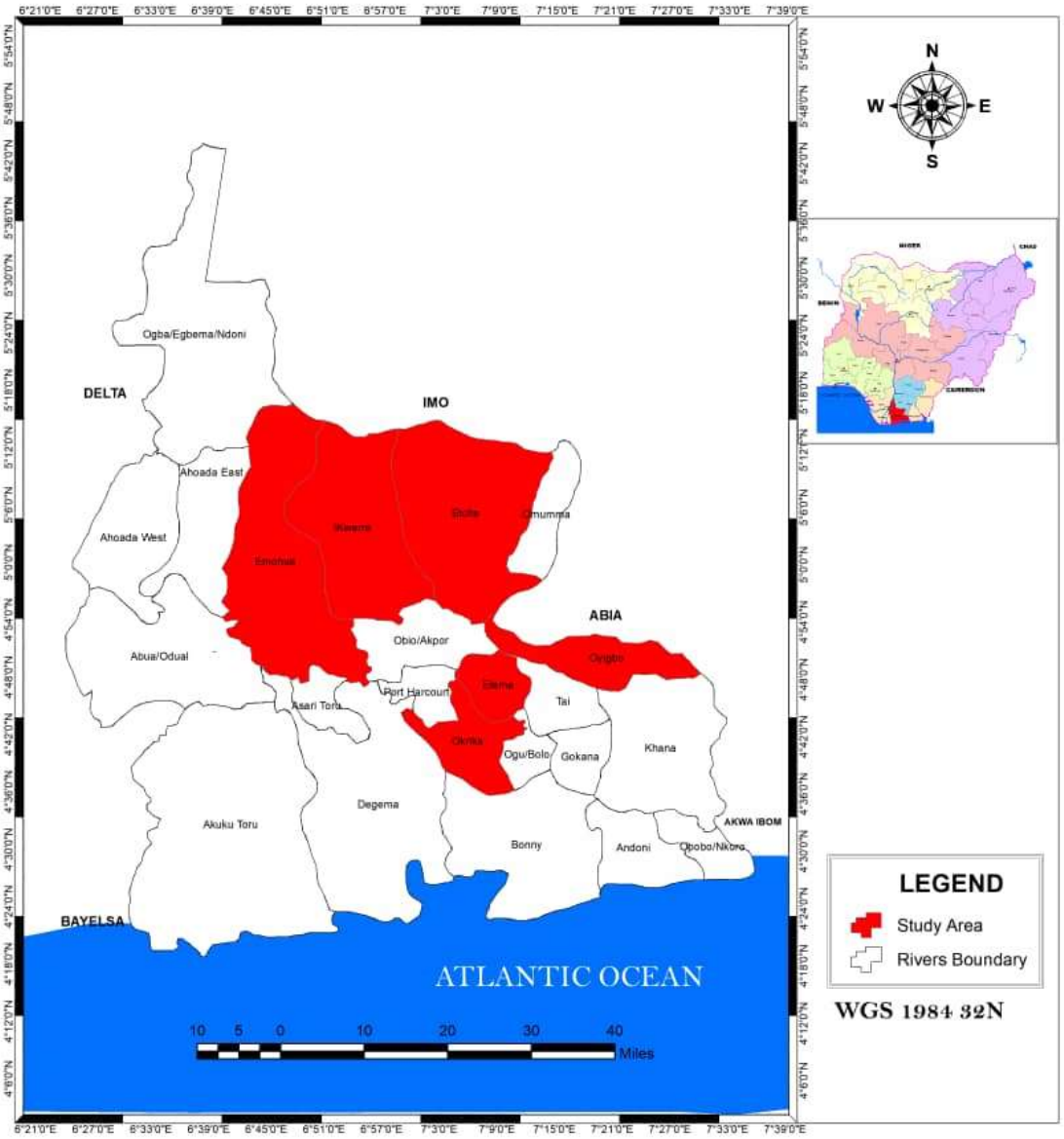


Figure 1: Rivers State showing Urban Fringes of Port Harcourt.

Source: Adapted from Google Earth Imagery, 2022.

The climate of Obio/Apkor is under the influence of both the South-West and North-East winds. The South-West wind brings wetness to the study area. It starts from the month of February to November which we can term the region's rainy season. The North/East trade wind brings about dry season; it passes through Saharan desert from the month of November to February (Wachukwu *et al*, 2020; Ayo *et al*, 2017).

Port Harcourt is sited 66km from the Atlantic Ocean on a relatively firm land near the Bonny river close to dockyard and Amadi creeks (Umeuduji & Aiseubeogun 1999).

In terms of general surface features, the area is very unique and falls within the coastal belt dominated by low lying coastal plain which belongs to the structural sedimentary formation of the recent Niger Delta. Umeuduji and Aisebeogun (1999) identified that the area is within the belt of beach ridge barrier complexes generally trending in an east-west direction with height which vary between 0-5m above sea level.

3.0 Methods and Materials

The research adopted descriptive survey research design. Both primary and secondary sources of data were used. The primary data are multispectral Landsat imageries, of 2000, 2010 and 2021 respectively which will be acquired. These imageries (Landsat 5 TM, Landsat 7 ETM+ and Landsat 8 OTI/LIRS) were acquired respectively freely online from the site GLCF website with a resolution of 30m. Socio-economic data were collected through the use of questionnaire.

4.0 Related Literatures

Siedentrop (2005), identified the impacts of urban growth and sprawl as ecological impacts, building and sealing of land, as well as indirect loss of natural potential of soils and the killing of endangered animals and plants. Sprawl can lead to erosion of urban functionality. Impact of sprawl is not limited to social and infrastructural, it also affects the economy of any given region. A conclusion can be drawn that there is a significant connection between expansion of settlements and concentration of poverty in core city area.

Alabi (2009) examined urban growth and sprawl, pattern and measurement in Lokoja, Nigeria. His study indicates that Lokoja is experiencing growth along the major highways traversing the city. New development areas are concentrated along the workers' village, tapering along the Kabba-Okene road. The researcher further highlighted that another area of recent expansion was towards the Ganaja– Ajaokuta road where several government estates had sprung up as well as some privately owned estates.

5.0 Results and Discussion

5.1 Gender of Respondents

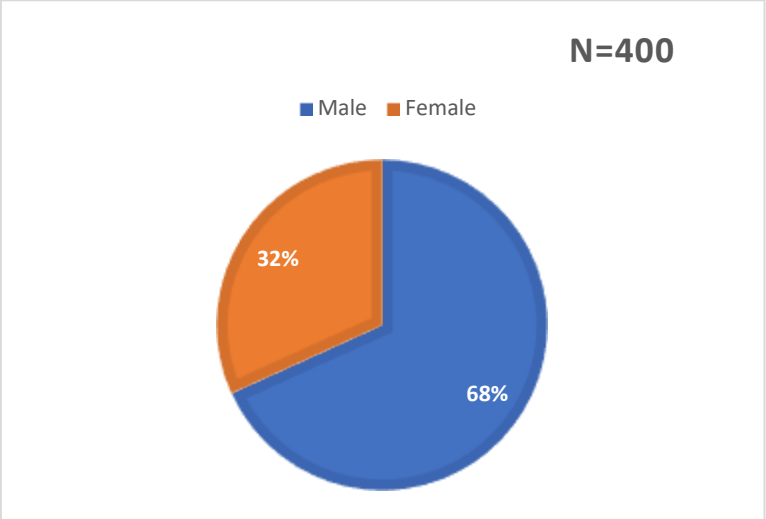


Figure 2: Percentage Distribution of Gender of Respondents

(Source: Researcher's Field Survey October 2022)

From the pictorial illustration in figure 2, males were more available to respond to the questions. From the figure, 273 representing 68.3% of those who responded were males while female respondents accounts for 31.8%.

5.2 Age of Respondents

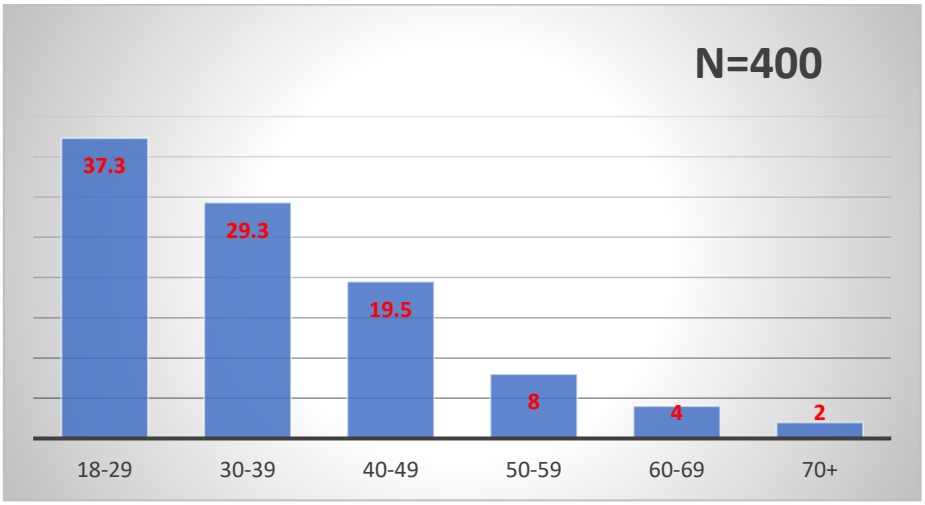


Figure 3: Percentage Distribution of Age of Respondents

(Source: Researcher's Field Survey October 2022)

Questionnaires were administered only to adult citizens. Those within the age of 18-29 are the modal respondents accounting for 37.3% of the respondents. Adults who are above 70 years of age were the least accounting for 2% of the respondents (See Figure 3).

5.3 Indigenous status

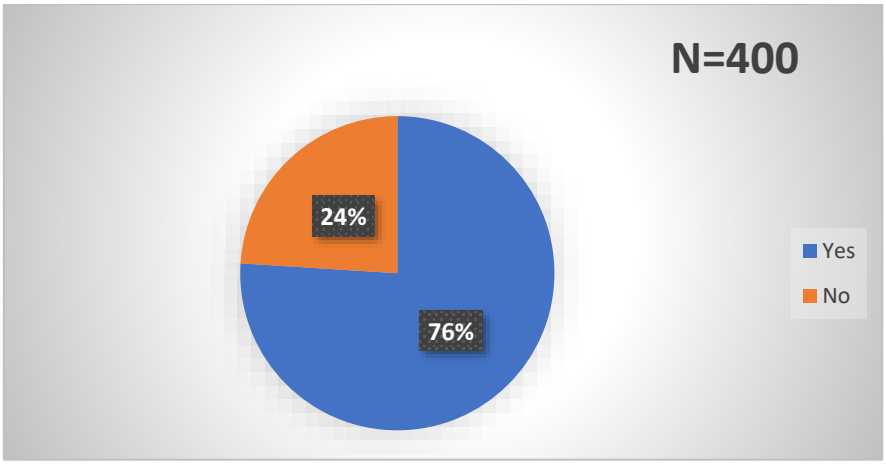


Figure 4: Percentage Distribution of Indigenous Status

(Source: Researcher's Field Survey October 2022)

Figure 4 indicates that 304 of the respondents which represents 76.0% of the respondents are indigenes of the study area while 96 respondents are non-indigenes.

5.4 Extent of Urban Sprawl

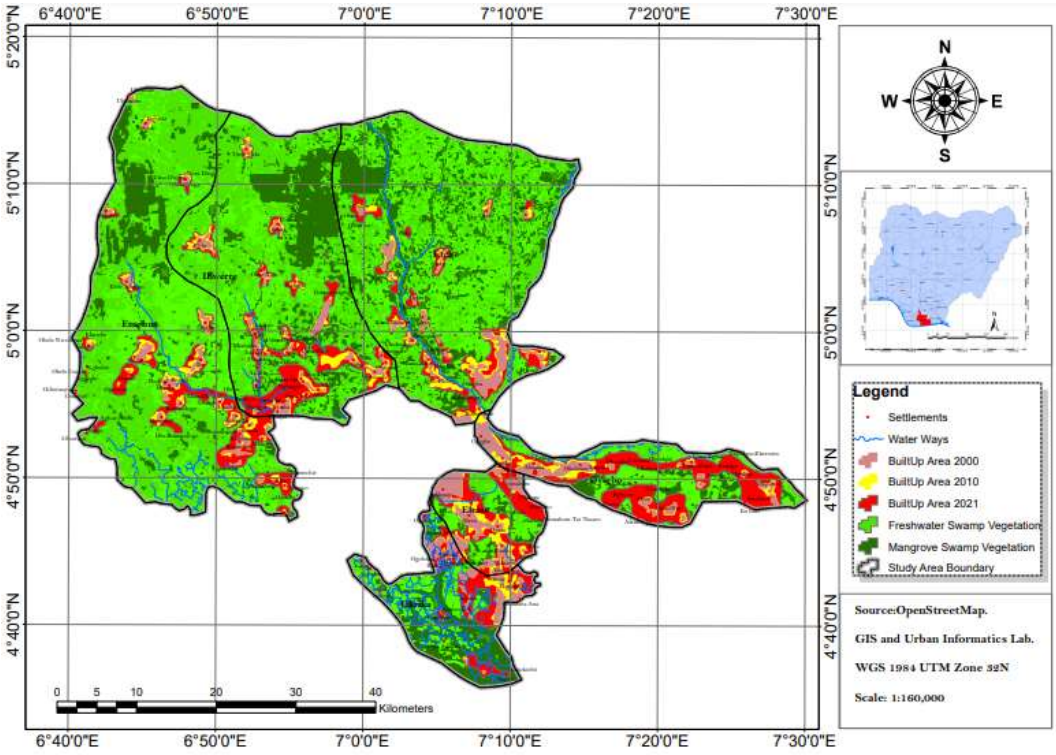


Figure 5: Extent of Urban Sprawl

(Source: Researcher's Field Survey October 2022)

Figure 5 and tables 1 to 3 clearly illustrate the land use cover change, it shows that, there was a rapid expansion of land use cover in all the six (6) Local Government Areas of the State studied, with a minimum of 65%- 70% from 2010 to 2021. this shows truly, that Rural-Urban growth and expansion are generally the result of large-scale settlement development that takes place amidst informal governmental land use constraints.

Table 1: Land Use Changes Due to Urban Sprawl in 2000

LGA	**2000**	**%**
Eleme	3,272.72Ha	23.74
Emohua	2,562.25Ha	3.08
Etche	3,226.23Ha	4.01
Ikwerre	2,404.98Ha	3.66
Okrika	2,300.91Ha	10.22
Oyigbo	3,044.52Ha	12.09

Source: Researchers' Field Survey (2022)

Table 2: Land Use Changes Due to Urban Sprawl in 2010

LGA	**2010**	**%**
Eleme	4,880.32Ha	35.41
Emohua	4,774.97Ha	5.74
Etche	5,581.14Ha	6.93
Ikwerre	4,481.10Ha	6.82
Okrika	3,283.77Ha	14.59
Oyigbo	4,507.47Ha	17.90

Source: Researchers' Field Survey (2022)

Table 3: Land Use Changes Due to Urban Sprawl in 2021

LGA	**2021**	**%**
Eleme	8,743.69Ha	63.44
Emohua	10,802.75Ha	12.99
Etche	9,458.46Ha	11.76
Ikwerre	11,023.70Ha	16.79
Okrika	7,042.08Ha	31.29
Oyigbo	13,401.94Ha	53.22

Source: Researchers' Field Survey (2022)

5.5 Urban Sprawl as a Threat to Land Resources

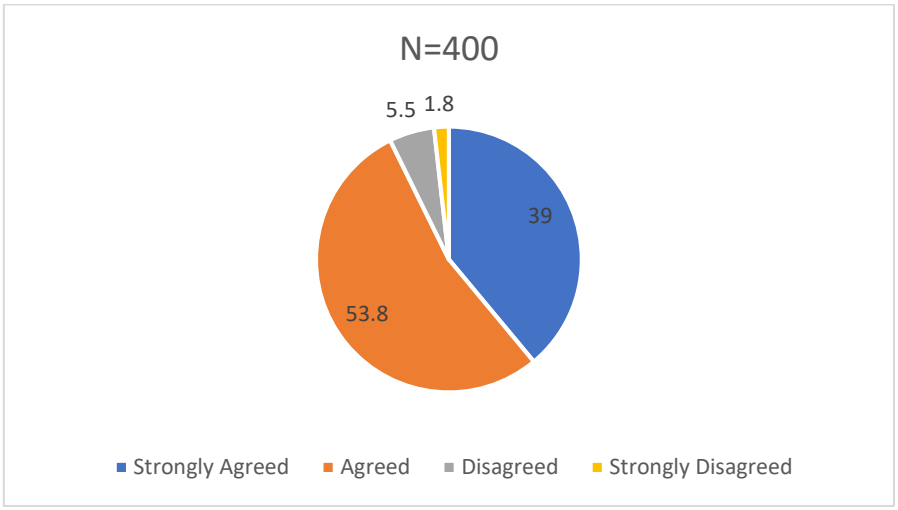


Figure 6: Urban Sprawl a Threat to Land Resources

(Source: Researcher's Field Survey October 2022)

Out of all respondents who commented on urban sprawl constituting a threat or decline to land resources, 53.8% said they only agree, 39.0% said they strongly agree, 5.5% said they disagree while 1.8% said they strongly disagree that urban sprawl constitutes a threat or decline to land resources (See figure 6).

5.6 Forest Resources as Worst Hit by Urban Sprawl

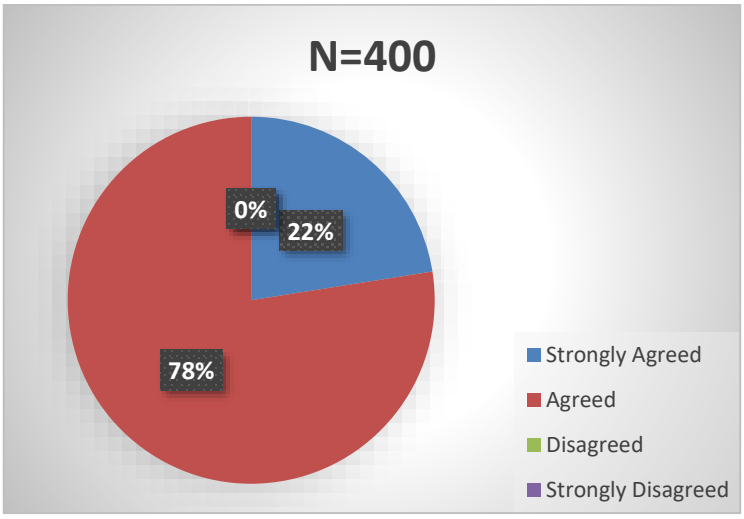
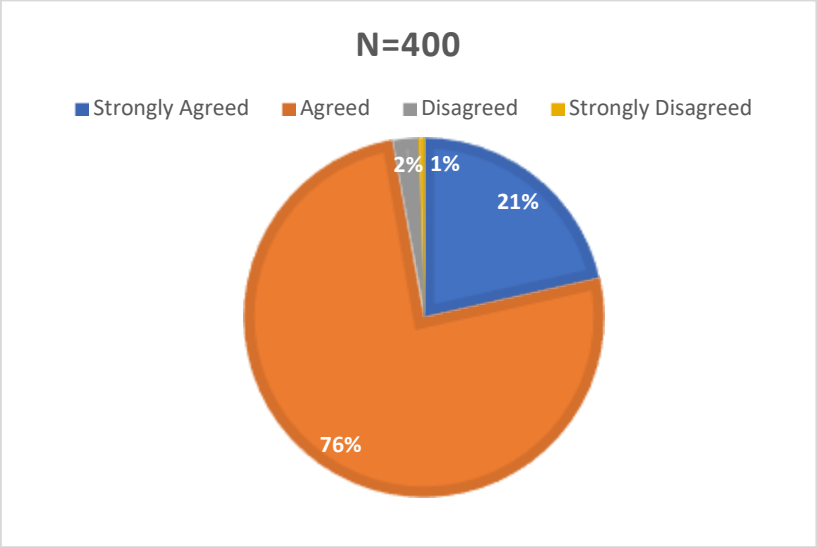


Figure 7: Urban Sprawl a Threat to Forest Resources

(Source: Researcher's Field Survey October 2022)

From Figure 7, all respondents are of the view that forest resources are affected by urban sprawl. 77.5% said they agree while 22.5% said they strongly agree that urban sprawl affects forest resources.

5.7 Urban Sprawl and Access to Farm Land



Figur8: Urban Sprawl Limiting People's Access to the Use of Their Lands for Farming

(Source: Researcher's Field Survey October 2022)

Majority of the respondents are of the view that urban sprawl is limiting people's access to land. This is evident as seen in figure 8 as 75.2% agree to that while 21.5% strongly agree. On the other hand, 2.3% said they disagree and 0.55 said they strongly disagree that urban sprawl is limiting people's access to land for farming.

Port Harcourt is experiencing rapid urbanization thereby causing its fringes to experience urban sprawl. There are factors responsible for the urban sprawl and these factors have their consequences on land resources decline. It is a fact that urban sprawl constitutes a threat to land resources as there is rapid decline of forest resources and limited lands for farming.

Urban sprawl has exerted impacts in the study area, such impacts includes the aggravation of social and economic diversion, segregation of residential area, less social interaction among residents of the study area and concentration of poor quality neighbourhood.

In order to decipher the economic impact of urban sprawl, it was discovered that urban sprawl causes increased expenditure on commuting from house to work, congestion of business with inefficient transportation system, added cost of extending urban infrastructure, suboptimal use of brownfields and no savings in provision of water and sewage facilities.

Some environmental resources are being lost as a result of urban sprawl. A well-known environmental loss is the consumption of land, building materials, expansion of quarries thereby loosing natural reserves, threat to river beds or ridges because of over extraction of gravel and coarse aggregate, loss of soil permeability, loss of biodiversity, damage to watershed, growing consumption of water and excessive energy consumption, pollution as a result of emission of CO2 emission.

Another effect of urban sprawl is in the area of natural protected areas and rural environment. Urban sprawl has caused loss of natural habitats, loss of best agricultural land, increase in the use of water and fertilizer in less productive area, increase in soil erosion and noise pollution in the rural area.

6.0 Conclusion and Recommendations

6.1 Conclusion

Rural-Urban sprawl which is the extension of the built up area into the suburbs and rural areas has impacts on the livelihood of residents and environment. There are factors that aggravate urban sprawl. Port Harcourt which is the area for this study has experienced steady growth in the past decades and is still experiencing more. In fact, Port Harcourt is just one of the cities in Nigeria and around the world that is experiencing urban sprawl with its attendant consequences. This work whose aim is to examine the impact of urban sprawl on land resources decline within the rural-urban fringes of Port Harcourt has discovered factors responsible for urban sprawl, consequences of urban sprawl on land resources decline within rural-urban fringes of Port Harcourt and actors who are working to curb the problems of urban sprawl in Port Harcourt. This work will give professionals in the built environment and decision makers necessary information required for adequate planning, development and management of the rural-urban fringes of Port Harcourt and ensure sustainable growth and development of Port Harcourt.

6.2 Recommendations

Having looked critically at the objectives and findings of this work, the following recommendations have been proffered:

- Social amenities should be provided in the rural areas so to curb the issue of mass exodus from the rural areas to Port Harcourt.
- Agriculture which is the basic occupation of the rural dwellers should be made more lucrative.
- Policies to ensure vertical growth rather than just horizontal growth in Port Harcourt should be put in place.
- The Port Harcourt master plan should be reviewed and the Greater Port Harcourt master plan should be fully implemented so as to curb the issue of lower tax rate, regulate urban planning and promote laws to govern growth and development of Port Harcourt and its fringes.
- There should be laws/implementations of laws on conservation and preservation of special areas.

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