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Examination of Trend Analysis of Land use Allocation in Delta State Nigeria, 2012-2022

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Abstract:- The trend analysis of land use allocation in Delta State, Nigeria from 2012 to 2022 is to provide an in-depth understanding of the changes and patterns in land use within the Delta State over a ten-year period. Land use allocation refers to the distribution and utilization of land for various purposes such as agriculture, residential, commercial, industrial, and infrastructure development. The aim of the study is to ascertain the percentage of land allocated to various land uses in Delta state from 2012 to 2022. This study utilizes remote sensing and geographic information system (GIS) techniques to analyze satellite imagery and spatial data. The study adopted content and qualitative analysis of the Land use allocation map of Asaba,Ughelli and Warri to ascertain the percentage of land allocated to various uses in Delta State from 2012-2022. The regression analysis carried out shows that there is a continuous increase in Residential Development, Commercial Development, Recreational Development, Road network Development, Utility and Service Infrastructure and decrease of Vegetation and Water body, Trend analysis of land use allocation in Delta state is likely to be influenced by these changes in vegetation and water bodies. The Two- way ANOVA was used to test the formulated hypothesis using SPSS (statistical package for social sciences). Trend analysis was carried out to determine the annual rate of change of the various land use allocation in Delta state from 2012 to 2022, The trend line and the annual rate of change show that as commercial, residential, recreation, utilities and road are having upward slope and a positive annual rate of change which signifies an increased annual allocation, water body and vegetation continue to have a downward slope and negative annual rate of change which signifies a reduced allocation annually. This simply means that land is being reclaimed from water bodies and vegetation area are being converted to other land uses in order to satisfy the ever increasing demand for commercial, residential, utilities and road land uses. The study found out that there is a constant increase in the allocation for residential land use in Asaba, Ughelli and Warri layouts made by the Delta State Government through the Ministry of Lands and Survey, Delta State These study recommends that Government should intensify efforts in ensuring that citizens adhere to the land use allocation. If a land has been allocated to be used for commercial purpose, such land should not be used for residential purpose.

Keywords:- *Trend Analysis, Land Use Allocation, Delta State.*

I. INTRODUCTION

Every activity of man as of necessity takes place on land and as a result of increased activities there arose conflicts in different land uses. One land use tends to succeed another where there is no control of such succession and use. Thus, the need for spatial ordering of land use with a view to creating functionally efficient and aesthetically pleasing environment for living, circulation and recreation, becomes imperative. Land use regulations serve the purpose of restricting development in order to give effect to urban plans. Land use planning regulations in Nigeria has its origins in British town planning activities that developed initially in response to the negative urban impacts of the industrial revolution. They were essentially aimed at improving health and safety by regulating overcrowding, pollution, inadequate services, facilities and amenities. The land use controls were intended to better organize urban space and produce ordered, safe, hygienic living environments (Ola, 2011). The British colonial administration used two major laws to achieve her planning objectives, and these were the 1917 Township Ordinance, and the 1946 Town and Country Planning Ordinance. Within the 1917 Township Ordinance the urban areas in Nigeria were divided into three classes of townships: the first class township of which Delta was the only one at that time; the second class townships which were towns located on the rail lines; and the other towns which were regarded as third class townships.

Governments all through the ages have recognized that land is an indispensable resource in a nation's economic and social development. Over the years, different communities have made enactments respecting how land should be owned, developed and managed. In other words the use to which land should be put, the nature and extent of development to be carried out thereon and indeed all decisions affecting land are dictated by the land laws of the country.

There are numerous demand and use of land resources ranging from agriculture, pasture, forestry, housing, urban regeneration, infrastructure amongst others. Obviously, most countries and societies have not been able to meet nor balance this ever increasing but conflicting demands and uses. These demands and uses has often created social upheaval and several efforts have been devoted to developing a system to administer land rights which can be refer to as Land Administration System– a process of determining, recording and disseminating information about ownership, value and uses of land. The creation of a

balanced land use system (urban equilibrium), that is, the provision of adequate land for the various land uses, consistent with the creation of functionally efficient physical environment, is the objective of the land use allocation. Land use allocation is to ensure the best utilization of land in the national interest, and to prevent individual land owners from using that land to the detriment of body politic (Lawal, 2000). This is in spite of the common law right to develop their land, as they like, provided they do not cause any nuisance or interfere with the rights of others. Land is expected to be allocated across various type of uses such as residential, commercial, industrial and agricultural etc. to give room for balanced development in the state. Often time developers face one challenge or the other which either delays or totally hinders the allocation of land for various uses. When this occurs it does have a negative implication on the development of the state.

A. The Benefits of Land use Allocation

Oyebanji (2003) as cited in Nwanekezie; Iroegbu; Alozie and Okorocha (2010) highlighted the benefits of a functional allocation of land to various use to include:

- It serves as a basis for describing the land use pattern of individual communities in comparison with what obtains in other places. Necessary corrective measures can thereafter be taken for enhanced efficiency.
- The value of an individual site is affected by the restriction of building density. In essence, such restriction limits the amount of capital, which can be applied to a given site.
- It alters the pattern of land values. It restrict the amount of land available for offices, raises the values of existing office land and thus of any land which in the future is given planning consent for offices.
- It shifts land values and cause the value of land in the urban area to fall. They affect the aggregate value and hence allocation efficiency.
- It has both direct and indirect distributional effects which may clash with the economic efficiency objectives.
- It is an avenue for sorting out units of land use into groups whose members have definable features in common.
- It forms the basis for the observation of all existing land uses with a view to knowing the trends of development and land utilization in any country.
- It offers recipe for successful planning activities against disaster land degradation and other environmental problems.
- It is useful in carrying out necessary survey in respect of all existing land uses with a view to checking haphazard development and making adequate provision for adequate supporting services.
- It helps immensely in the determination and enhancement of land values.

B. Land use Allocation Committee as Provided by the Land use Act

Section 2(2) of the Act mandated the Governor to empanel a Land Use and Allocation Committee to perform various functions. The appointment, composition and the modus operandi of the committee is at the exclusive discretion of the Governor. The committee shall consist of such number of persons as the Governor may determine, but shall include in its membership at least not less than two persons possessing qualifications approved as estate surveyors or land officers and who have had such qualification for not less than five years; and a legal practitioner. The Governor is thus the unquestionable personage in the overall administration of land in the state. In practice the composition, quality and tenure of the committee has tended to vary over time depending on the government in power and the disposition of the governor. Commenting on the composition and relevancy of the committee, Omotola observed that

"It is doubtful whether from the composition and mode of appointment of members of the committees whether any person can ever obtain a satisfactory compensation even for improvements on land compulsorily acquired by government. Since the committee cannot be an independent and impartial tribunal, the provision is not only retrograde but also conflicts with the fundamental principles of natural justice which requires that a person shall not be a judge in his own cause."

The Act is undemocratic in its provision and unrepresentative in its administration. Members of the public and other segments of the society are not represented as of right in the committee as the law provides no criteria for the appointment into the committee. Furthermore there is no certainty of tenure or duration for members of the committee as they hold their position in the committee at the pleasure of the Governor. Unfortunately, the state legislature is powerless to curtail the excesses of the Governor in this regard since they lack the power to amend and or review the Land Use Act, being a Federal legislation. The power of the Governor in the composition, powers and operations of the committee must be reviewed to capture the present nature of governance in civil society.

➢ *In Furtherance of the Foregoing it is Recommended that the Act be Amended in the Following Respect.*

- All lands in the state should not be vested in the Governor but in a corporate body to be called the State Land Use and Allocation Board to be held and administered for the use and common benefit of all Nigerians in accordance with the provisions of the Act.
- The Board shall have responsibility for any matter connected with the management of land in the State and on any matter connected with the resettlement of persons affected by the revocation of rights of occupancy on the ground of overriding public interest under this Act.
- Membership of the Board shall include the Governor as the Chairman, members of the State Traditional Chiefs; Experienced Lawyers, Estate Valuers, Surveyors, all nominated through their professional associations; selected relevant state commissioners; members representing the Community Development Association (CDAs) nominated from among the members of the State CDAs; four other members representing the

general public appointed by the governor on the recommendation of the simple majority of the members of the state Assembly; and the executive secretary of the Board appointed by the governor on the recommendation of the simple majority of the members of the state Assembly.

- Members of the board, except the Governor and the state commissioners, shall serve for a fixed period of time renewable not more than once. On been appointed members shall, save for death, resignation, criminal conviction and or infirmity, have a secured tenure of office and shall only be liable to be removed by the Governor on the recommendation of simple majority of members of the State House of Assembly.
- With such broad based membership and statutory powers of the board, the hitherto excessive powers of the Governor will be curtailed. Land management in the state will come to resemble the wishes and aspirations of the members of the public as it will infuse more public participation in land administration in the state. Such recommendation will also ensure a constant feedback and a crisscross of opinion on land administration between the government and the governed and thus lessen issues of conflicts with respect to land matters.

C. The Succession Theory of Urban Land Uses

This is a contemporary model on urban land use change which assumes that over time, the growth pattern of an urban area will result to succession in use of different land uses as the best and highest use changes (John, 1977). The theory emphasized that the central district that is already congested to further accommodates economic activities will eventually expand by the redevelopment of proximate land use zone otherwise known as the CBD Fringe or Transition Zone and slightly into the Medium Value Residential Zone, hence changing the character of the neighborhoods to that of the commercial premises. This theory explains very well the current state of our urban centers, whereby in most cases it is difficult to clearly differentiate Residential neighborhood from commercial or industrial neighborhood. This is as a result of encroachment of commercial and industrial properties into residential neighborhood.

D. Approaches to Urban Land use Allocation

Onokerhoraye and Omuta (1994); Lawal (2000) and Oyebanji (2000) as cited in Nwanekezie; Iroegbu; Alozie and Okorocha (2010) have identified three major ways of allocating land to urban uses. These include:

➢ *Development Control: -*

This is designed to regulate the growth of a settlement in a planned and orderly manner. Development control has two mechanisms or technical devices used in the control process. They include:

- *Land use Zoning: -*

This is the practice of defining certain areas on the map to be reserved for certain land use and not for other. An area could be zoned commercial-for instance, in such case any application to develop a noncommercial activity would be refused. This technique of development control was popular under the development planning system where development plans were to a great extent, land use zone plans and the refusal of application for non-conforming uses was often made on this basis. With the introduction of structure planning and its more flexible position and strategic approach, the use of land zoning mechanism for development control has diminished.

- *Planning Standard:-*

Efficient urban land use allocation of a country, town, city, district or neighborhood can be achieved by stipulating adequate standards for all aspect of development. The planning standards are either prescriptive or regulatory. Prescriptive standards are used to insure that there will be adequate playground for children open spaces for relaxation and recreation. It also ensures that residential, commercial, industrial, educational and agricultural areas are properly and carefully located to prevent conflicts and promote a harmonious interrelationship. Regulatory standard are used to ensure that there will be adequate day lighting, ventilation, sun lighting, car parking, plot ratio or coverage density etc. planning standards are widely used as regulatory mechanism to ensure that development is in accordance with certain minimum standards. Such minimum standards are often defined in subsidiary planning legislations as regulations or by-laws.

➢ *Planning Schemes:-*

This is a second approach to urban land allocation, which relates to the preparation of scheme of actions on any part of a city declared as planning area. This type of scheme usually specifies uses and regulates overall development in a particular area. It could involve establishment of separate residential estate, shopping complex, new town, mechanic village, industrial centers and a host of other land uses. It may also entail provision of basic infrastructure to ensure comfort living, easy movement and for the eradication of certain social vices and diseases. For example housing estates or new town or satellite town can be established to minimize shortage of accommodation and congestion in an urban center. In addition, overhead bridges, fly-over, and ring roads and dual carriage – ways can be constructed to tackle traffic problems within a city center.

➢ *Master Plan:-*

This is usually prepared in order to provide a general guide for the development of a city and to further serve as development policy guide to both public and private developers. It is therefore, necessary for a master plan to be prepared for every town or city with the aim of allocating its land space to major uses.

In its preparation, the inter-relationship of the uses and socio-economic implications of one use in relation to others are duly considered in a master plan. It is a futuristic positive approach to land use in a given city or region with a view to assigning every area to types and form of uses like housing circulation, utilities, services, open space and general design.

E. Type of Land Allocation to Various uses

The typical land allocation to various uses could be assigned to the following:

➢ *Residential Layout:-*

A neighborhood is the minimum planning unit desirable for the development of residential areas. It is the area within which residents may all share the common services, social activities and facilities required in the vicinity of the dwellings. The population of neighborhoods according to Farmer and Gibb (1979) vary from 2,000 to 8,000 requiring land areas of 20 – 100 hectares. The density of the development being the primary determining factor.

➢ *Commercial Layouts:-*

In commercial layout plans, at least 45-50% of the land to be developed should be allocated to road and vehicular parking and at least 10% to recreation and public utilities. This means that the land areas (building plots) put to actual commercial use should not exceed 40-45% of the land area. A small commercial layout for a neighborhood shopping center or market requires at least 1.5 hectares (Farmer and Gibb, 1979).

- *Industrial Layouts:-*

The minimum land area required for modern industrial estate is about 20 hectares (Farmer and Gibb, 1979). Of these, 30-40% should be allocated to roads and vehicular parking. This implies that not more than 50-60% of the entire layout land should be committed to actual industrial uses.

II. METHODOLOGY

The study adopted content and qualitative analysis of the Land use allocation map of Asaba, Ughelli and Warri to ascertain the percentage of land allocated to various uses in Delta State from 2012-2022. The choice of this location as the study area is because these cities in Delta state has in each them allocations made by Delta State Land Use Allocation Committee under the Ministry of Lands and Surveys Delta State and they are equally the major urban centers in Delta State

Land Map Cover from Delta State Ministry of Lands and Surveys (2012-2022) The Land Cover Map and figures in table below serve only as a guide for land allocation in a residen tial neighborhood in Delta State Ministry of Lands and Surveys layout. As these do not represent minimum and maximum standards, there may be reasonable variation from them in other States.

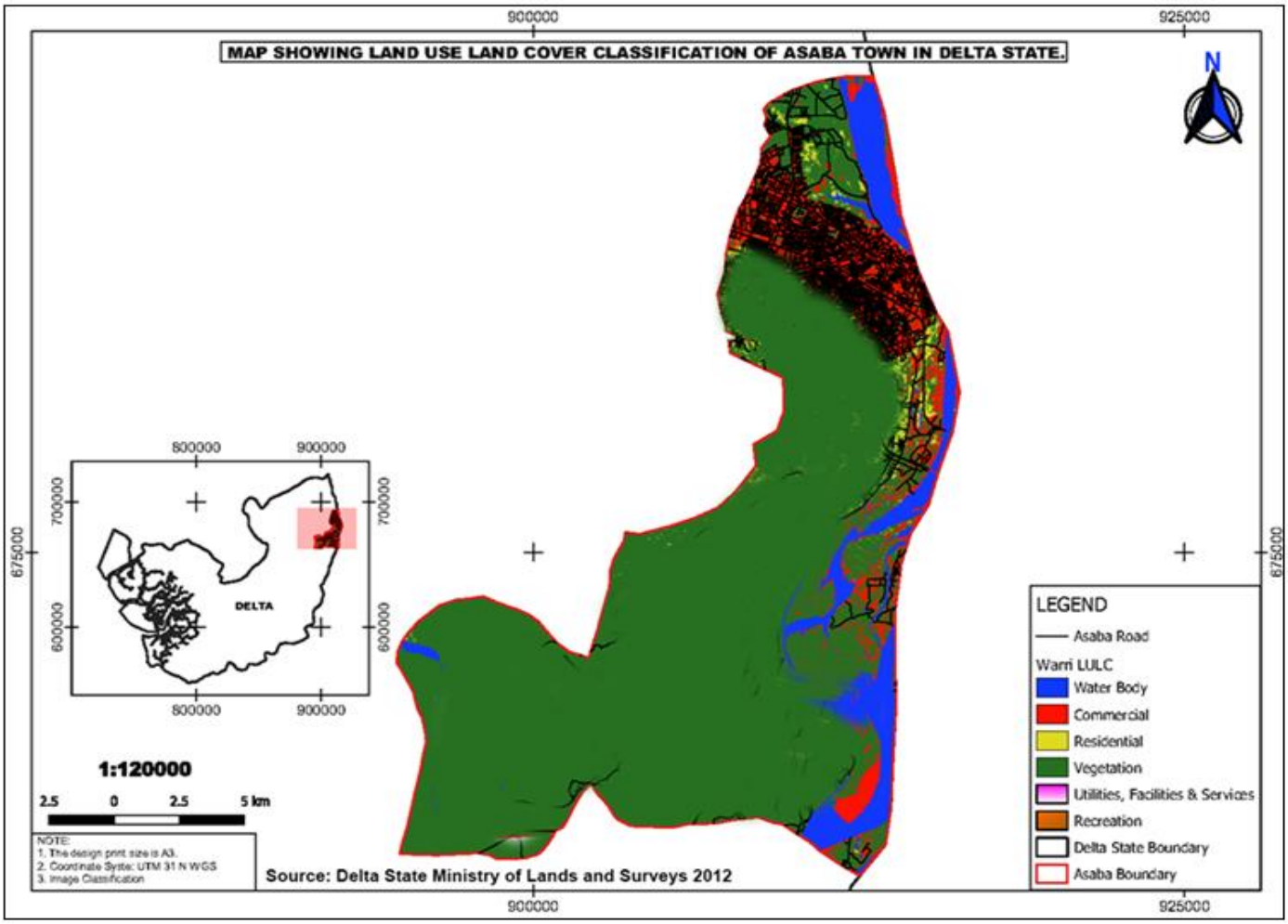

Fig 1 Map Showing Land use Cover in Asaba, Delta State 2012

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Table 1 Land use Allocation for Asaba 2012

Land Use	Area m^2	Percentage (%)
Water Body	26,327,946.51	10.51
Commercial	41,814,973.87	14.9
Residential	13,582,884.65	4.91
Vegetation	143,800,857.30	62.26
Utilities, Facilities & Service	9,063,719.29	2.95
Recreation	7,184,965.15	2.47
Road	12,110,347.62	2
	253,885,694.40	100

Table 2 Land use Allocation for Asaba 2013

Land Use	Area m^2	Percentage (%)
Water Body	25,830,358.68	10.21
Commercial	43,259,270.50	15.41
Residential	13,924,545.99	5.05
Vegetation	136,247,320.90	60.25
Utilities, Facilities & Service	10,964,486.26	3.43
Recreation	8,112,396.79	2.8
Road	13,251,315.28	2.85
Total	**253,885,694.40**	**100**

Table 3 Land use Allocation for Asaba 2014

Land Use	Area m^2	Percentage (%)
Water Body	25,332,770.85	9.91
Commercial	44,703,567.13	15.93
Residential	14,266,207.33	5.19
Vegetation	128,693,784.50	58.24
Utilities, Facilities & Service	12,865,253.23	3.31
Recreation	9,039,828.43	3.12
Road	14,392,283.94	3.7
Total	**253,885,694.40**	**100**

Table 4 Land use Allocation for Asaba 2015

Land Use	Area m^2	Percentage (%)
Water Body	24,835,183.02	9.61
Commercial	46,147,863.76	16.45
Residential	14,607,868.67	5.33
Vegetation	121,140,248.10	56.23
Utilities, Facilities & Service	14,766,020.19	3.18
Recreation	9,967,260.07	3.44
Road	15,533,252.59	3.55
Total	**253,885,694.40**	**100**

Table 5 Land use Allocation for Asaba 2016

Land Use	Area m^2	Percentage (%)
Water Body	24,337,595.19	9.31
Commercial	47,592,160.39	16.97
Residential	14,949,529.01	5.47
Vegetation	113,586,711.70	54.22
Utilities, Facilities & Service	16,666,787.16	3.05
Recreation	10,894,691.71	3.76
Road	16,674,221.24	3.4
Total	**253,885,694.40**	**100**

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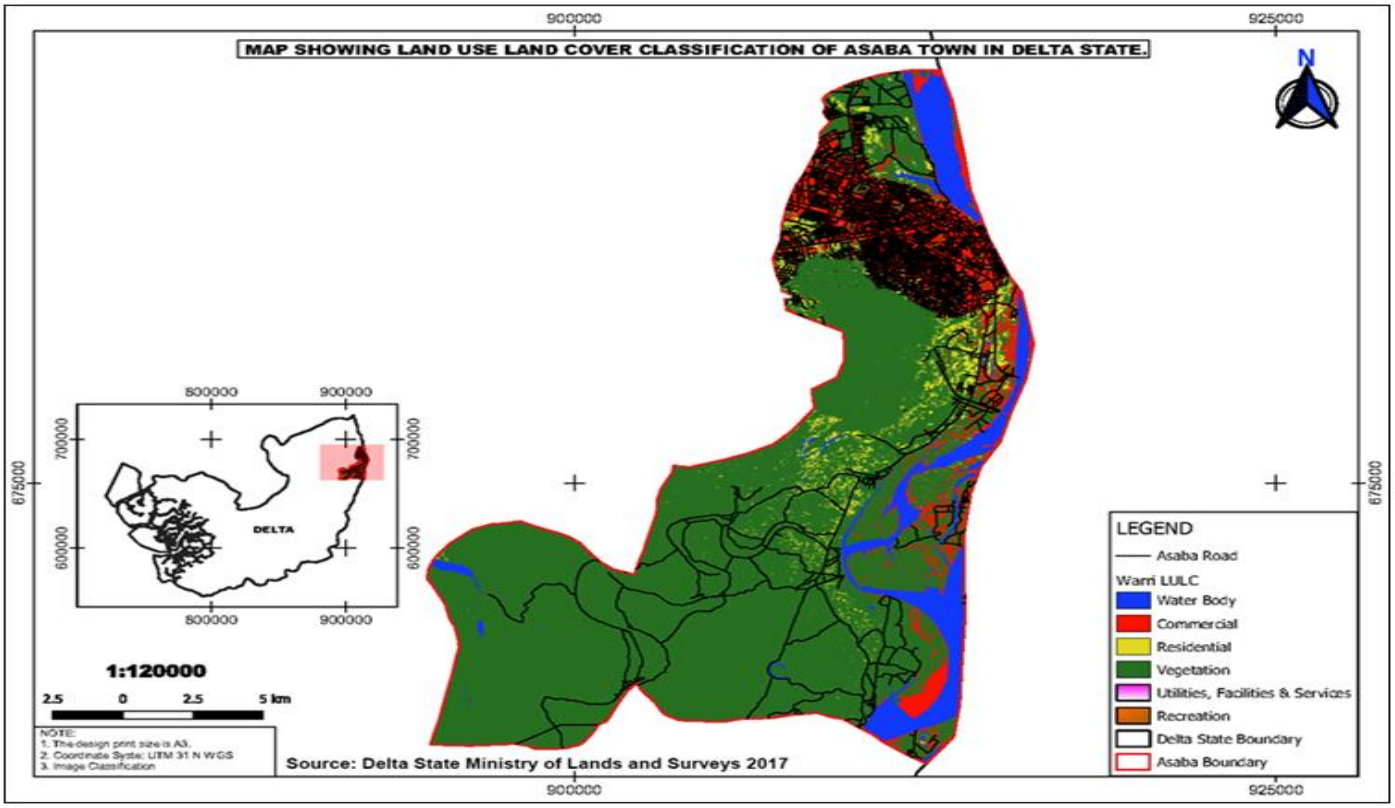

Fig 2 Map Showing Land use Cover in Asaba, Delta State 2017

Table 6 Land use Allocation for Asaba 2017

Land Use	Area m^2	Percentage (%)
Water Body	23,500,853.19	9.27
Commercial	49,632,958.45	19.57
Residential	16,042,324.30	6.31
Vegetation	126,734,353.68	49.91
Utilities, Facilities & Service	13,678,161.64	5.39
Recreation	9,504,113.29	3.7
Road	14,853,940.46	5.85
Total	**253,885,694.40**	**100**

Table 7 Land use Allocation for Asaba 2018

Land Use	Area m^2	Percentage (%)
Water Body	22,848,866.81	8.97
Commercial	51,294,658.96	20.36
Residential	16,662,465.07	6.63
Vegetation	121,989,880.50	48.42
Utilities, Facilities & Service	15,742,318.70	4.55
Recreation	11,607,646.89	3.8
Road	16,991,127.22	4.27
Total	**253,885,694.40**	**100**

Table 8 Land use Allocation for Asaba 2019

Land Use	Area m^2	Percentage (%)
Water Body	22,196,880.43	8.67
Commercial	52,956,359.47	21.14
Residential	17,282,605.83	6.95
Vegetation	117,245,407.40	47.92
Utilities, Facilities & Service	17,806,476.75	4.71
Recreation	13,711,180.50	4.22
Road	19,128,314.97	4.69
Total	**253,885,694.40**	**100**

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Table 9 Land use Allocation for Asaba 2020

Land Use	Area m^2	Percentage (%)
Water Body	21,544,894.04	8.37
Commercial	54,618,059.98	21.92
Residential	17,902,746.60	7.27
Vegetation	112,501,934.30	47.42
Utilities, Facilities & Service	19,870,634.80	4.87
Recreation	15,814,714.11	4.64
Road	21,265,502.72	5.11
Total	**253,885,694.40**	**100**

Table 10 Land use Allocation for Asaba 2021

Land Use	Area m^2	Percentage (%)
Water Body	20,892,907.66	8.06
Commercial	56,279,760.49	22.7
Residential	18,522,887.37	7.59
Vegetation	107,758,461.20	46.92
Utilities, Facilities & Service	21,934,792.86	5.04
Recreation	17,918,247.72	5.06
Road	23,402,690.47	5.53
Total	**253,885,694.40**	**100**

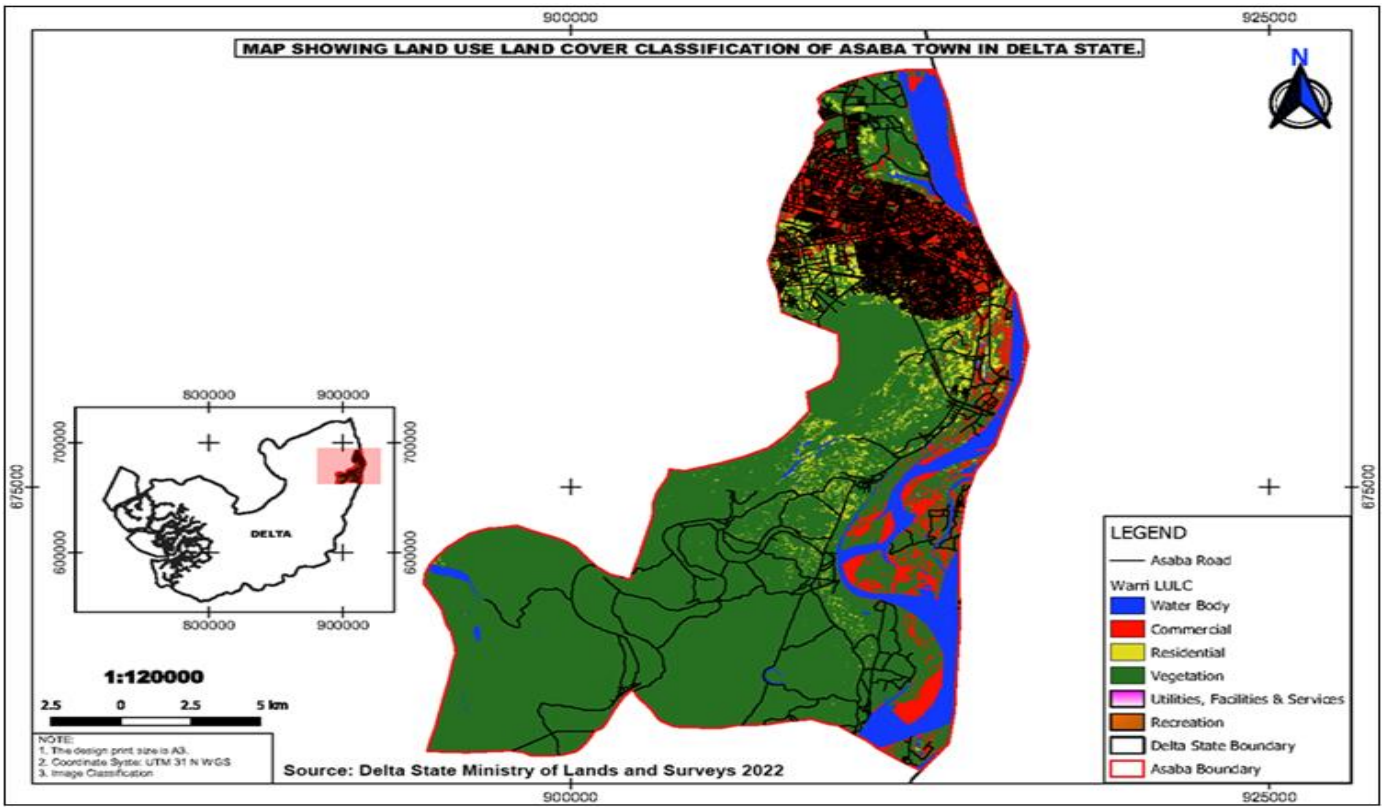

Fig 3 Map Showing Land Use Cover in Asaba, Delta State 2022

Table 11 Land Use Allocation for Asaba 2022

Land Use	Area m^2	Percentage (%)
Water Body	21,191,051.87	8.34
Commercial	57,924,269.44	22.8
Residential	18,770,601.19	7.39
Vegetation	108,785,868.81	42.8
Utilities, Facilities & Service	18,464,603.53	7.28
Recreation	11,104,939.36	4.37
Road	16,708,761.79	7.02
	253,885,694.40	100

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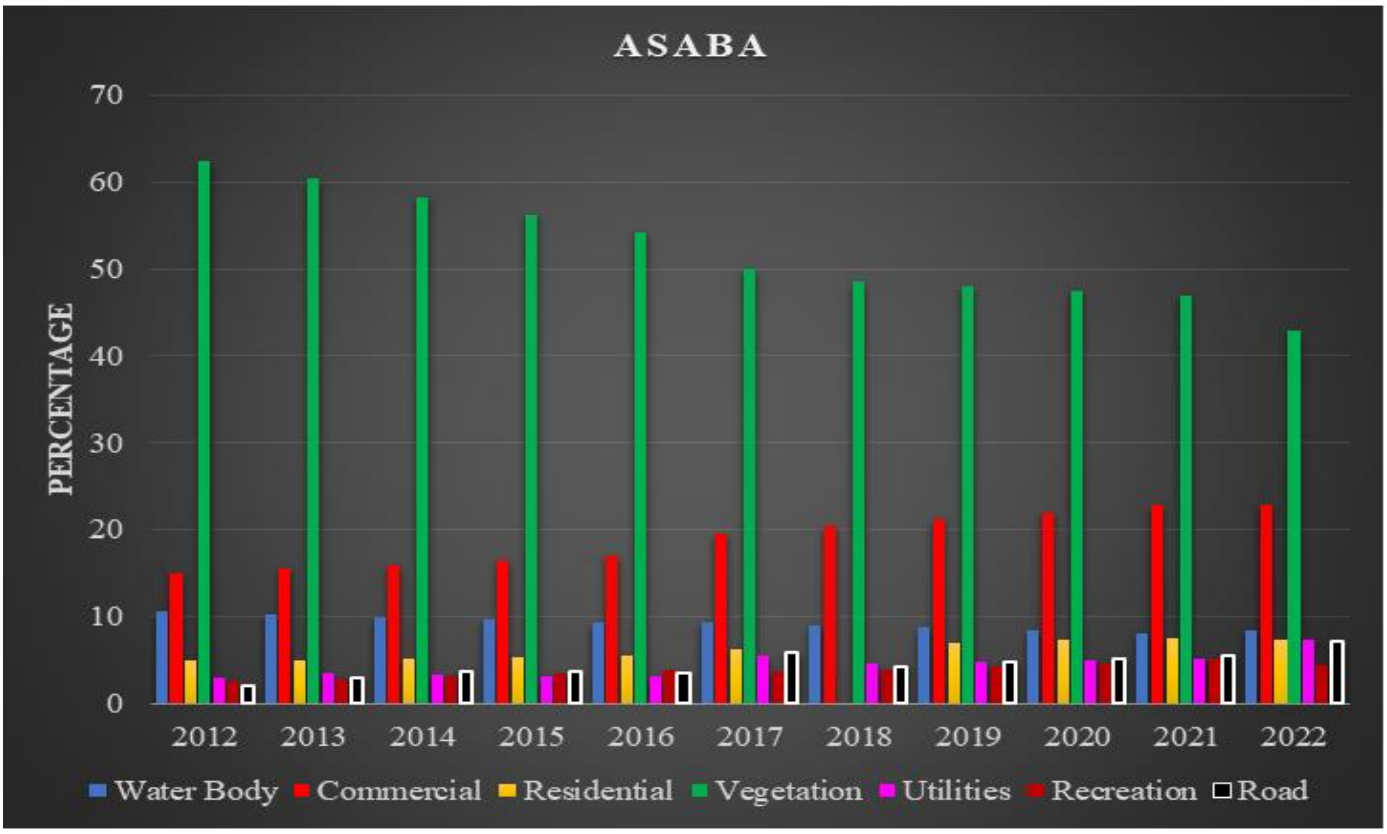

Fig 4 Bar Chat Showing Percentage of Land use Allocation in Asaba (2012-2022)

Table 1 to 11 show that the allocation of land use in Delta state (Asaba) has experienced significant growth and diversification between 2012 and 2022. This expansion can be attributed to the implementation of effective and efficient land use and allocation procedures in the state. The government of Delta state has recognized the importance of proper land management and has taken proactive measures to ensure sustainable development across various sectors.

One of the key areas that has witnessed an increase in land use allocation is residential development. As the population of Delta state continues to grow, there has been a corresponding need for more housing options. The government has responded to this demand by allocating more land for residential purposes, allowing for the construction of new housing estates and communities. This has not only provided shelter for the growing population but also stimulated economic activity in the construction sector.

Commercial land use has also seen a significant increase in allocation. Delta state, being a hub for business activities, has attracted numerous investors and entrepreneurs over the years. To accommodate this influx, the government has allocated more land for commercial purposes, including the establishment of shopping malls, office complexes, and industrial zones. This expansion has not only created employment opportunities but also enhanced economic growth and development in the state.

The allocation of land for road infrastructure has been another crucial aspect of effective land use procedures in Delta state. Recognizing the importance of a well-connected transportation network, the government has allocated substantial land for road construction and expansion projects. This includes both intra-city roads as well as major highways connecting Delta state with other regions. The improved road infrastructure has facilitated easier movement of goods and people, boosting trade and commerce within and beyond the state's borders.

Lastly, the allocation of land for utilities facilities and services has played a crucial role in the development of Delta state. The government has recognized the importance of providing essential services such as water supply, electricity, and waste management to its residents. To ensure efficient delivery of these services, land has been allocated for the construction of water treatment plants, power stations, and waste management facilities. This has improved the overall living conditions in the state and contributed to its sustainable development.

In conclusion, the increase in land use allocation for various purposes in Delta state between 2012 and 2022 can be attributed to effective and efficient land use and allocation procedures implemented by the government. The allocation of land for residential, commercial, road infrastructure, recreational, and utilities facilities and services has contributed to the overall development and growth of the state.

III. ASABA TREND LINE

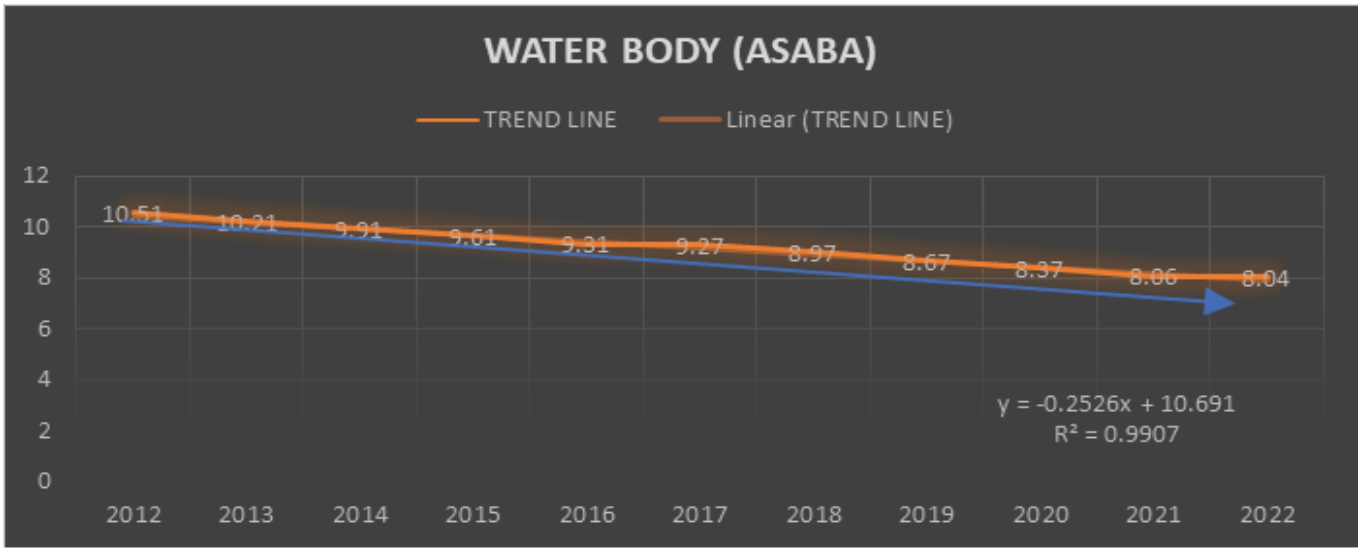

Fig 5 Trend Line of Water Body Land use Allocation Asaba 2012-2022

The graph above shows the annual rate of change on water bodies from 2012 to 2022 in Asaba, Nigeria. The regression equation is y = -0.2526x + 10.691. The slope of the regression line is -0.2526, which means that the average annual rate of change on water bodies is decreasing by 0.2526 units per year. In other words, the water bodies are shrinking by 0.2526 units per year. Overall, the graph implies that the average annual rate of change on water bodies in Asaba, is decreasing. The R-squared value in the graph is 0.9907. This means that 99.07% of the variation on water bodies can be explained by the linear regression model. the SPSS output is given below;

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.691	1.167		1759.947	.000
	Water Bodies	-0.2526	.127	-.995	-30.963	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9907. This means that 99.07% of the variation on water bodies can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9907[a]	.991	.990	.337
a. Predictors: (Constant), Percentage (%)				

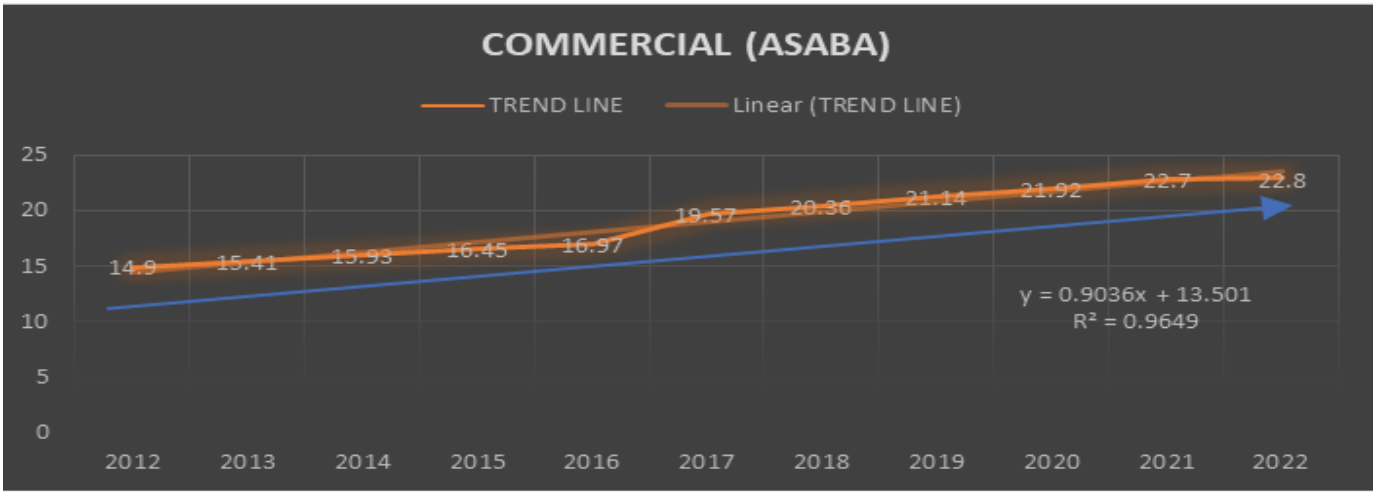

Fig 6 Trend Line of Commercial Land use Allocation Asaba 2012-2022

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The graph above shows the annual rate of change on commercial from 2012 to 2022 in Asaba, Nigeria. The regression equation is y = 0.9036x + 13.501. The slope of the regression line is 0.9036, which means that the average annual rate of change on commercial is increasing by 0.9036 units per year. This implies that the average annual rate of change on commercial in Asaba, is increasing. The R-squared value in the graph is 0.9649. This means that 96.49% of the variation on commercial can be explained by the linear regression model. The SPSS output is given as follows;

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.501	1.300		1535.864	.000
	Commercial	0.906	.068	.982	15.724	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9649. This means that 96.49% of the variation on commercial can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9649[a]	.965	.961	.655
a. Predictors: (Constant), Percentage (%)				

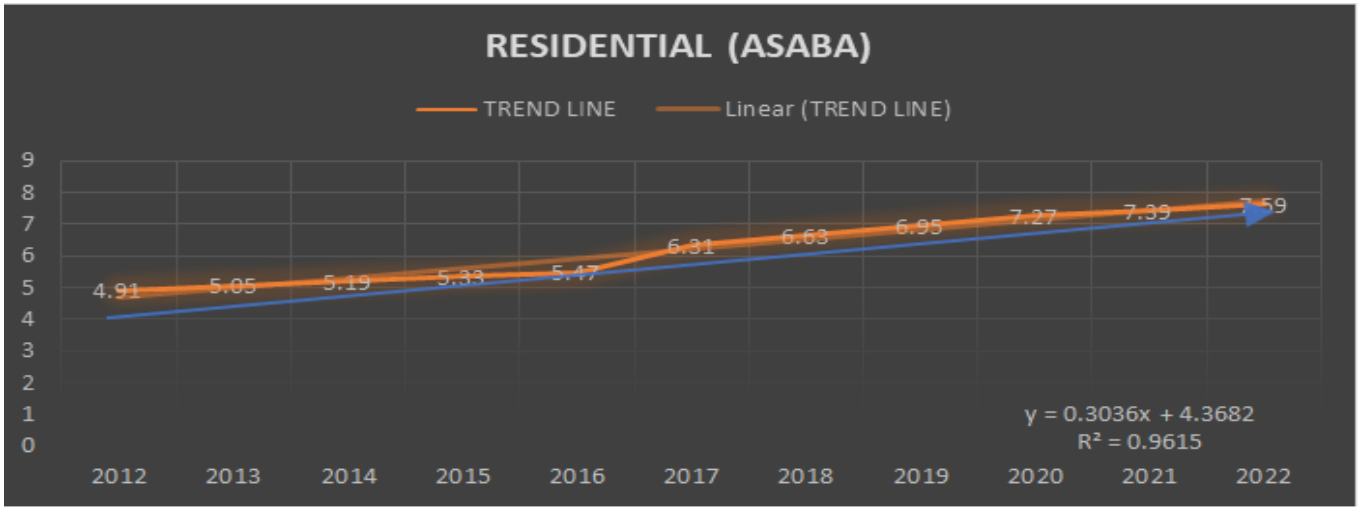

Fig 7 Trend Line of Residential Land use Allocation Asaba 2012-2022

The graph above shows the annual rate of change on residential from 2012 to 2022 in Asaba, Nigeria. The regression equation is y = 0.3036x + 4.3682. The slope of the regression line is 0.3036, which means that the average annual rate of change on residential is increasing by 0.3036 units per year. This implies that the average annual rate of change on residential in Asaba, is increasing. The R-squared value in the graph is 0.9615. This means that 96.15% of the variation on residential can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.3682	1.324		1508.159	.000
	Residential	0.3036	.211	.981	14.984	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9615. This means that 96.15% of the variation on residential can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.961[a]	.961	.957	.686
a. Predictors: (Constant), Percentage (%)				

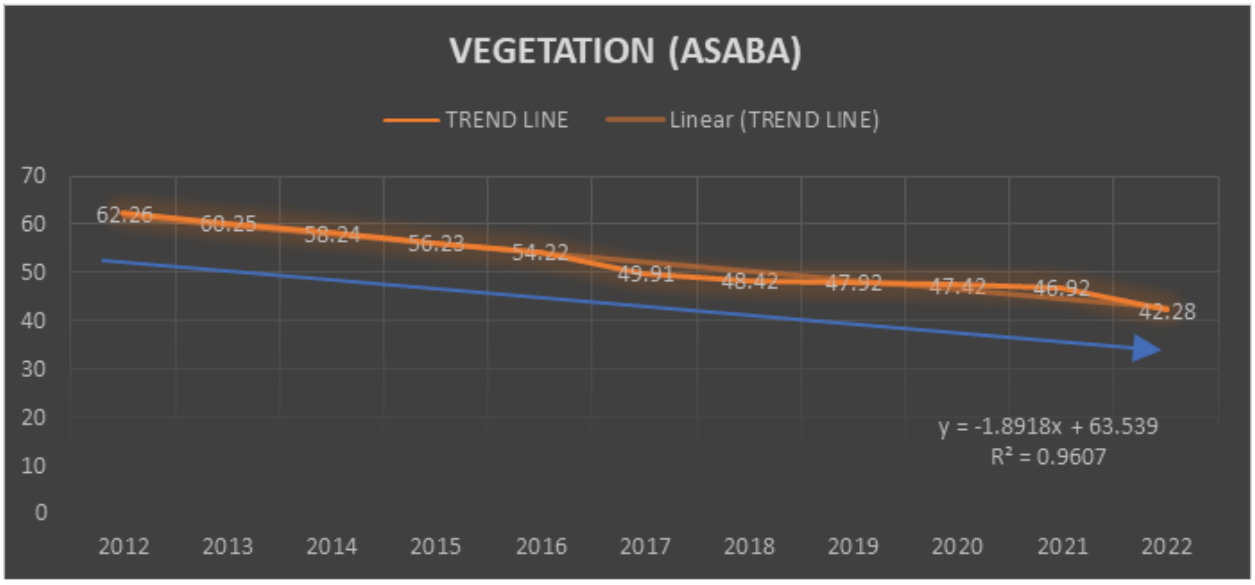

Figure 8 Trend Line of Vegetation Land use Allocation Asaba 2012-2022

The graph above shows the annual rate of change on vegetation from 2012 to 2022 in Asaba, Nigeria. The regression equation is y = -1.8918x + 63.539. The slope of the regression line is -1.8918, which means that the average annual rate of change on vegetation is decreasing by -1.8918 units per year. This implies that the average annual rate of change on vegetation in Asaba, is decreasing. The R-squared value in the graph is 0.9607. This means that 96.07% of the variation on vegetation can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	63.539	1.217		1690.34	.000
	vegetation	-1.8918	.452	.96	11.34	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9607. This means that 96.07% of the variation on vegetation can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9607[a]	.961	.956	.693
a. Predictors: (Constant), Percentage (%)				

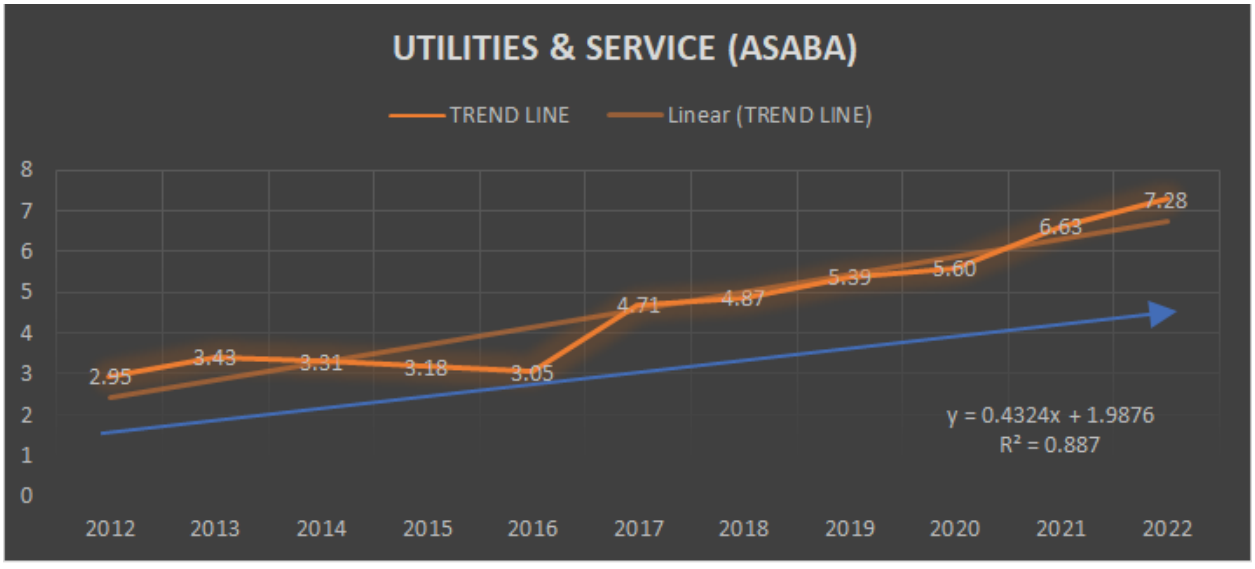

Fig 9 Trend Line of Utilities & Service Land use Allocation Asaba 2012-2022

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The graph above shows the annual rate of change on utilities & Service from 2012 to 2022 in Asaba, Nigeria. The regression equation is y = 0.4324x + 1.9876. The slope of the regression line is 0.4324, which means that the average annual rate of change on utilities & Service is increasing by 0.4324 units per year. This implies that the average annual rate of change on utilities & Service in Asaba, is increasing. The R-squared value in the graph is 0.9615. This means that 88.7% of the variation on utilities & Service can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.9876	1.799		1135.981	.000
	Utilities & Service	0.4324	.034	-.980	-14.833	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9615. This means that 88.7% of the variation on utilities & Service can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9615[a]	.973	.970	.573
a. Predictors: (Constant), Percentage (%)				

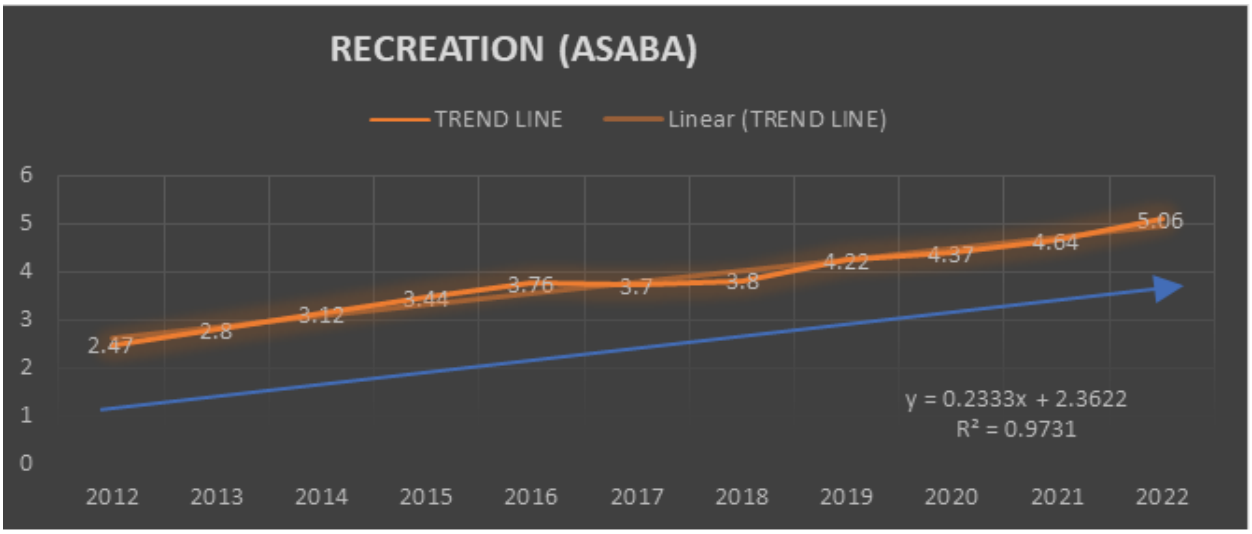

Fig 10 Trend Line of Recreational Land use Allocation Asaba 2012-2022

The graph above shows the annual rate of change on recreation from 2012 to 2022 in Asaba, Nigeria. The regression equation is y = 0.2333x + 2.3622. The slope of the regression line is 0.2333, which means that the average annual rate of change on recreation is increasing by 0.2333 units per year. This implies that the average annual rate of change on recreation in Asaba, is increasing. The R-squared value in the graph is 0.9731. This means that 97.31% of the variation on recreation can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.3622	.886		2258.826	.000
	Percentage (%)	0.2333	.231	.986	18.059	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9731. This means that 97.31% of the variation on recreation can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9731[a]	.999	.999	.120
a. Predictors: (Constant), Percentage (%)				

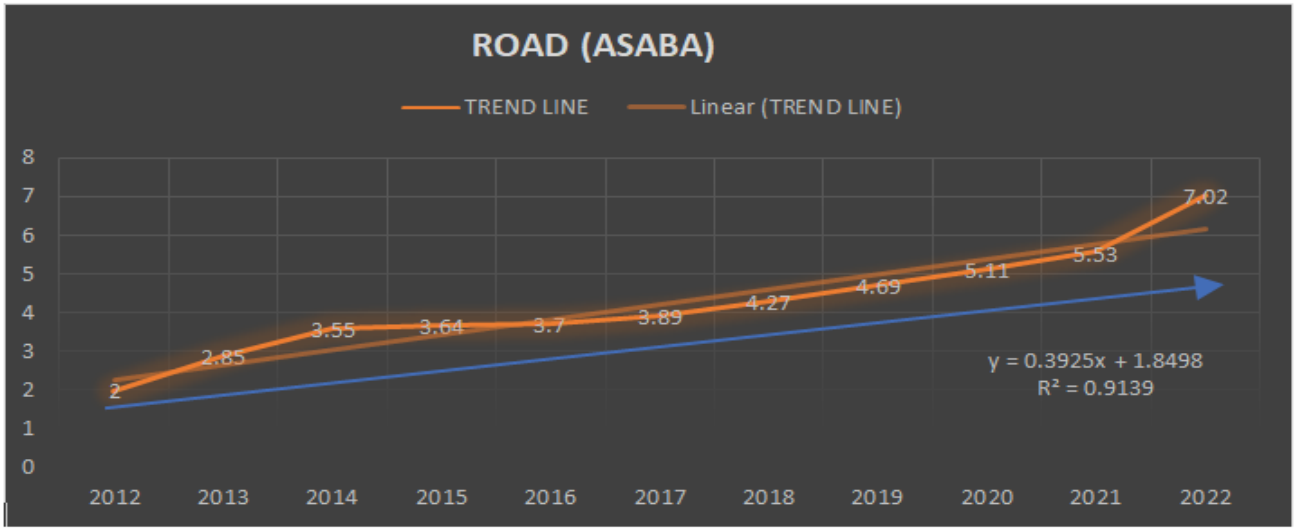

Fig 11 Trend Line of Road Land use Allocation Asaba 2012-2022

The graph above shows the annual rate of change on road from 2012 to 2022 in Asaba, Nigeria. The regression equation is y = 0.3925x + 1.8498. The slope of the regression line is 0.3925, which means that the average annual rate of change on road is increasing by 0.3925 units per year. This implies that the average annual rate of change on road in Asaba, is increasing. The R-squared value in the graph is 0.9139. This means that 91.39% of the variation on road can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.8498	.886		2258.826	.000
	Road	0.3925	.231	.986	18.059	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9139. This means that 91.39% of the variation on road can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.9139[a]	0.9243	1.000	.023
a. Predictors: (Constant), Percentage (%)				

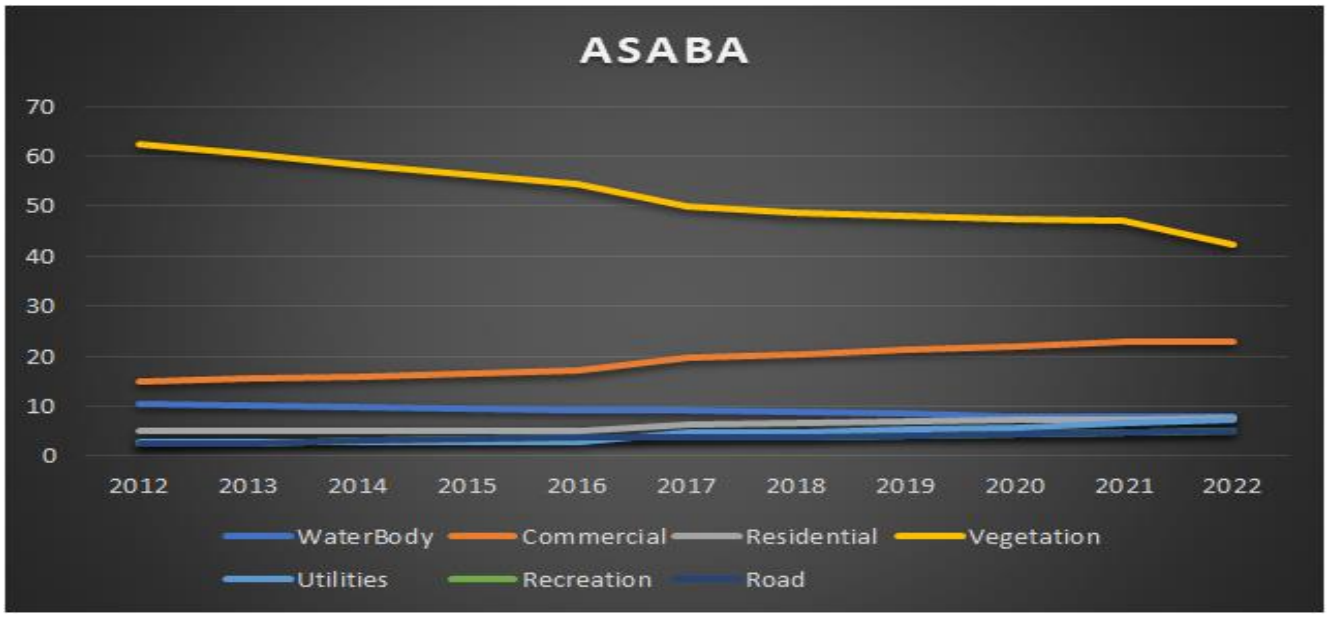

Fig 12 Multiple Trend Line Graph of Land use Allocation Asaba 2012-2022

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From the multiple trend line graph of land use allocation Asaba 2012-2022 (fig 12) above, it is observed that the average annual rate of change in commercial land use is increasing by 0.9036 unit per year, residential increasing in average annual rate of change by 0.3036,utilities & service by 0.4324 unit per year, recreation by 0.2333 unit per year, road by 0.3924 unit per year while water body and vegetation average annual rate of change is decreasing by -0,2526 unit per year and -1.8918 unit per year respectively.

➢ *Graphic Representation of the Percentage Rate of Land Use Allocated To Various Uses in Asaba 2012-2022*

Asaba in Delta State, has experienced a continuous increase in residential, commercial, recreational, roads, utility and service activities in recent years. This growth has had significant implications for the trend analysis of land use allocation in the state.

- *Residential Development:*

The increasing population of Delta State has led to a high demand for residential properties, resulting in the expansion of residential areas and the conversion of agricultural lands to residential use. This has led to a significant increase in the allocation of land for residential purposes, which has resulted in the development of new neighborhoods and the expansion of existing ones.

- *Commercial Development:*

The growth of commercial activities in Delta State has also led to an increase in the allocation of land for Commercial purposes. This has resulted in the development of new shopping centers, office complexes and other commercial facilities. The increase in commercial activities has also led to an increase in the demand for land for industrial purposes, such as factories and warehouses.

- *Recreational Development:*

The state's rich natural resources and scenic beauty have made it an attractive destination for recreational activities such as tourism, fishing, and hunting. This has led to an increase in the allocation of land for recreational purposes, such as parks, gardens, and other leisure facilities.

- *Road Network Development:*

The continuous increase in residential, commercial, and recreational activities has led to an increase in the demand for road infrastructure. This has resulted in the expansion of the state's road network, which has facilitated the movement of people, goods, and services.

- *Utility and Service Infrastructure:*

The growth of residential, commercial, and recreational activities has also led to an increase in the demand for utility and service infrastructure such as water supply, electricity, and telecommunications.

This has resulted in the expansion of the state's utility and service infrastructure, which has improved the quality of life for residents and supported the growth of economic activities.

Again the continuous decrease in **vegetation and water bodies** in Delta state can have significant implications on trend analysis of land use allocation. Land use allocation refers to the process of determining how land resources are distributed and utilized for various purposes such as agriculture, urban development, industrial activities, and conservation.

One of the key implications of the decrease in vegetation is the loss of ecosystem services provided by forests and other natural habitats. Vegetation plays a crucial role in regulating climate, maintaining soil fertility, preventing erosion, and supporting biodiversity. When vegetation cover decreases, these ecosystem services are compromised, leading to negative impacts on land use allocation. For example, reduced vegetation cover can result in increased soil erosion and decreased soil fertility, making it less suitable for agricultural activities. This may lead to a shift in land use allocation away from agriculture towards other sectors such as urban development or industrial activities.

Similarly, the decline in water bodies such as rivers, lakes, and wetlands can also have significant implications for land use allocation. Water bodies provide important resources for various sectors including agriculture, fisheries, and tourism. They also play a crucial role in regulating local climate and supporting biodiversity. When water bodies decrease in size or quality, it can affect the availability of water resources for different land use activities. For instance, reduced water availability may limit agricultural production or impact the viability of certain industries that rely on water for their operations. This can result in a reallocation of land resources towards alternative uses that are less dependent on water.

The trend analysis of land use allocation in Delta state is likely to be influenced by these changes in vegetation and water bodies. A continuous decrease in vegetation cover and water bodies can indicate a shift in land use patterns over time. For example, if there is a significant decline in agricultural land due to decreased vegetation cover or limited water availability, it may suggest a transition towards other sectors such as urban development or industrialization. Similarly, if there is an increase in urban areas or industrial zones at the expense of natural habitats, it may indicate a trend towards more intensive land use practices.

Moreover, the decrease in vegetation and water bodies can also have indirect impacts on land use allocation through their effects on other factors such as climate change and biodiversity loss. Climate change can alter temperature and precipitation patterns, which in turn can affect the suitability of land for different uses. For instance, changes in rainfall patterns may render certain areas less suitable for agriculture or increase the risk of flooding in urban areas. Biodiversity loss resulting from the decline in vegetation and water bodies can also impact land use allocation by affecting ecosystem functioning and resilience. Loss of biodiversity can lead to decreased productivity and

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increased vulnerability to pests and diseases, which can influence the choice of land use activities.

In conclusion, the continuous decrease in vegetation and water bodies in Delta state can have significant implications for trend analysis of land use allocation. These changes can affect ecosystem services, water availability, and other factors that influence land use decisions. Understanding these implications is crucial for sustainable land management and planning in the face of environmental challenges.

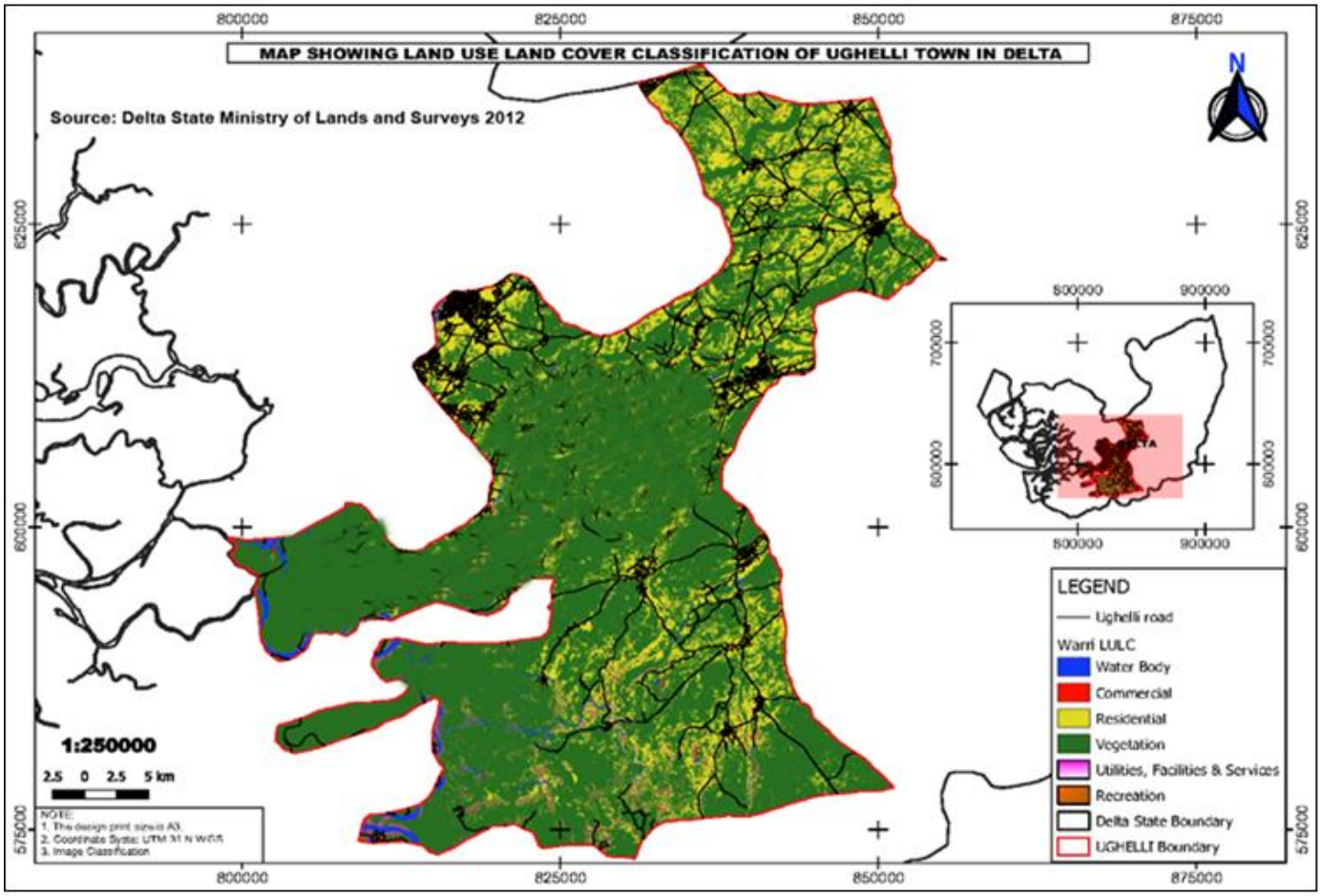

Fig 13 Map Showing Land use Cover Map of Ughelli 2012

Table 12 Land use Allocation for Ughelli 2012

Land Use	Area m^2	Percentage (%)
Water Body	27,465,230.41	1.72
Commercial	28,263,638.27	1.77
Residential	274,971,667.29	17.22
Vegetation	953,298,985.88	59.70
Utilities, Facilities & Service	100,120,345.75	6.27
Recreation	63,553,265.73	3.98
Road	149,142,588.41	9.34
Total	**1,596,815,721.75**	**100.00**

Table 13 Land use Allocation for Ughelli 2013

Land Use	Area m^2	Percentage (%)
Water Body	27,081,778.11	1.7
Commercial	29,534,912.04	1.85
Residential	281,222,097.79	17.61
Vegetation	931,775,025.31	58.35
Utilities, Facilities & Service	105,246,775.55	6.59
Recreation	68,873,979.03	4.31
Road	149,122,033.99	9.34
Total	**1,596,815,721.75**	**100.00**

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Table 14 Land use Allocation for Ughelli 2014

Land Use	Area m^2	Percentage (%)
Water Body	26,698,325.80	1.67
Commercial	30,846,185.80	1.93
Residential	287,472,486.60	18
Vegetation	910,651,064.71	57.03
Utilities, Facilities & Service	110,413,207.77	6.91
Recreation	74,157,684.72	4.64
Road	149,538,086.47	9.36
Total	**1,596,815,721.75**	**100.00**

Table 15 Land use Allocation for Ughelli 2015

Land Use	Area m^2	Percentage (%)
Water Body	26,314,873.50	1.65
Commercial	32,197,459.53	2.02
Residential	293,722,833.74	18.39
Vegetation	889,927,104.06	55.73
Utilities, Facilities & Service	115,619,642.41	7.24
Recreation	79,404,382.79	4.97
Road	150,390,745.84	9.42
Total	**1,596,815,721.75**	**100.00**

Table 16 Land use Allocation for Ughelli 2016

Land Use	Area m^2	Percentage (%)
Water Body	25,931,421.19	1.62
Commercial	33,588,733.25	2.1
Residential	299,973,139.20	18.79
Vegetation	869,603,143.37	54.46
Utilities, Facilities & Service	120,866,079.47	7.57
Recreation	84,614,073.24	5.3
Road	151,680,012.10	9.5
Total	**1,596,815,721.75**	**100.00**

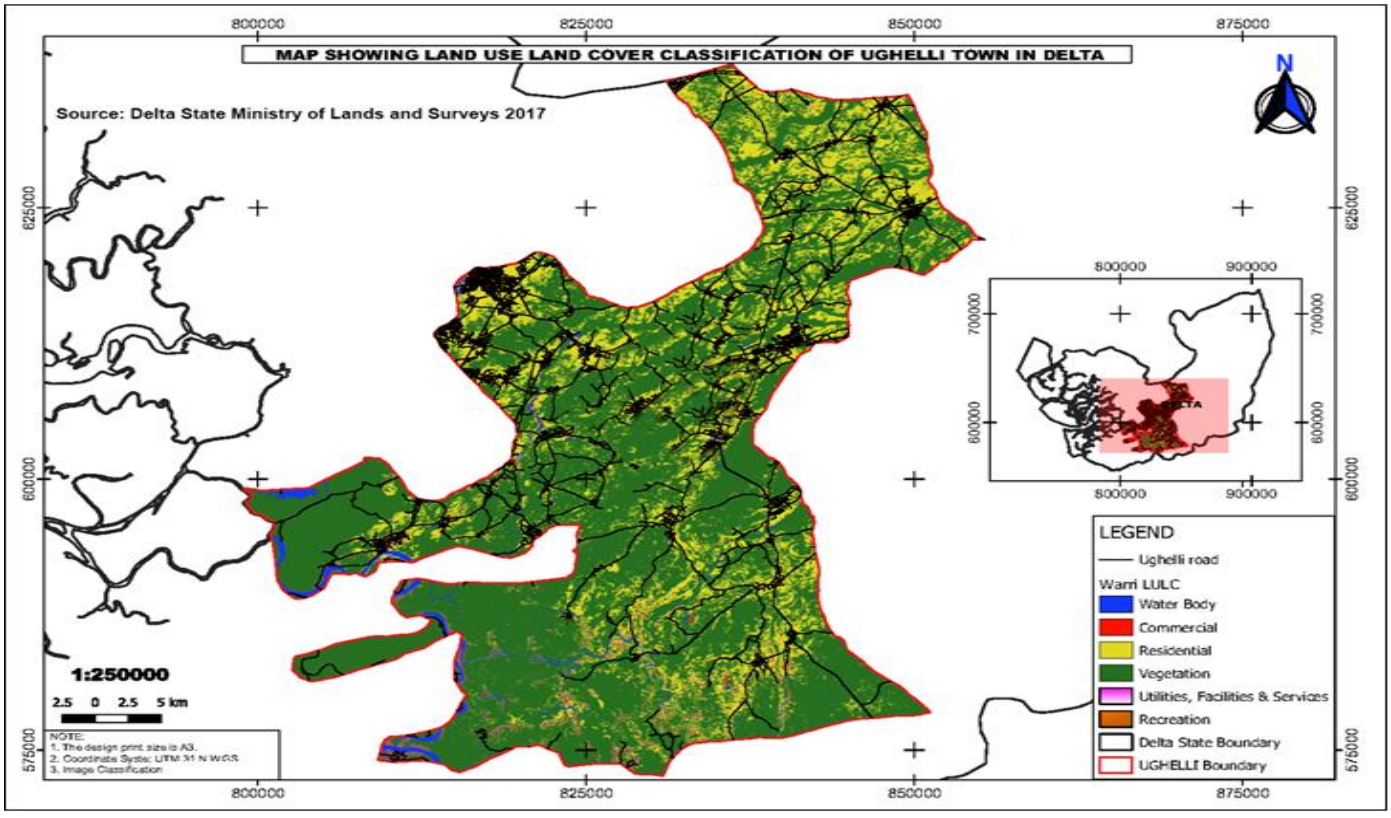

Fig 14 Map Showing Land use Cover Map of Ughelli 2017

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Table 17 Land use Allocation for Ughelli 2017

Land Use	Area m^2	Percentage (%)
Water Body	25,547,968.89	1.6
Commercial	35,020,006.95	2.2
Residential	306,223,402.98	19.2
Vegetation	849,679,182.65	53.2
Utilities, Facilities & Service	126,152,518.95	7.9
Recreation	89,786,756.07	6.17
Road	153,405,885.26	9.73
Total	**1,596,815,721.75**	**100**

Table 18 Land use Allocation for Ughelli 2018

Land Use	Area m^2	Percentage (%)
Water Body	25,164,516.59	1.58
Commercial	36,491,280.63	2.29
Residential	312,473,625.08	19.57
Vegetation	830,155,221.89	51.99
Utilities, Facilities & Service	131,478,960.85	8.23
Recreation	94,922,431.29	5.94
Road	155,568,365.31	9.74
Total	**1,596,815,721.75**	**100.00**

Table 19 Land use Allocation for Ughelli 2019

Land Use	Area m^2	Percentage (%)
Water Body	24,781,064.28	1.55
Commercial	38,002,554.30	2.38
Residential	318,723,805.50	19.96
Vegetation	811,031,261.08	50.79
Utilities, Facilities & Service	136,845,405.17	8.57
Recreation	100,021,098.89	6.26
Road	158,167,452.26	9.91
Total	**1,596,815,721.75**	**100.00**

Table 20 Land use Allocation for Ughelli 2020

Land Use	Area m^2	Percentage (%)
Water Body	24,397,611.98	1.53
Commercial	39,553,827.94	2.48
Residential	324,973,944.24	20.35
Vegetation	792,307,300.24	49.62
Utilities, Facilities & Service	142,251,851.91	8.91
Recreation	105,082,758.87	6.58
Road	161,203,146.09	10.1
Total	**1,596,815,721.75**	**100.00**

Table 21 Land use Allocation for Ughelli 2021

Land Use	Area m^2	Percentage (%)
Water Body	24,014,159.68	1.5
Commercial	41,145,101.57	2.58
Residential	331,224,041.30	20.74
Vegetation	773,983,339.36	48.47
Utilities, Facilities & Service	147,698,301.06	9.25
Recreation	110,107,411.23	6.9
Road	164,675,446.82	10.31
Total	**1,596,815,721.75**	**100.00**

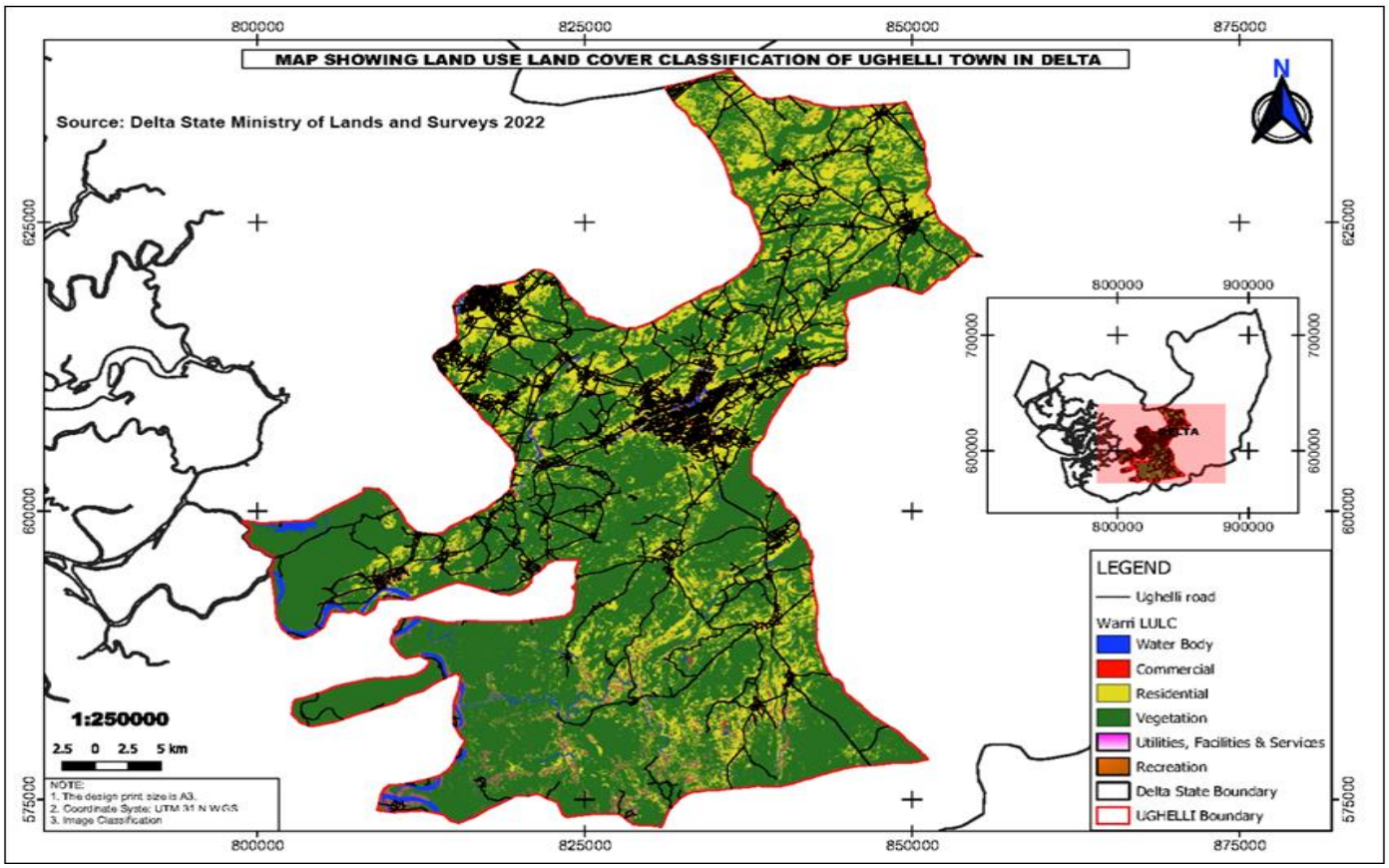

Fig 15 Map Showing Land use Cover Map of Ughelli 2022

Table 22 Land use Allocation for Ughelli 2022

Land Use	Area m^2	Percentage (%)
Water Body	23,630,707.38	1.48
Commercial	42,776,375.18	2.68
Residential	337,474,096.68	21.12
Vegetation	756,059,378.44	47.32
Utilities, Facilities & Service	153,184,752.64	9.6
Recreation	115,095,055.98	7.21
Road	168,584,354.45	10.59
Total	**1,596,815,721.75**	**100**

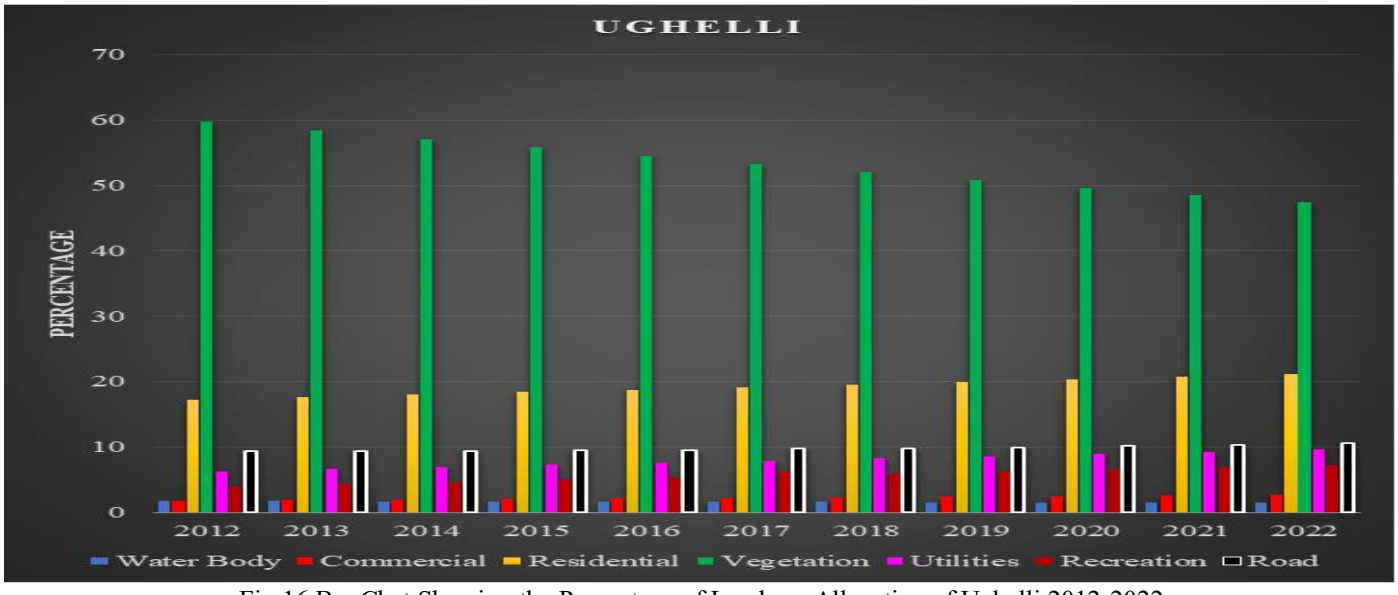

Fig 16 Bar Chat Showing the Percentage of Land use Allocation of Ughelli 2012-2022

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Table 12 to 22 show that the allocation of land use in Delta state (s Ughelli) has experienced significant growth and diversification between 2012 and 2022. This expansion can be attributed to the implementation of effective and efficient land use and allocation procedures in the state. The government of Delta state has recognized the importance of proper land management and has taken proactive measures to ensure sustainable development across various sectors.

One of the key areas that has witnessed an increase in land use allocation is residential development. As the population of Delta state continues to grow, there has been a corresponding need for more housing options. The government has responded to this demand by allocating more land for residential purposes, allowing for the construction of new housing estates and communities. This has not only provided shelter for the growing population but also stimulated economic activity in the construction sector.

Commercial land use has also seen a significant increase in allocation. Delta state, being a hub for business activities, has attracted numerous investors and entrepreneurs over the years. To accommodate this influx, the government has allocated more land for commercial purposes, including the establishment of shopping malls, office complexes, and industrial zones. This expansion has not only created employment opportunities but also enhanced economic growth and development in the state.

The allocation of land for road infrastructure has been another crucial aspect of effective land use procedures in Delta state. Recognizing the importance of a well-connected transportation network, the government has allocated substantial land for road construction and expansion projects. This includes both intra-city roads as well as major highways connecting Delta state with other regions. The improved road infrastructure has facilitated easier movement of goods and people, boosting trade and commerce within and beyond the state's borders.

Lastly, the allocation of land for utilities facilities and services has played a crucial role in the development of Delta state. The government has recognized the importance of providing essential services such as water supply, electricity, and waste management to its residents. To ensure efficient delivery of these services, land has been allocated for the construction of water treatment plants, power stations, and waste management facilities. This has improved the overall living conditions in the state and contributed to its sustainable development.

In conclusion, the increase in land use allocation for various purposes in Delta state between 2012 and 2022 can be attributed to effective and efficient land use and allocation procedures implemented by the government. The allocation of land for residential, commercial, road infrastructure, recreational, and utilities facilities and services has contributed to the overall development and growth of the state.

IV. UGHELLI TREND LINE

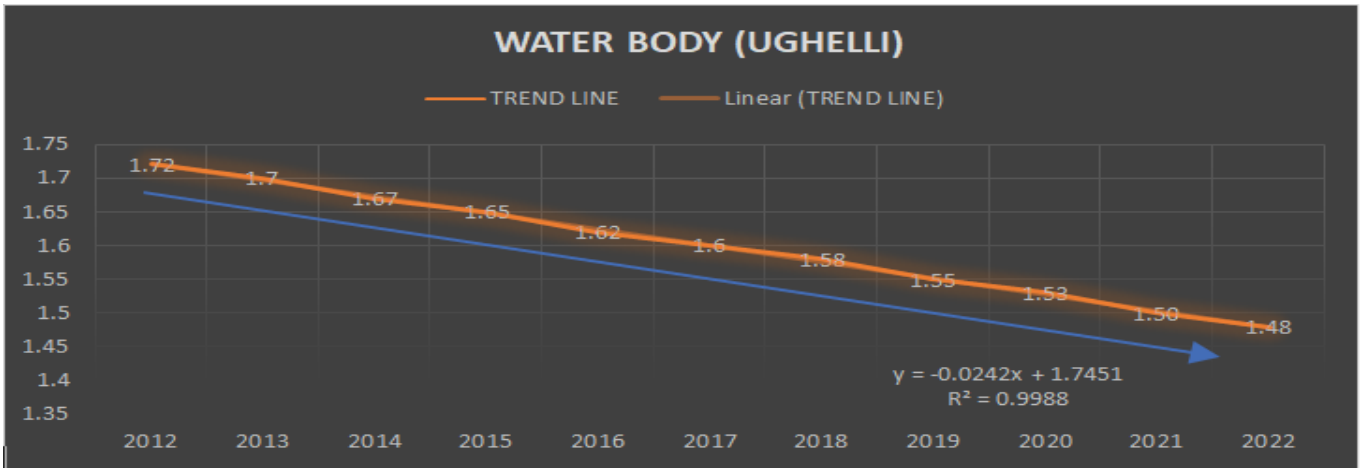

Fig 17 Trend Line of Water body Land use Allocation Ughelli 2012-2022

The graph above shows the annual rate of change on water bodies from 2012 to 2022 in Ughelli. The regression equation is y = -0.0242x + 1.7451. The slope of the regression line is -0.0242, which means that the average annual rate of change on water bodies is decreasing by -0.0242 units per year. This implies that the average annual rate of change on water bodies in Ughelli, is decreasing. The R-squared value in the graph is 0.9988. This means that 99.88% of the variation on water bodies can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.7451	.760		2741.314	.000
	Water bodies	-0.0242	.474	-.999	-87.069	.000
a. Dependent Variable: Year						

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The R-squared value in the graph is 0.9988. This means that 99.88% of the variation on water bodies can be explained by the linear regression model.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.9988[a]	.999	.999	.096
a. Predictors: (Constant), Percentage (%)				

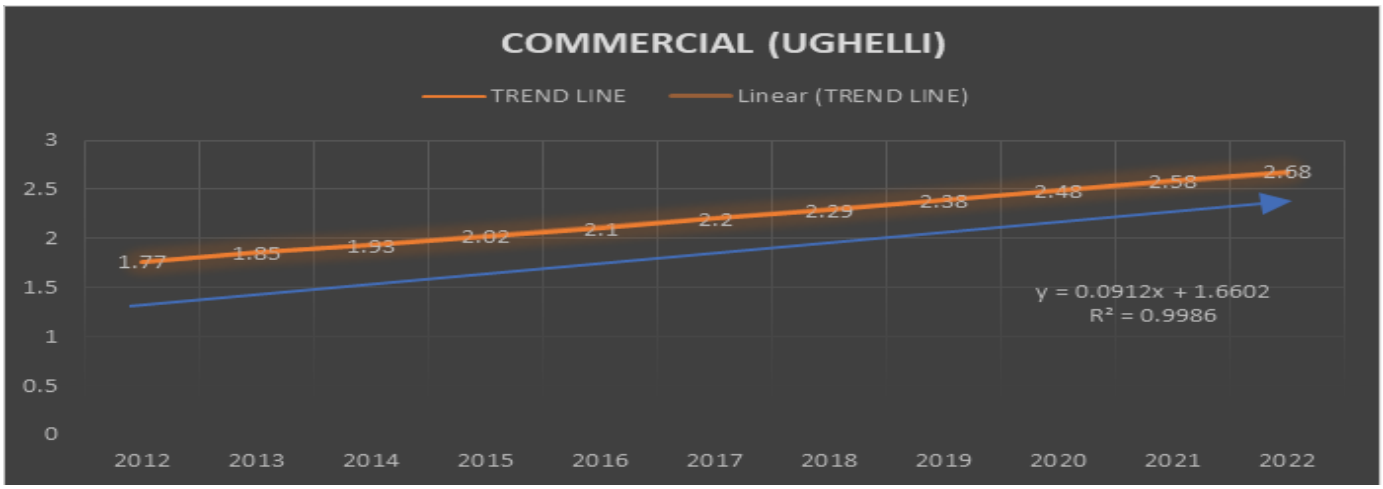

Fig 18 Trend Line of Commercial Land use Allocation Ughelli 2012-2022

The graph above shows the annual rate of change on commercial from 2012 to 2022 in Ughelli. The regression equation is y = 0.0912x + 1.6602. The slope of the regression line is 0.0912, which means that the average annual rate of change on commercial is increasing by 0.0912 units per year. This implies that the average annual rate of change on water bodies in Ughelli, is increasing. The R-squared value in the graph is 0.9986. This means that 99.86% of the variation on commercial can be explained by the linear regression model.

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	1.6602	.302		6594.790	.000
	Commercial	0.0912	.136	.999	80.679	.000
a. Dependent Variable: Year						

This means that 99.86% of the variation on commercial can be explained by the linear regression model.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.9986[a]	1.000	1.000	.042
a. Predictors: (Constant), Percentage (%)				

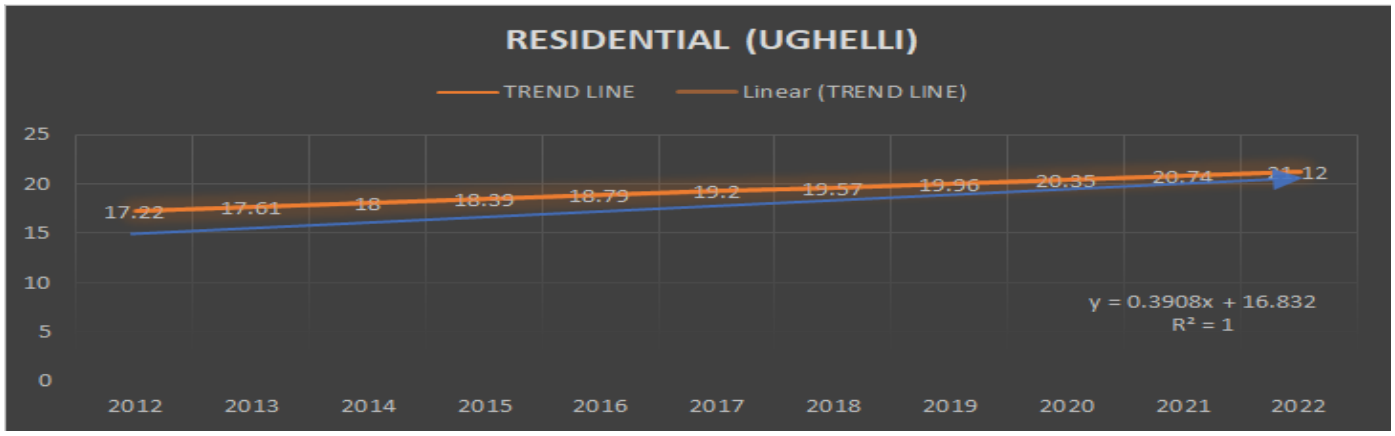

Fig 19 Trend Line of Residential Land use Allocation Ughelli 2012-2022

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The graph above shows the annual rate of change on residential from 2012 to 2022 in Ughelli. The regression equation is y = 0.3908x + 16.832. The slope of the regression line is 0.3908, which means that the average annual rate of change on residential is increasing by 0.3908 units per year. This implies that the average annual rate of change on residential in Ughelli, is increasing.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.832	.109		18036.992	.000
	Residential	0.3908	.006	1.000	450.658	.000
a. Dependent Variable: Year						

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.980[a]	.961	.956	.693
a. Predictors: (Constant), Percentage (%)				

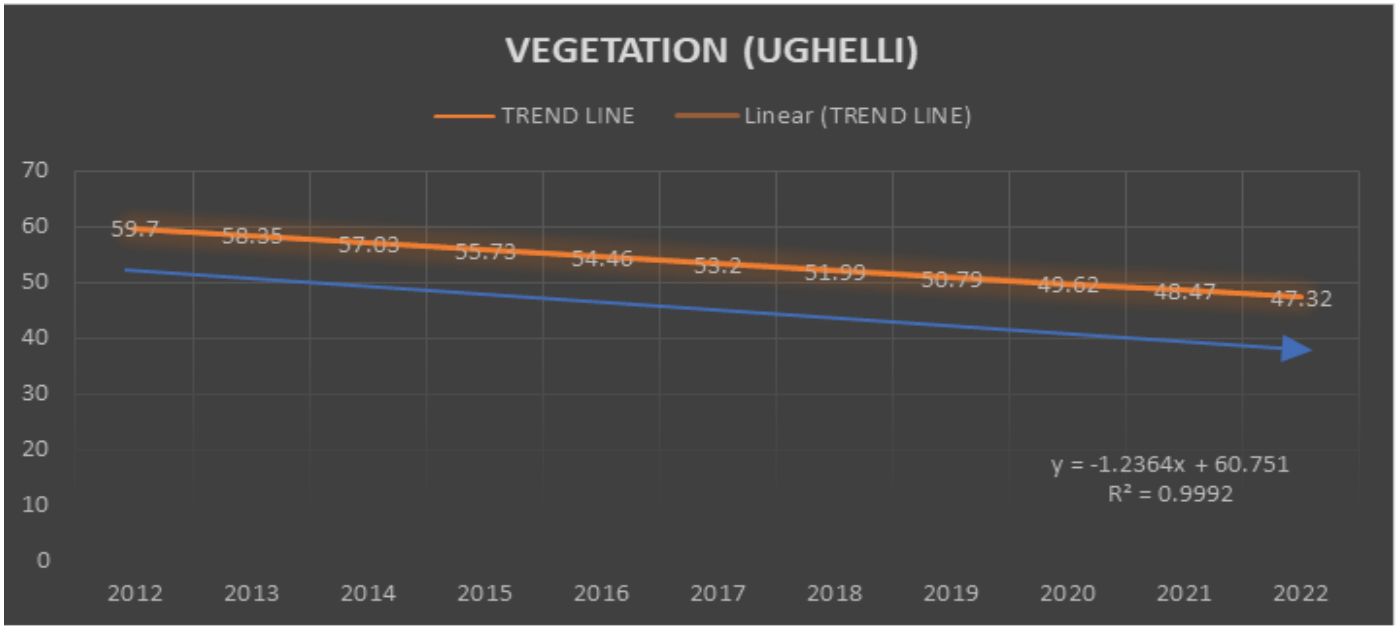

Fig 20 Trend Line of Vegetation Land use Allocation Ughelli 2012-2022

The graph above shows the annual rate of change on vegetation from 2012 to 2022 in Ughelli. The regression equation is y = -1.2364x + 60.751. The slope of the regression line is -1.2364, which means that the average annual rate of change on vegetation is decreasing by -0.0242 units per year. This implies that the average annual rate of change on vegetation in Ughelli, is decreasing. The R-squared value in the graph is 0.9992. This means that 99.92% of the variation on vegetation can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	60.751	.395		5212.104	.000
	Vegetable	-1.2364	.007	-1.000	-109.348	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9992. This means that 99.92% of the variation on vegetation can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9992[a]	.961	.957	.686
a. Predictors: (Constant), Percentage (%)				

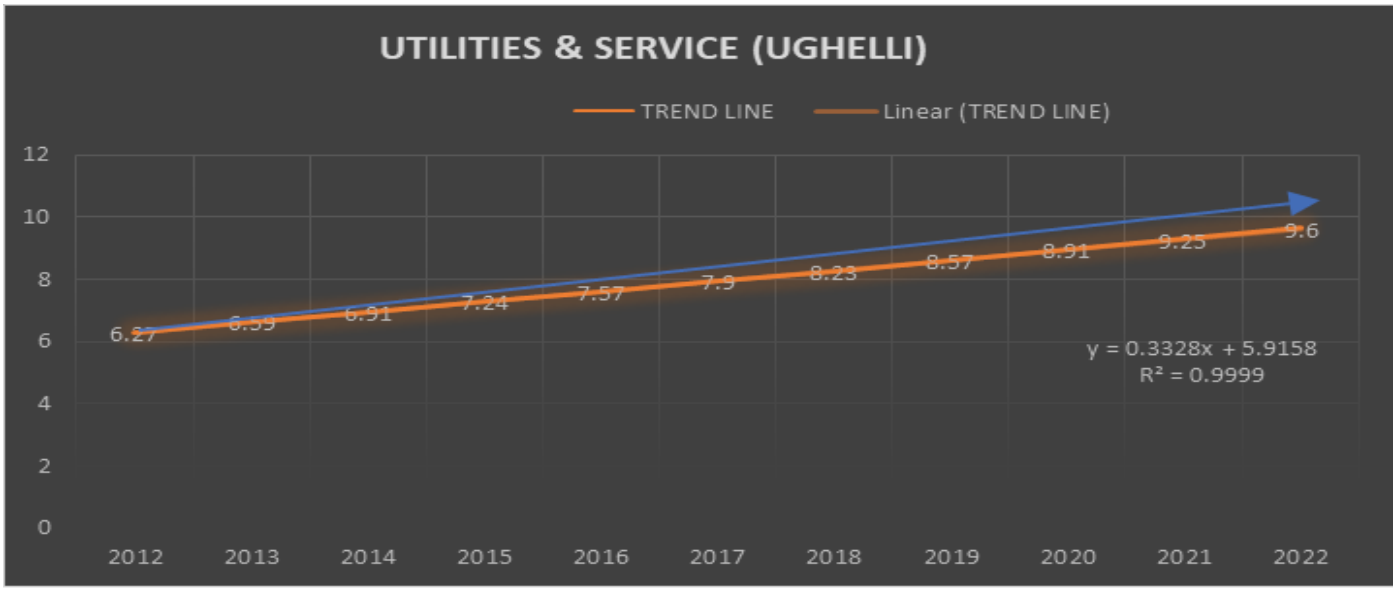

Fig 21 Trend Line of Utilities & Service Land use Allocation Ughelli 2012-2022

The graph above shows the annual rate of change on utilities & Service from 2012 to 2022 in Ughelli. The regression equation is y = 0.3328x + 5.9158. The slope of the regression lie is 0.3328, which means that the average annual rate of change on water bodies is increasing by 0.3328 units per year. This implies that the average annual rate of change on water bodies in Ughelli, is increasing. The R-squared value in the graph is 0.9999. This means that 99.99% of the variation on utilities & Service can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.9158	.096		20838.911	.000
	utilities & Service	0.3328	.012	1.000	250.717	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9999. This means that 99.99% of the variation on utilities & Service can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9999[a]	.991	.990	.337
a. Predictors: (Constant), Percentage (%)				

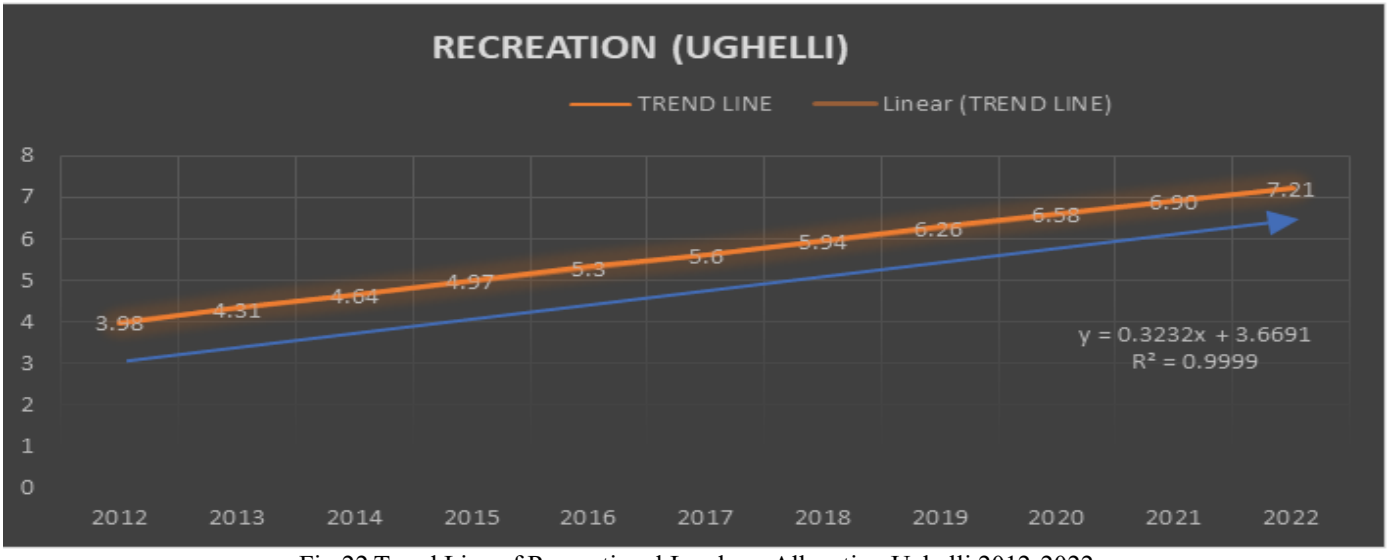

Fig 22 Trend Line of Recreational Land use Allocation Ughelli 2012-2022

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The graph above shows the annual rate of change on recreation from 2012 to 2022 in Ughelli. The regression equation is y = 0.3232x + 3.6691. The slope of the regression line is 0.3232, which means that the average annual rate of change on water bodies is decreasing by 0.3232 units per year. This implies that the average annual rate of change on recreation in Ughelli, is increasing. The R-squared value in the graph is 0.9999. This means that 99.99% of the variation on recreation can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.6691	.051		39543.137	.000
	recreation	0.3232	.009	1.000	348.783	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9999. This means that 99.99% of the variation on recreation can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9999[a]	.983	.981	.454
a. Predictors: (Constant), Percentage (%)				

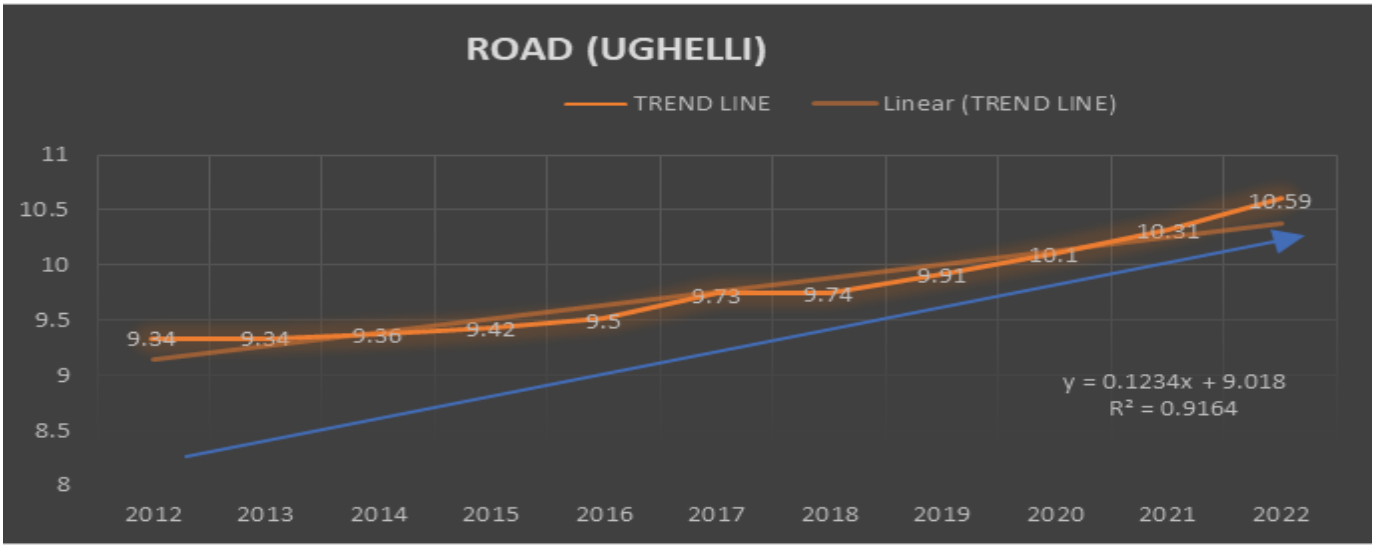

Fig 23 Trend Line of Road Land use Allocation Ughelli 2012-2022

The graph above shows the annual rate of change on road from 2012 to 2022 in Ughelli. The regression equation is y = 0.1234x + 9.018. The slope of the regression line is 0.1234, which means that the average annual rate of change on road is increasing by 0.1234 units per year. This implies that the average annual rate of change on road in Ughelli, is increasing. The R-squared value in the graph is 0.9988. This means that 91.64% of the variation on road can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.018	7.305		276.951	.000
	Road	0.123	.776	-.203	-.623	.549
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9988. This means that 91.64% of the variation on road can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.994[a]	.988	.986	.391
a. Predictors: (Constant), Percentage (%)				

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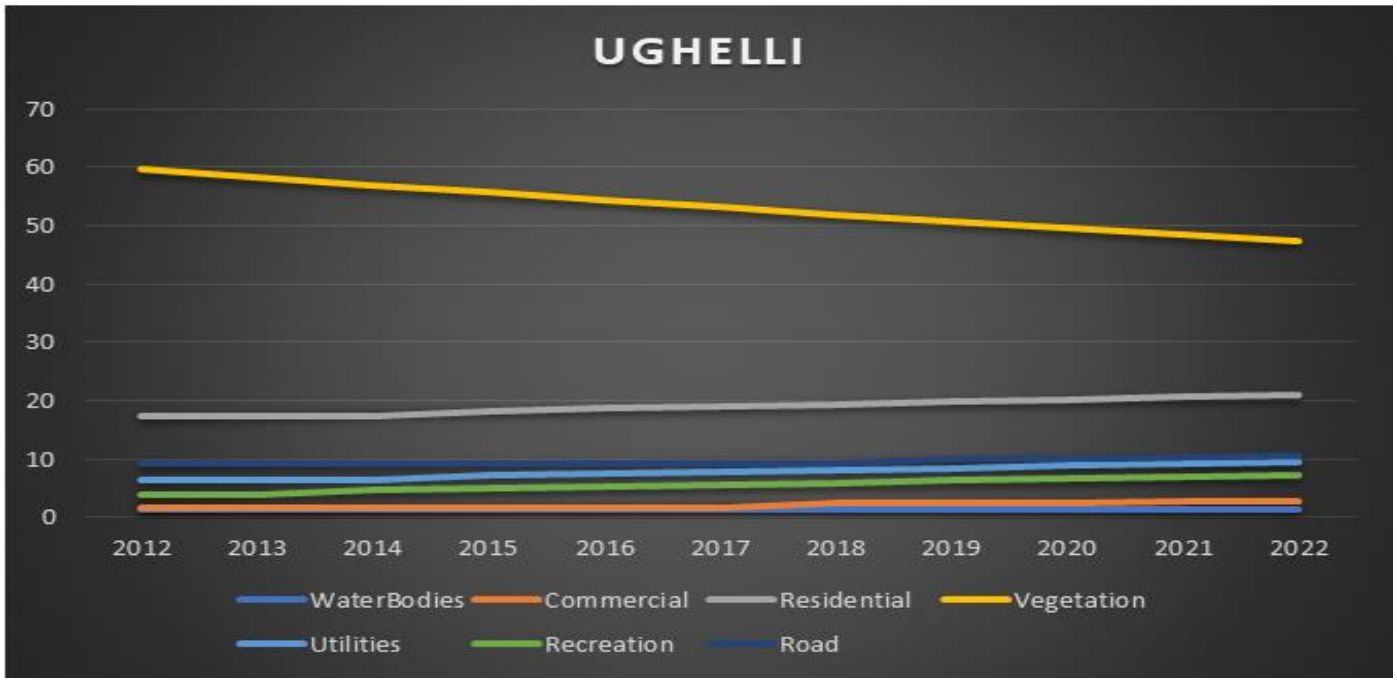

Fig 24 Multiple Trend Line Graph of Land use Allocation Ughelli 2012-2022

From the multiple trend line graph of land use allocation Ughelli 2012-2022 (fig 24) above, it is observed that the average annual rate of change in commercial land use is increasing by 0.0912 unit per year, residential increasing in average annual rate of change by 0.3908,utilities & service by 0.3328 unit per year, recreation by 0.3232 unit per year, road by 0.1234 unit per year while water body and vegetation average annual rate of change is decreasing by -0.0242 unit per year and -1.2364 unit per year respectively.

➢ *Graphic Representation of the Percentage Rate of Land use Allocated to Various uses in Ughelli 2012-2022*

Ughelli in Delta State, has experienced a continuous increase in residential, commercial, recreational, roads, utility and service activities in recent years. This growth has had significant implications for the trend analysis of land use allocation in the state.

- *Residential Development:*

The increasing population of Delta State has led to a high demand for residential properties, resulting in the expansion of residential areas and the conversion of agricultural lands to residential use. This has led to a significant increase in the allocation of land for residential purposes, which has resulted in the development of new neighborhoods and the expansion of existing ones.

- *Commercial Development:*

The growth of commercial activities in Delta State has also led to an increase in the allocation of land for commercial purposes. This has resulted in the development of new shopping centers, office complexes, and other commercial facilities. The increase in commercial activities has also led to an increase in the demand for land for industrial purposes, such as factories and warehouses.

- *Recreational Development:*

The state's rich natural resources and scenic beauty have made it an attractive destination for recreational activities such as tourism, fishing, and hunting. This has led to an increase in the allocation of land for recreational purposes, such as parks, gardens, and other leisure facilities.

- *Road Network Development:*

The continuous increase in residential, commercial, and recreational activities has led to an increase in the demand for road infrastructure. This has resulted in the expansion of the state's road network, which has facilitated the movement of people, goods, and services.

- *Utility and Service Infrastructure:*

The growth of residential, commercial, and recreational activities has also led to an increase in the demand for utility and service infrastructure such as water supply, electricity, and telecommunications. This has resulted in the expansion of the state's utility and service infrastructure, which has improved the quality of life for residents and supported the growth of economic activities.

Again the continuous decrease in **vegetation and water bodies** in Delta state can have significant implications on trend analysis of land use allocation. Land use allocation refers to the process of determining how land resources are distributed and utilized for various purposes such as agriculture, urban development, industrial activities, and conservation.

One of the key implications of the decrease in vegetation is the loss of ecosystem services provided by forests and other natural habitats. Vegetation plays a crucial role in regulating climate, maintaining soil fertility, preventing erosion, and supporting biodiversity. When vegetation cover decreases, these ecosystem services are

compromised, leading to negative impacts on land use allocation. For example, reduced vegetation cover can result in increased soil erosion and decreased soil fertility, making it less suitable for agricultural activities. This may lead to a shift in land use allocation away from agriculture towards other sectors such as urban development or industrial activities.

Similarly, the decline in water bodies such as rivers, lakes, and wetlands can also have significant implications for land use allocation. Water bodies provide important resources for various sectors including agriculture, fisheries, and tourism. They also play a crucial role in regulating local climate and supporting biodiversity. When water bodies decrease in size or quality, it can affect the availability of water resources for different land use activities. For instance, reduced water availability may limit agricultural production or impact the viability of certain industries that rely on water for their operations. This can result in a reallocation of land resources towards alternative uses that are less dependent on water.

The trend analysis of land use allocation in Delta state is likely to be influenced by these changes in vegetation and water bodies. A continuous decrease in vegetation cover and water bodies can indicate a shift in land use patterns over time. For example, if there is a significant decline in agricultural land due to decreased vegetation cover or limited water availability, it may suggest a transition towards other sectors such as urban development or industrialization. Similarly, if there is an increase in urban areas or industrial zones at the expense of natural habitats, it may indicate a trend towards more intensive land use practices.

Moreover, the decrease in vegetation and water bodies can also have indirect impacts on land use allocation through their effects on other factors such as climate change and biodiversity loss. Climate change can alter temperature and precipitation patterns, which in turn can affect the suitability of land for different uses. For instance, changes in rainfall patterns may render certain areas less suitable for agriculture or increase the risk of flooding in urban areas. Biodiversity loss resulting from the decline in vegetation and water bodies can also impact land use allocation by affecting ecosystem functioning and resilience. Loss of biodiversity can lead to decreased productivity and increased vulnerability to pests and diseases, which can influence the choice of land use activities.

In conclusion, the continuous decrease in vegetation and water bodies in Delta state can have significant implications for trend analysis of land use allocation. These changes can affect ecosystem services, water availability, and other factors that influence land use decisions. Understanding these implications is crucial for sustainable land management and planning in the face of environmental challenges.

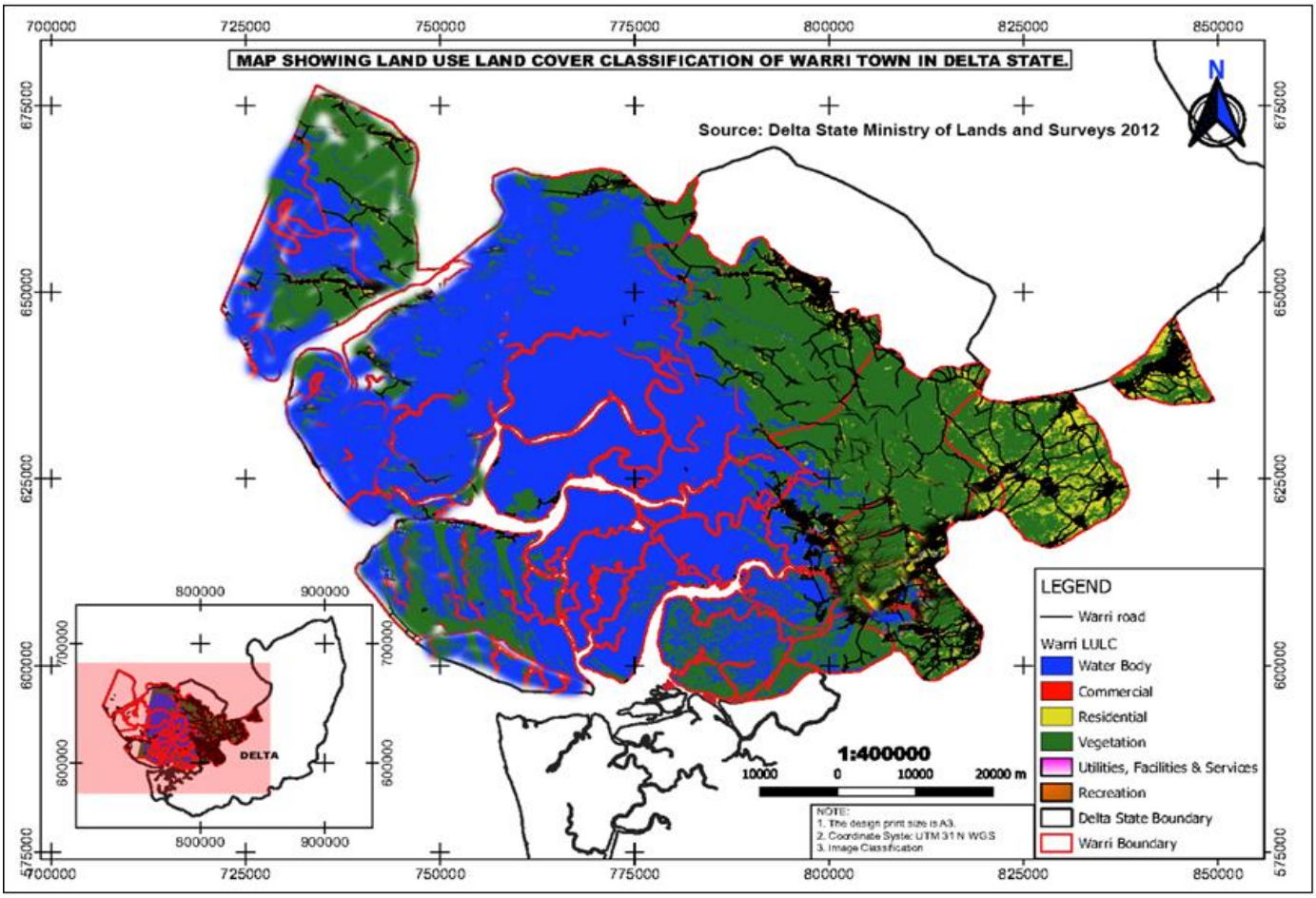

Fig 25 Map Showing Land use Cover Map of Warri 2012

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Table 23 Land use Allocation for Warri 2012

Land Use	Area m^2	Percentage (%)
Water Body	1,075,852,881.21	33.51
Commercial	158,857,595.33	3.12
Residential	269,854,248.48	5.3
Vegetation	2,799,355,958.78	54.98
Utilities, Facilities & Service	79,937,956.63	1.57
Recreation	84,520,387.26	1.66
Road	623,210,566.31	12.24
Total	**5,091,589,594.00**	**100**

Table 24 Land use Allocation for Warri 2013

Land Use	Area m^2	Percentage (%)
Water Body	1,170,556,447.66	32.89
Commercial	163,338,194.17	3.21
Residential	282,481,390.67	5.55
Vegetation	2,651,394,365.18	52.07
Utilities, Facilities & Service	82,687,415.01	1.62
Recreation	87,473,509.22	1.72
Road	653,658,272.08	12.84
Total	**5,091,589,594.00**	**100**

Table 25 Land use Allocation for Warri 2014

Land Use	Area m^2	Percentage (%)
Water Body	1,265,260,014.11	32.28
Commercial	167,818,793.02	3.30
Residential	295,108,532.87	5.80
Vegetation	2,503,432,771.58	49.17
Utilities, Facilities & Service	85,436,873.39	1.68
Recreation	90,426,631.19	1.78
Road	684,105,977.85	13.44
Total	**5,091,589,594.00**	**100**

Table 26 Land use Allocation for Warri 2015

Land Use	Area m^2	Percentage (%)
Water Body	1,359,963,580.55	31.66
Commercial	172,299,391.86	3.38
Residential	307,735,675.06	6.04
Vegetation	2,355,471,177.97	46.26
Utilities, Facilities & Service	88,186,331.77	1.73
Recreation	93,379,753.15	1.83
Road	714,553,683.63	14.03
Total	**5,091,589,594.00**	**100**

Table 27 Land use Allocation for Warri 2016

Land Use	Area m^2	Percentage (%)
Water Body	1,454,667,147.00	31.05
Commercial	176,779,990.71	3.47
Residential	320,362,817.26	6.29
Vegetation	2,207,509,584.37	43.36
Utilities, Facilities & Service	90,935,790.15	1.79
Recreation	96,332,875.12	1.89
Road	745,001,389.40	14.63
Total	**5,091,589,594.00**	**100**

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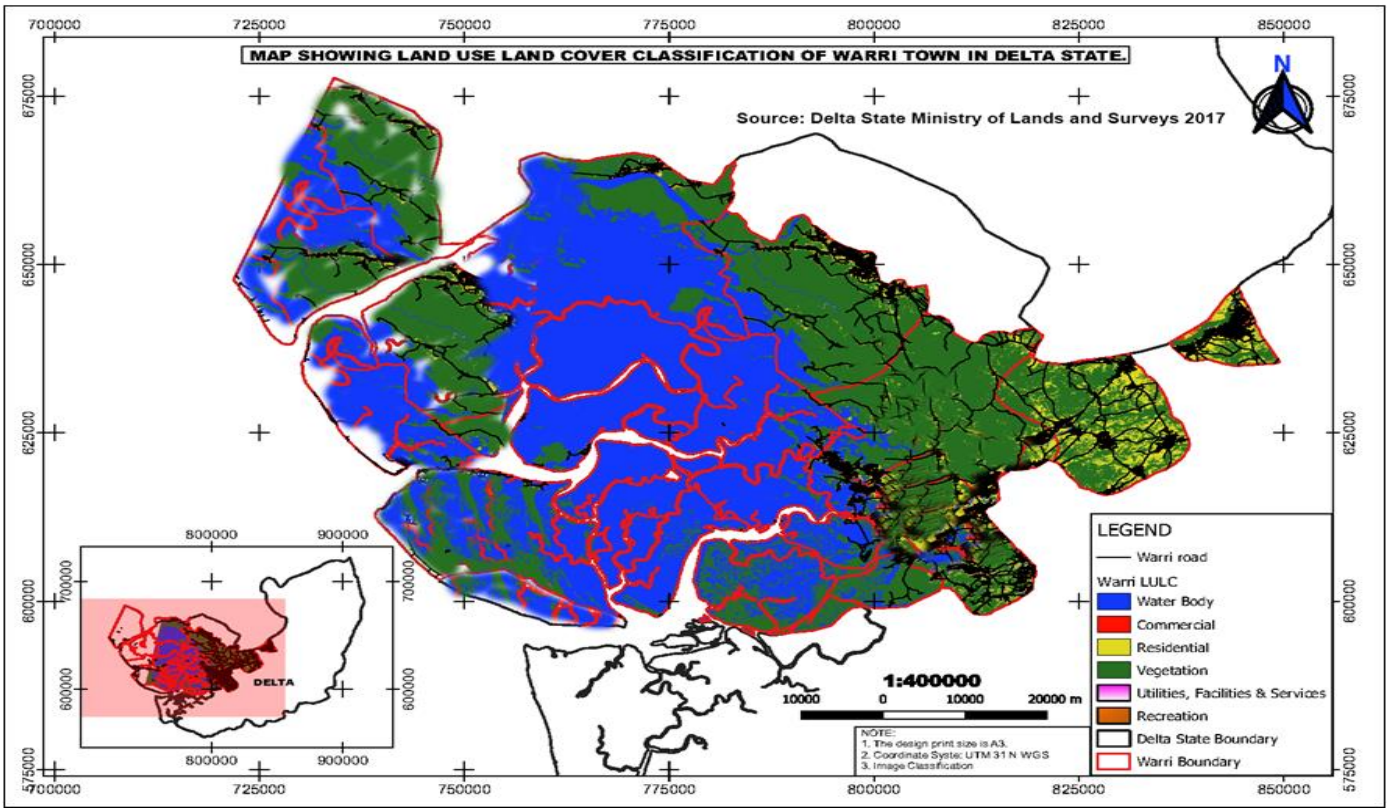

Fig 26 Map Showing Land use Cover Map of Warri 2017

Table 28 Land use Allocation for Warri 2017

Land Use	Area m^2	Percentage (%)
Water Body	1,549,370,713.45	30.43
Commercial	181,260,589.55	3.56
Residential	332,989,959.45	6.54
Vegetation	2,059,547,990.77	40.45
Utilities, Facilities & Service	93,685,248.53	1.84
Recreation	99,285,997.08	1.95
Road	775,449,095.17	15.23
Total	**5,091,589,594.00**	**100**

Table 29 Land use Allocation for Warri 2018

Land Use	Area m^2	Percentage (%)
Water Body	1,580,734,905.36	28.57
Commercial	188,286,983.18	3.70
Residential	354,374,635.74	6.96
Vegetation	1,945,394,552.02	38.21
Utilities, Facilities & Service	97,860,352.00	1.92
Recreation	103,664,764.12	2.04
Road	821,273,401.54	16.13
Total	**5,091,589,594.00**	**100**

Table 30 Land use Allocation for Warri 2019

Land Use	Area m^2	Percentage (%)
Water Body	1,612,099,097.27	26.71
Commercial	195,313,376.81	3.84
Residential	375,759,312.03	7.38
Vegetation	1,831,241,113.26	35.97
Utilities, Facilities & Service	102,035,455.48	2.00
Recreation	108,043,531.17	2.12
Road	867,097,707.90	17.03
Total	**5,091,589,594.00**	**100**

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Table 31 Land use Allocation for Warri 2020

Land Use	Area m^2	Percentage (%)
Water Body	1,643,463,289.18	24.85
Commercial	202,339,770.44	3.97
Residential	397,143,988.32	7.80
Vegetation	1,717,087,674.51	33.72
Utilities, Facilities & Service	106,210,558.95	2.09
Recreation	112,422,298.21	2.21
Road	912,922,014.27	17.93
Total	**5,091,589,594.00**	**100**

Table 32 Land use Allocation for Warri 2021

Land Use	Area m^2	Percentage (%)
Water Body	1,674,827,481.09	22.99
Commercial	209,366,164.07	4.11
Residential	418,528,664.61	8.22
Vegetation	1,602,934,235.75	31.48
Utilities, Facilities & Service	110,385,662.43	2.17
Recreation	116,801,065.26	2.29
Road	958,746,320.63	18.83
Total	**5,091,589,594.00**	**100**

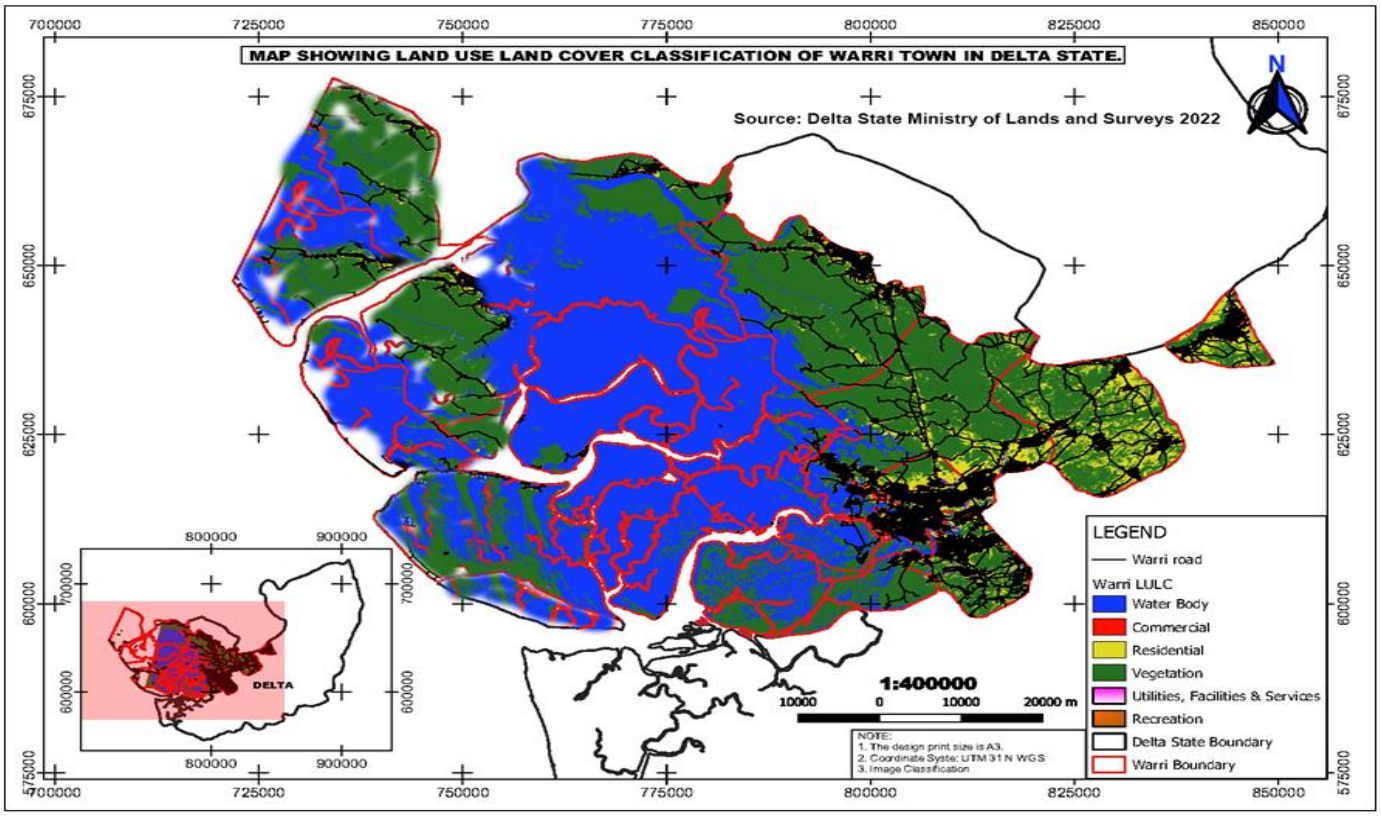

Fig 27 Map Showing Land use Cover Map of Warri 2022

Table 33 Land use Allocation for Warri 2022

Land Use	Area m^2	Percentage (%)
Water Body	1,706,191,673.00	21.13
Commercial	216,392,557.70	4.25
Residential	439,913,340.90	8.64
Vegetation	1,488,780,797.00	29.24
Utilities, Facilities & Service	114,560,765.90	2.25
Recreation	121,179,832.30	2.38
Road	1,004,570,627.00	19.73
Total	**5,091,589,594.00**	**100**

ISSN No:-2456-2165

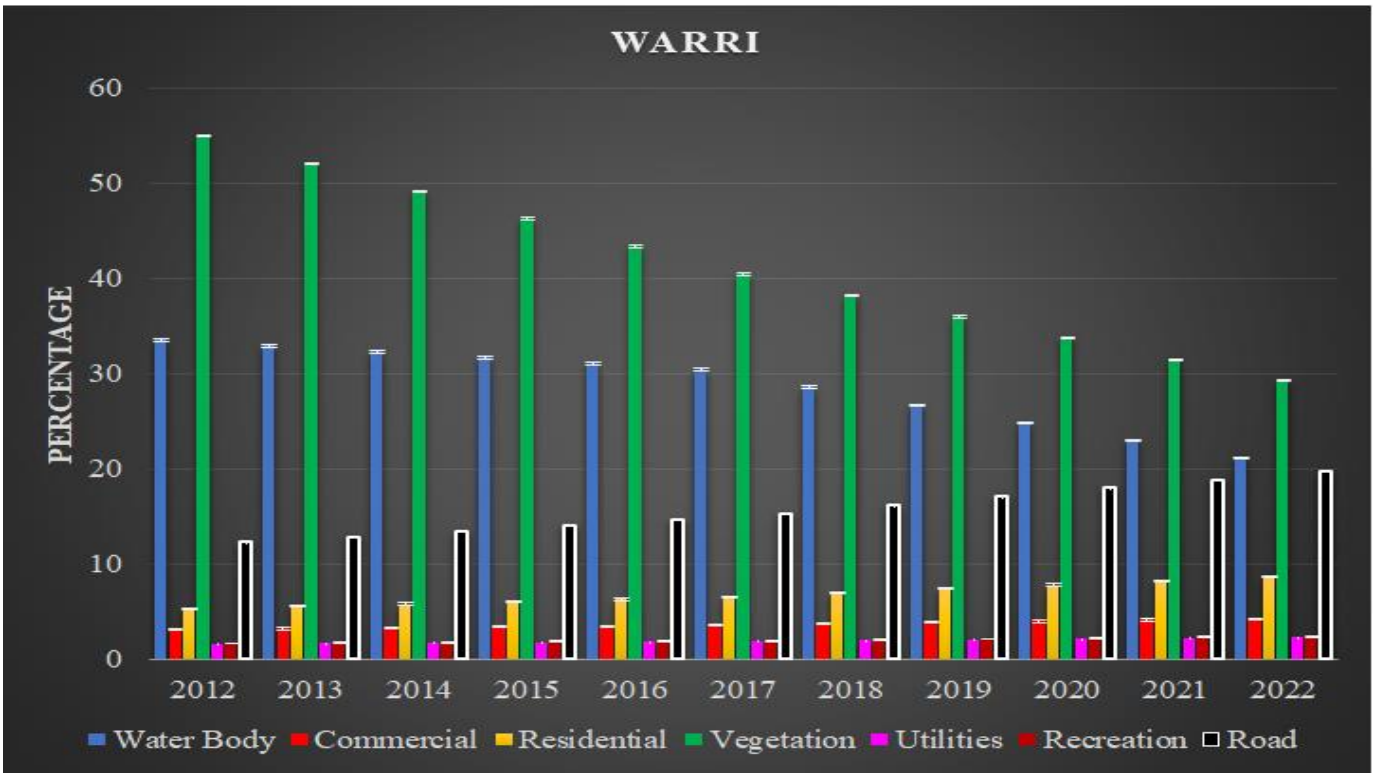

Fig 28 Bar Chat showing the Percentage of Land use Allocation of Warri 2012-2022

Table 23 to 33 show that the allocation of land use in Delta state (Warri) has experienced significant growth and diversification between 2012 and 2022. This expansion can be attributed to the implementation of effective and efficient land use and allocation procedures in the state. The government of Delta state has recognized the importance of proper land management and has taken proactive measures to ensure sustainable development across various sectors.

One of the key areas that has witnessed an increase in land use allocation is residential development. As the population of Delta state continues to grow, there has been a corresponding need for more housing options. The government has responded to this demand by allocating more land for residential purposes, allowing for the construction of new housing estates and communities. This has not only provided shelter for the growing population but also stimulated economic activity in the construction sector.

Commercial land use has also seen a significant increase in allocation. Delta state, being a hub for business activities, has attracted numerous investors and entrepreneurs over the years. To accommodate this influx, the government has allocated more land for commercial purposes, including the establishment of shopping malls, office complexes, and industrial zones. This expansion has not only created employment opportunities but also enhanced economic growth and development in the state.

The allocation of land for road infrastructure has been another crucial aspect of effective land use procedures in Delta state. Recognizing the importance of a well-connected transportation network, the government has allocated substantial land for road construction and expansion projects. This includes both intra-city roads as well as major highways connecting Delta state with other regions. The improved road infrastructure has facilitated easier movement of goods and people, boosting trade and commerce within and beyond the state's borders.

Furthermore, there has been an increased allocation of land for recreational purposes. The government understands the significance of providing spaces for leisure activities and promoting a healthy lifestyle among its residents. As a result, more land has been designated for parks, sports facilities, and other recreational amenities. This not only enhances the quality of life for the people of Delta state but also attracts tourists and boosts the tourism industry.

Lastly, the allocation of land for utilities facilities and services has played a crucial role in the development of Delta state. The government has recognized the importance of providing essential services such as water supply, electricity, and waste management to its residents. To ensure efficient delivery of these services, land has been allocated for the construction of water treatment plants, power stations, and waste management facilities. This has improved the overall living conditions in the state and contributed to its sustainable development.

In conclusion, the increase in land use allocation for various purposes in Delta state between 2012 and 2022 can be attributed to effective and efficient land use and allocation procedures implemented by the government. The allocation of land for residential, commercial, road infrastructure, recreational, and utilities facilities and services has contributed to the overall development and growth of the state.

V. WARRI TREND LINE

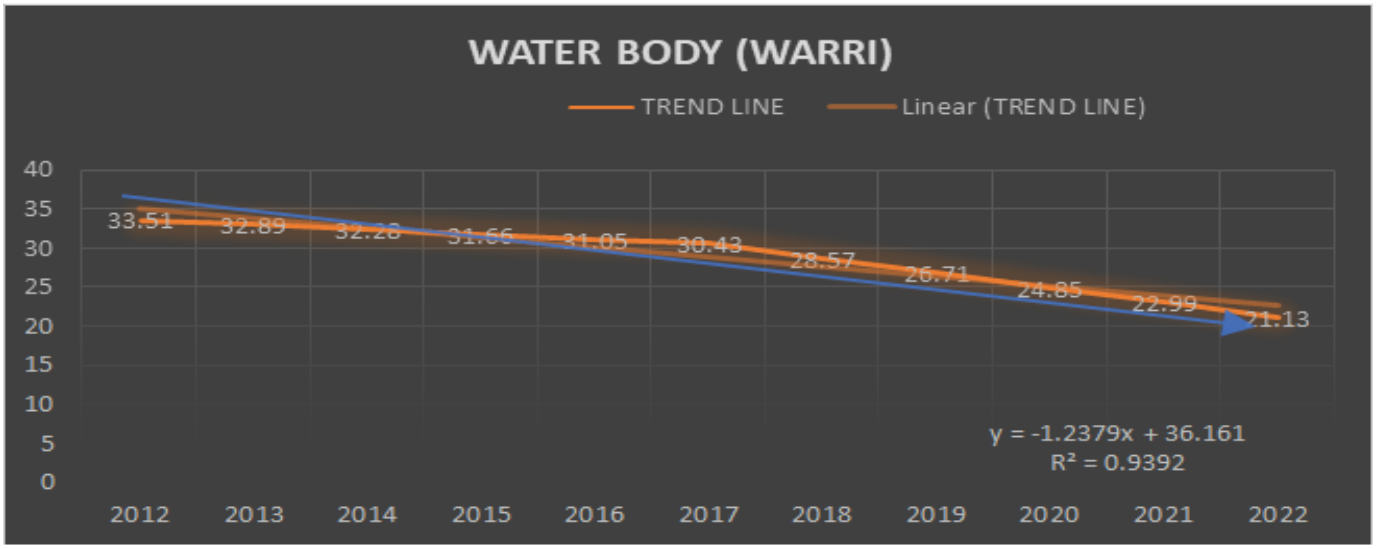

Fig 29 Trend Line of Water body Land use Allocation Warri 2012-2022

The graph above shows the annual rate of change on water bodies from 2012 to 2022 in Warri. The regression equation is y = -1.2379x + 36.161. The slope of the regression line is -1.2379, which means that the average annual rate of change on water bodies is decreasing by -1.2379 units per year. This implies that the average annual rate of change on water bodies in Warri, is decreasing. The R-squared value in the graph is 0.9392. This means that 93.92% of the variation on water bodies can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	36.161	1.867		1091.833	.000
	Water bodies	-1.2379	.064	-.969	-11.789	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9392. This means that 93.92% of the variation on water bodies can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9392[a]	.989	.988	.364
a. Predictors: (Constant), Percentage (%)				

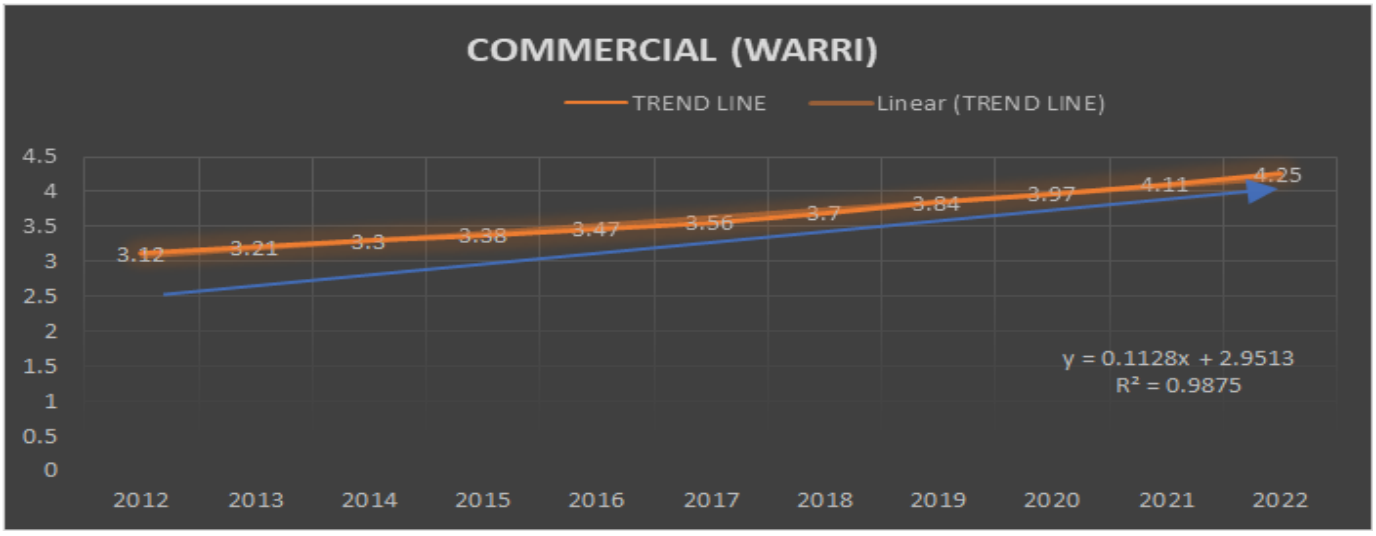

Fig 30 Trend Line of Commercial Land use Allocation Warri 2012-2022

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The graph above shows the annual rate of change on commercial from 2012 to 2022 in Warri. The regression equation is y = 0.1128x + 2.9575. The slope of the regression line is 0.1128, which means that the average annual rate of change on commercial is increasing by 0.1128 units per year. This implies that the average annual rate of change on commercial in Warri, is increasing. The R-squared value in the graph is 0.9875. This means that 98.75% of the variation on commercial can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.9575	1.196		1660.250	.000
	commercial	0.1128	.328	.994	26.689	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9875. This means that 98.75% of the variation on commercial can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9875[a]	.942	.936	.839
a. Predictors: (Constant), Percentage (%)				

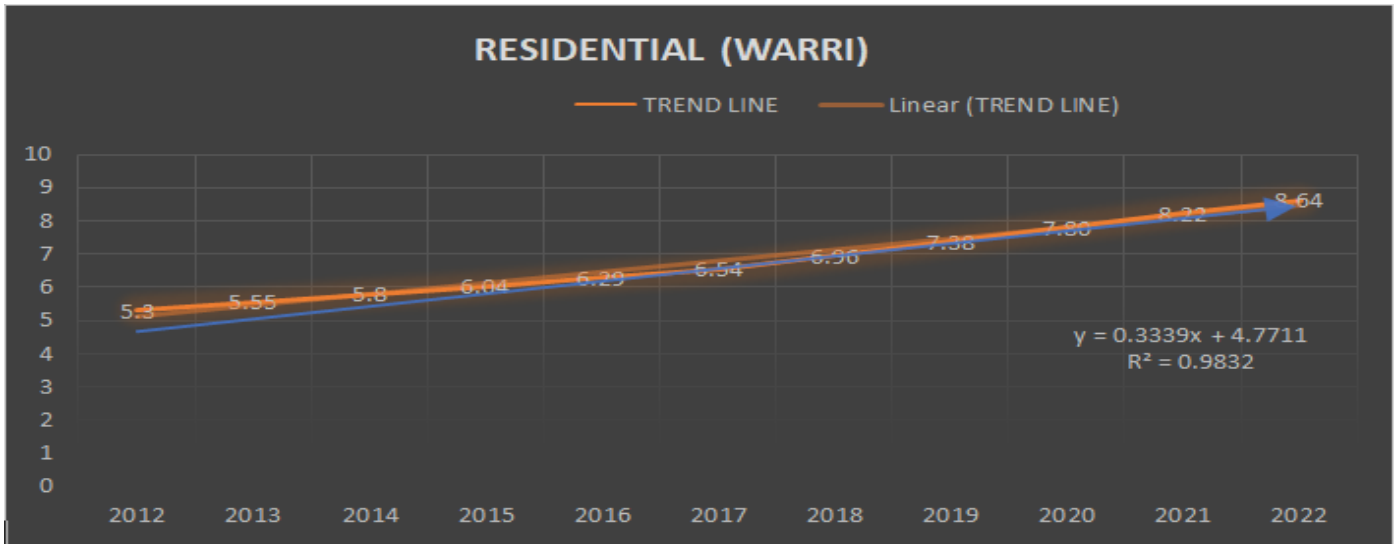

Fig 31 Trend Line of Residential Land use Allocation Warri 2012-2022

The graph above shows the annual rate of change on residential from 2012 to 2022 in Warri. The regression equation is y = 0.3330x + 4.7711. The slope of the regression line is 0.3330, which means that the average annual rate of change on residential is increasing by 0.3330 units per year. This implies that the average annual rate of change on residential in Warri, is increasing. The R-squared value in the graph is 0.9832. This means that 98.32% of the variation on residential can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.7711	.881		2266.497	.000
	residential	0.3330	.128	.992	22.916	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9832. This means that 98.32% of the variation on residential can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9835[a]	.990	.989	.346
a. Predictors: (Constant), Percentage (%)				

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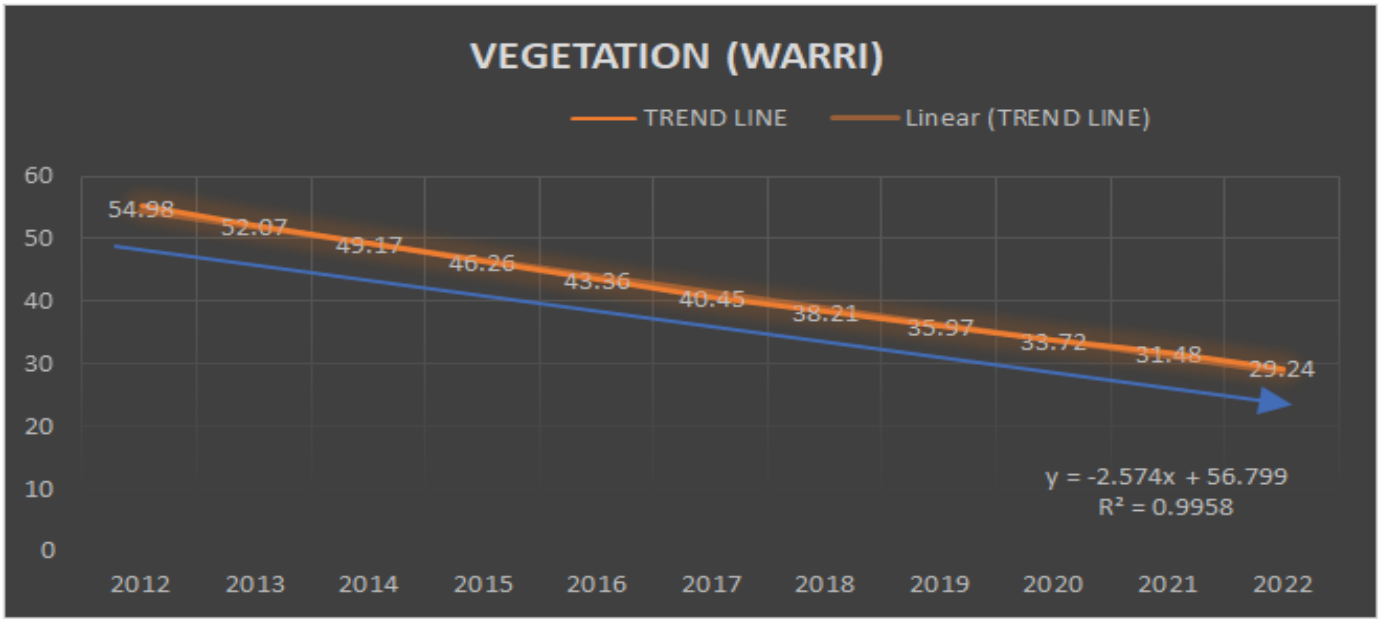

Fig 32 Trend Line of Vegetation Land use Allocation Warri 2012-2022

The graph above shows the annual rate of change on vegetation from 2012 to 2022 in Warri. The regression equation is y = -2.574x + 4.7711. The slope of the regression line is -2.574, which means that the average annual rate of change on vegetation is decreasing by 0.2574 units per year. This implies that the average annual rate of change on residential in Warri, is decreasing. The R-squared value in the graph is 0.9958. This means that 99.58% of the variation on vegetation can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.7711	.957		2079.593	.000
	vegetation	-2574	.506	.995	28.668	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9958. This means that 99.58% of the variation on vegetation can be explained by the linear regression model.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.9958[a]	.939	.932	.862
a. Predictors: (Constant), Percentage (%)				

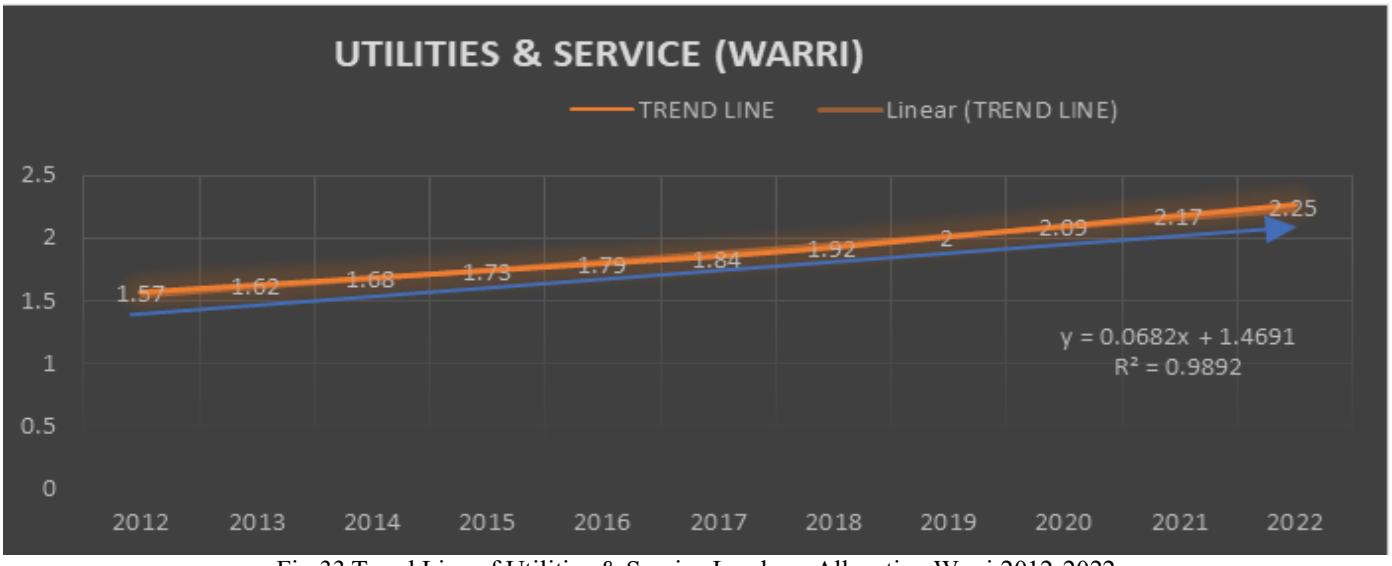

Fig 33 Trend Line of Utilities & Service Land use Allocation Warri 2012-2022

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The graph above shows the annual rate of change on utilities & Service from 2012 to 2022 in Warri. The regression equation is y = 0.0682x + 1.4691. The slope of the regression line is 0.0682, which means that the average annual rate of change on utilities & Service is increasing by 0.0682 units per year. This implies that the average annual rate of change on utilities & Service in Warri, is increasing. The R-squared value in the graph is 0.9892. This means that 98.92% of the variation on utilities & Service can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.4691	.914		2177.319	.000
	Percentage (%)	0.0682	.457	.995	30.197	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9892. This means that 98.92% of the variation on utilities & Service can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.9892[a]	.999	.999	.096
a. Predictors: (Constant), Percentage (%)				

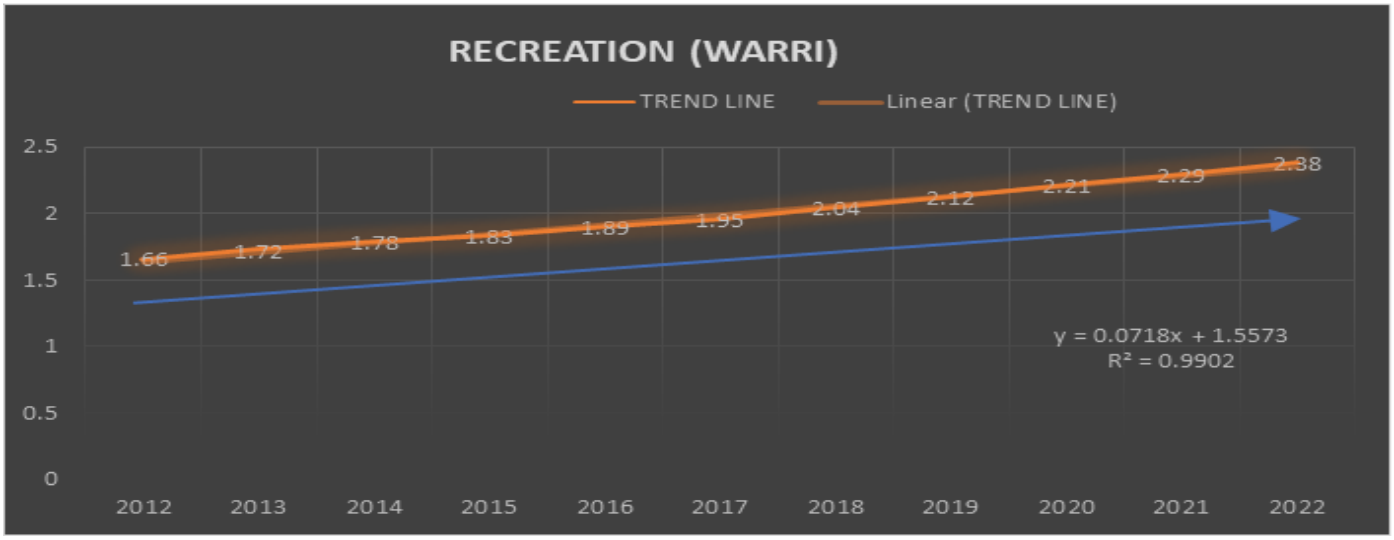

Fig 34 Trend Line of Recreational Land use Allocation Warri 2012-2022

The graph above shows the annual rate of change on recreation from 2012 to 2022 in Warri. The regression equation is y = 0.0718x + 1.5573. The slope of the regression line is 0.0718, which means that the average annual rate of change on recreation is increasing by 0.0718 units per year. This implies that the average annual rate of change on recreation in Warri, is increasing. The R-squared value in the graph is 0.9902. This means that 99.02% of the variation on recreation can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.5573	2.670		743.329	.000
	Percentage (%)	0.0717	1.389	.971	12.135	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9902. This means that 99.02% of the variation on recreation can be explained by the linear regression model.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9902[a]	.989	.988	.364
a. Predictors: (Constant), Percentage (%)				

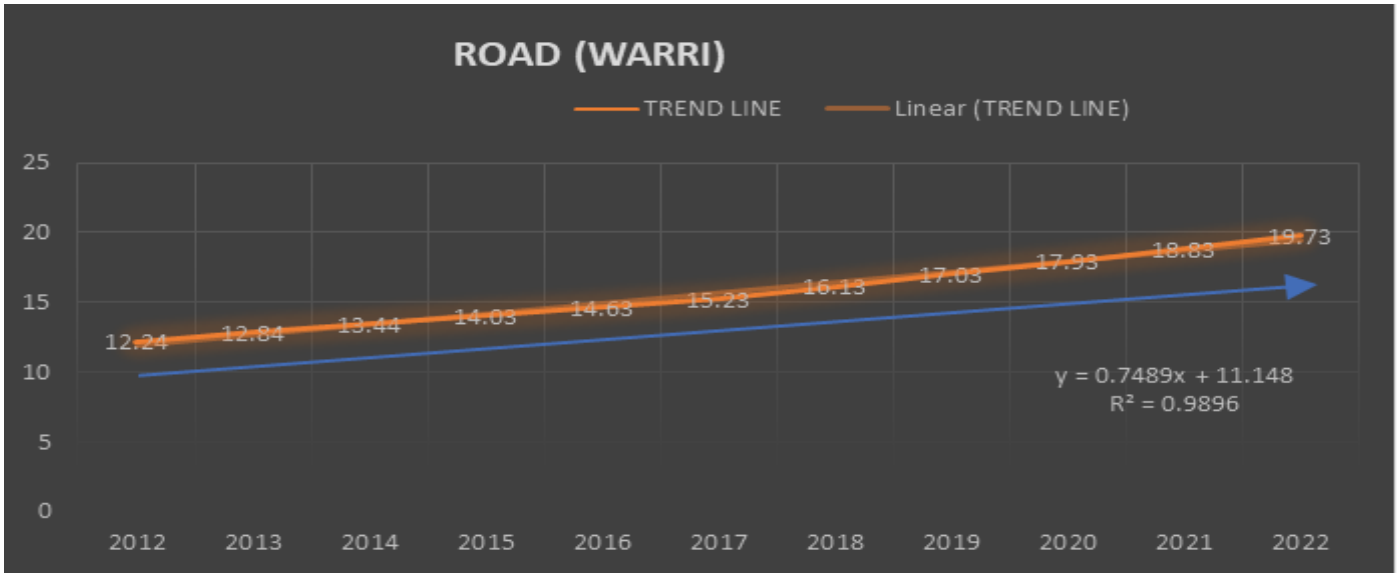

Fig 35 Trend Line of Road Land use Allocation Warri 2012-2022

The graph above shows the annual rate of change on road from 2012 to 2022 in Warri. The regression equation is y = 0.7489x + 11.148. The slope of the regression line is 0.7489, which means that the average annual rate of change on road is increasing by 0.7489 units per year. This implies that the average annual rate of change on road in Warri, is increasing. The R-squared value in the graph is 0.9896. This means that 98.96% of the variation on road can be explained by the linear regression model.

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.148	.957		2079.593	.000
	Percentage (%)	0.7489	.506	.995	28.668	.000
a. Dependent Variable: Year						

The R-squared value in the graph is 0.9896. This means that 98.96% of the variation on road can be explained by the linear regression model.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.9896[a]	.942	.936	.839
a. Predictors: (Constant), Percentage (%)				

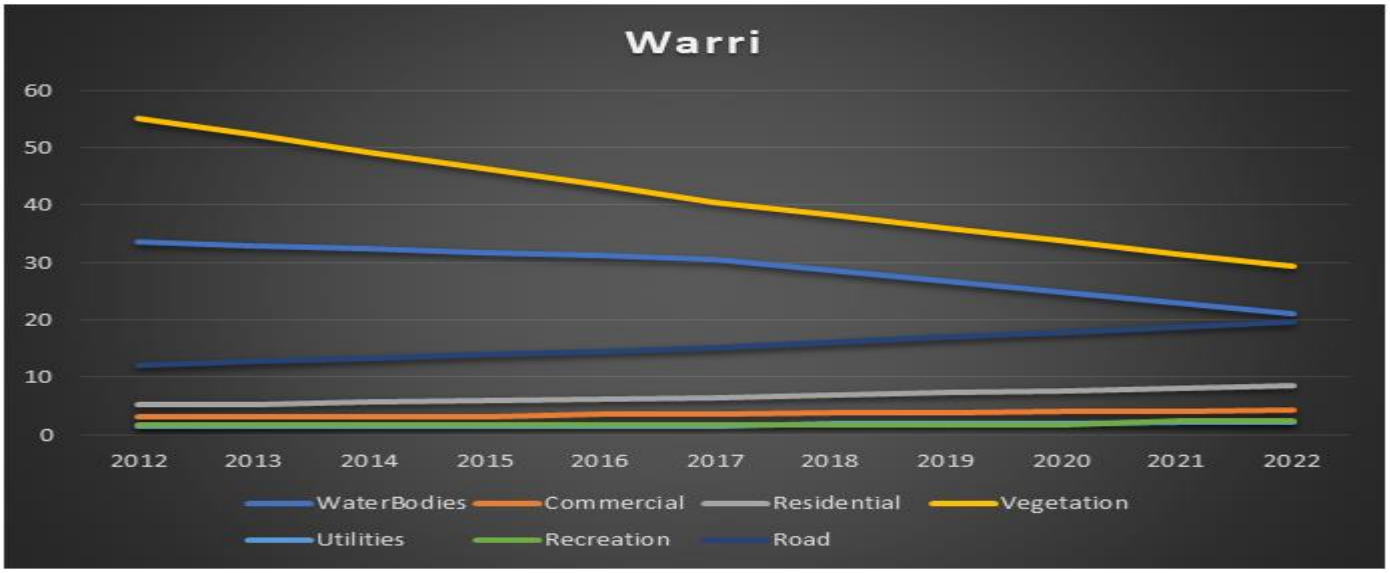

Fig 36 Multiple Trend Line of Land use Allocation Warri 2012 -2022

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From the multiple trend line graph of land use allocation Warri 2012-2022 (fig 36) above, it is observed that the average annual rate of change in commercial land use is increasing by 0.1128 unit per year, residential increasing in average annual rate of change by 0.3330,utilities & service by 0.0682 unit per year, recreation by 0.0718 unit per year, road by 0.7489 unit per year while water body and vegetation average annual rate of change is decreasing by -1.2379 unit per year and -2.574 unit per year respectively.

➢ *Graphic Representation of the Percentage Rate of Land use Allocated to Various uses in Warri 2012-2022*

Warri in Delta State, has experienced a continuous increase in residential, commercial, recreational, roads, utility and service activities in recent years. This growth has had significant implications for the trend analysis of land use allocation in the state.

- *Residential Development:*

The increasing population of Delta State has led to a high demand for residential properties, resulting in the expansion of residential areas and the conversion of agricultural lands to residential use. This has led to a significant increase in the allocation of land for residential purposes, which has resulted in the development of new neighborhoods and the expansion of existing ones.

- *Commercial Development:*

The growth of commercial activities in Delta State has also led to an increase in the allocation of land for commercial purposes. This has resulted in the development of new shopping centers, office complexes, and other commercial facilities. The increase in commercial activities has also led to an increase in the demand for land for industrial purposes, such as factories and warehouses.

- *Recreational Development:*

The state's rich natural resources and scenic beauty have made it an attractive destinatison for recreational activities such as tourism, fishing, and hunting. This has led to an increase in the allocation of land for recreational purposes, such as parks, gardens, and other leisure facilities.

- *Road Network Development:*

The continuous increase in residential, commercial, and recreational activities has led to an increase in the demand for road infrastructure. This has resulted in the expansion of the state's road network, which has facilitated the movement of people, goods, and services.

- *Utility and Service Infrastructure:*

The growth of residential, commercial, and recreational activities has also led to an increase in the demand for utility and service infrastructure such as water supply, electricity, and telecommunications. This has resulted in the expansion of the state's utility and service infrastructure, which has improved the quality of life for residents and supported the growth of economic activities.

Again the continuous decrease in **vegetation and water bodies** in Delta state can have significant implications on trend analysis of land use allocation. Land use allocation refers to the process of determining how land resources are distributed and utilized for various purposes such as agriculture, urban development, industrial activities, and conservation.

One of the key implications of the decrease in vegetation is the loss of ecosystem services provided by forests and other natural habitats. Vegetation plays a crucial role in regulating climate, maintaining soil fertility, preventing erosion, and supporting biodiversity. When vegetation cover decreases, these ecosystem services are compromised, leading to negative impacts on land use allocation. For example, reduced vegetation cover can result in increased soil erosion and decreased soil fertility, making it less suitable for agricultural activities. This may lead to a shift in land use allocation away from agriculture towards other sectors such as urban development or industrial activities.

Similarly, the decline in water bodies such as rivers, lakes, and wetlands can also have significant implications for land use allocation. Water bodies provide important resources for various sectors including agriculture, fisheries, and tourism. They also play a crucial role in regulating local climate and supporting biodiversity. When water bodies decrease in size or quality, it can affect the availability of water resources for different land use activities. For instance, reduced water availability may limit agricultural production or impact the viability of certain industries that rely on water for their operations. This can result in a reallocation of land resources towards alternative uses that are less dependent on water.

The trend analysis of land use allocation in Delta state is likely to be influenced by these changes in vegetation and water bodies. A continuous decrease in vegetation cover and water bodies can indicate a shift in land use patterns over time. For example, if there is a significant decline in agricultural land due to decreased vegetation cover or limited water availability, it may suggest a transition towards other sectors such as urban development or industrialization. Similarly, if there is an increase in urban areas or industrial zones at the expense of natural habitats, it may indicate a trend towards more intensive land use practices.

Moreover, the decrease in vegetation and water bodies can also have indirect impacts on land use allocation through their effects on other factors such as climate change and biodiversity loss. Climate change can alter temperature and precipitation patterns, which in turn can affect the suitability of land for different uses. For instance, changes in rainfall patterns may render certain areas less suitable for agriculture or increase the risk of flooding in urban areas. Biodiversity loss resulting from the decline in vegetation and water bodies can also impact land use allocation by affecting ecosystem functioning and resilience. Loss of biodiversity can lead to decreased productivity and

increased vulnerability to pests and diseases, which can influence the choice of land use activities.

In conclusion, the continuous decrease in vegetation and water bodies in Delta state can have significant implications for trend analysis of land use allocation. These changes can affect ecosystem services, water availability, and other factors that influence land use decisions. Understanding these implications is crucial for sustainable land management and planning in the face of environmental challenges.

Hypothesis was postulated and tested to ascertain the impact of Land use allocation on property development.

- *H_0: The land use allocation do not have significant impact on property development in Delta State.*

Table 34 Test of Hypothesis

Sources of variances	SS	DF	MS	Cal-F	Crit-P Level
Between group	4523.66	1	4523.66		0.002
Within group	541	7	77.29	3.20	0.001

The table above shows that P-value of 0.001 is less than 0.05 level of significant

This lead to the rejection of the hypothesis that the land use allocation has no significant impact on property developments in Delta State.

VI. SUMMARY OF FINDINGS

The study found out that there is a constant increase in the allocation for residential land use in the layouts made by the Delta State Government through the Ministry of Lands and Survey, Delta State.

Trend analysis was carried out to determine the annual rate of change of the various land use allocation in Delta state from 2012 to 2022, The trend line and the annual rate of change show that as commercial, residential, recreation, utilities and road are having upward slope and a positive annual rate of change which signifies an increased annual allocation, water body and vegetation continue to have a downward slope and negative annual rate of change which signifies a reduced allocation annually. This simply means that land is being reclaimed from water bodies and vegetation area are being converted to other land uses in order to satisfy the ever increasing demand for commercial, residential, utilities and road.

VII. CONCLUSION

In conclusion, the trend analysis of Land Use Allocation in Delta State, Nigeria 2012-2022 highlights the significant increase in urbanization and built-up areas, expansion of industrial and commercial activities, and the importance of environmental conversation. These findings provide valuable insights for policymakers, urban planners, and stakeholders involved in Land Use management and sustainable development in Delta State.

➢ *The Study Recommends that:*

- Government should intensify efforts in ensuring that citizens adhere to the land use allocation. If a land has been allocated to be used for commercial purpose, such land should not be used for residential purpose.
- Zoning regulations and building codes should be strictly adhered to by property developer
- Streamlining of land allocation procedures: The land use and allocation procedures should be streamlined to make it more efficient and transparent. This will attract more investors to invest in the state and boost property development.

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