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INVENTORY OF LANDUSE ACTIVITIES IN RIPARIAN AREA OF A STREAM, A CASE STUDY OF OGANGAN STREAM IN IGEDE-EKITI, EKITI STATE, NIGERIA

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Abstract

This paper examined inventory of landuse activities in riparian area of a stream, a case study of Ogangan stream in Igede-Ekiti with the major aim of determining the land use activities existing in the immediate riparian area of the stream. The study was carried out in 2019 and employed the collection of data from both primary and secondary sources. Primary sources of data for this study were mainly observation. The outcome of the study revealed that there are various classfications of landuse within Ogagan River riparian corrridor, which ranges from Agricultural, residential, industrial landuse. The study concluded that riparian zone is one of the most degraded ecosystems in the world with agricultural land use considered the broadest stressors and therefore recommended that there should be enforcement of the watershed management regulation for protection of 150m from the sides of rivers..

Keywords: Land, Land use, Stream and Riparian area

1.1 Introduction

Land use involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats. It refers to various ways in which human beings make use of and manage the land and its resources (Environmental Literacy Council).Land use refers to human activities on the land which are directly related to the land (Willy, 2009). Landuse has also been defined as the total of arrangements, activities, and inputs that people undertake in a certain land cover type. Land cover is the physical and biological material found on the surface of the land, existing as vegetation or the built environment (human-created structures). Land cover describes the vegetational and artificial constructions covering the land surface (Burley, 2017). On any patch of land, there can be both a land use and a land cover. In some cases, land use and land cover can be consistent in that one infers the other. For example, a land cover of agricultural row crop is consistent with a land use of agriculture. In other cases, forest land cover may be coincident with a land use of urban, agriculture, residential, and forestland use. Nonetheless, these two types of data allow interpretation of human use and of potential habitat conditions and ecological processes. (Clawson and Stewart, 2015)

Human being shape the land through increasing populations, agricultural expansion, mineral and forest resource excavation, changing the flow of rivers, and with layers of industrial and urban infrastructure (Mira, 2004).Over the course of history, human beings have had a changeable relationship to the land. Early humans are believed to have used the land with little modification for shelter, food gathering, and defensive aims. It wasn't until the domestication of plants and animals approximately 10,000 years ago that land use involved extensive changes in the landscape. With domestication, came large-scale clearing for both settlement and agriculture. Growing populations built structures on the land (or out of the land) for shelter, defense and worship, and altered the existing land cover and the course of waterways for food, power, and transportation (Erickson and Fay, 2011).

A riparian zone or riparian area is the interface between land and a river or stream. The word riparian is derived from Latin "Ripa" meaning river bank. Riparian refers to thevegetation, habitats and ecosystems associated with bodies of water (streams, springs or lakes) or dependent on the existence of perennial, intermittent, or ephemeral surface or subsurface water drainage. (ArizonaRiparian Council 1988).Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence). Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines. (National Research Council, U.S, 2002).

1.2 Statement of the Research Problem

Stream ecosystems are among the most degraded habitat types on Earth with landscape change considered the dominant stressor (Sala, 2000). As a result, there is continuing riparian ecosystem degradation reflected through loss of riparian vegetation, diminishing forest cover, reduced water quality, soil productivity and wetland areas leading to a decline in the ecological stability of these systems. Land cover and land use (Hereafter referred to collectively as land use) determine many waterway characteristics, including hydrology, stream chemistry, and sediment deposition (Allan, 2004).Riparian areas are essential for diminishing negative impacts of land use activities on river. However, influences derived from intensive land use throughout watersheds may limit the effectiveness of riparian buffers, especially where they are discontinuous.

1.3 Research Questions

What are the land use activities existing in the immediate riparian area of the stream?

1.4 Objective of the Study

The objective of the study is to carry out a field observation by taking inventory of all land use activities existing in the immediate riparian area of the stream.

1.5 The Study Area

Location and Boundaries

Igede-Ekiti lies within latitudes $7^0$39' and $7^0$41' North of the Equator and longitudes $5^0$7' and $5^0$8' East of the Greenwich Meridian. It is the Headquarters of Irepodun/Ifelodun Local Government Area of Ekiti state. It shares political boundaries in the North with Awo-Ekiti, in the South with Ilawe-Ekiti, in the East with Iyin-Ekiti and West with Aramoko-Ekiti. It is at a distance of about 15kilometres from Ado-Ekiti, the state capital and 64kilometers from Akure, the capital of Ondo state. Igede-Ekiti covers a land area about 10km^2. The population according to 1966 census stood at 31, 041 people and had tremendously increases ever since. The current population of Igede-Ekiti is about 87,282.

Climate

The entire zone lies within the humid tropics hence experiences a hot-wet climate, a characteristics feature of a typical rainforest belt of the southwestern Nigeria. An annual mean sea level temperature of 27^0C (53.6^0F) with annual range between -17.2^0C and -14.4^0C were common. Total annual rainfall varies between 1500mm and 2700mm, displaying two peaks (double maxima) in July and September coinciding with the passage of the overhead sun, with a short dry spell or August Break lying between both orographic/relief and convectional rainfalls with lightening and thunders at the onset and retreat regimes. High relative humidity of about 80% is common. Extreme cold (Harmattan) in December and January is predominant.

Physiography

Igede-Ekiti is situated on relatively high land with Esu Hill being the highest peak and an outcrop at Oke Aga in Odogede Quarters. Igede, by this scenario, became a watershed and sources of many important rivers; e.g River Osun (The revered "Osun Osogbo"), Orunro, Elemi, Inansi, **Ogangan (case study**), Ogburuu, Ogbese, Ebisi, Eripon, Apon, Afunnigboya, Olutogin, Amugbadagbe, Eriki, Eeriologbo, e.t.c. they all possess potentials for fishery, dams and tourism development. (IPA, IDC 2013)

Vegetation

The study area exhibits an equatorial floral phenomenon in most parts until of recent due to human intervention (clearing, felling and burning) where traces of derived savanna are becoming noticeable. Indigenous trees include; Iroko, Idigbo, Oganwo, Mahogany, Olee, Oriro, etc. intermingled with shorter trees and oil palms in some open locations. Infacts, savanna vegetation is fast overtaking and displacing the aborigine forest (IPA, IDC 2013).

1.6 Literature Review

Riparian zones or areas are known for the variety of important functions they serve in the environment, and how detrimental their alteration could be to plants, animals and human being. In view of this, many authors, scholars and researchers have contributed to the study of riparian zones as well as the various factors that influences them.

Arthington and Pusey, (2003) in a publication "Flow restoration and protection in Australian rivers" highlighted the significance of riparian zones. They explained that Forested riparian corridors directly provide many ecological benefits for Streams. Riparian Forests can buffer streams from particulate and chemical pollution in the air and water, provided they are not bypassed by artificial drainage systems. Riparian forests increase inputs of litter and woody debris, provide shade which moderates temperatures, increase bank stability, decrease erosion and increase sequestration of sediments, nutrients, and contaminants. This is relevant to this study as the services provided by a riparian zone are common to all riparian areas across the world, if these areas remain in unaltered state.

Olaloye, (2015) studied Riparian forest and adjacent upland vegetation in Southwestern Nigeria. They explained that tropical rainforest is the dominant vegetation type in southern Nigeria (accounting for over 70 % of the total forest zone) although it covers only about 12% of the surface area of Nigeria. As tropical forests become more fragmented due to deforestation, agricultural use, urbanization etc. riparian forests play a crucial role in providing habitat corridors between forest patches to increase landscape connectivity. Unfortunately, riparian forests are under severe threat worldwide (Sparovek, 2002). They asserted that, few studies have been conducted on most riparian forest in southwestern Nigeria, despite their uniqueness and large economic and ecological value, riparian forest ecosystems have, until recently remained largely ignored and unmanaged in addition to inadequate knowledge about species occurring in riparian forests.

1.7 Research Methods

Data for this study were collected from both primary and secondary sources. Primary sources of data for this study were mainly observation. Initial reconnaissance was carried out in the study area to ascertain various land uses of the riparian zone, in-depth oral interview of the community members for first-hand information, especially residents and farmers very close to the river. Adjacent land use activities were obtained through direct observation and measurement. The data collected were presented in statistical tabulated tables, charts and graphical representations to assess various landuse classification and predominant land uses.

1.8 Results and Discussion

The riparian area of Ogangan river consists of various species of indigenous plants and animals in the past has been severely disturbed as a result of human activities and taken over by various land uses. Natural land cover that existed in the area is now replaced by various land uses. Considerable rate of landuse activities were seen at all the zones of the river, from the upper stream through the middle stream to the lower stream. The distance of the river from the upper stream to lower stream was measured to be about 144metres. At the upper stream of the river are agricultural land uses with variety of crops such as; maize cocoyam, cassava etc. Some cash crops such cocoa and kolanut were also cultivated at the upper stream. Also, very close to the river at the upper stream was a palm oil mill.The highest rate of landuse occurred at the mid-stream, majorly agricultural land uses characterized with subsistence farming system (Table 1).

At the downstream, residential landuse was dominant subjecting the river to various domestic uses. Food crops were also cultivated around people's houses. There was outcrop of rocks on both side of the midstream. Some natural vegetation's also existed around the stream, although very few at the lower stream (see Table 1).

Table 1: Major Landuse classifications in Ogangan Riparian Corridor

River's Segment	Major Land uses
Upstream	i. Forest (indigenous plants) ii. Agricultural land (cocoa,kolanut, plantain, cassava and cocoyam plantation)
Midstream	i. Agricultural land (cassava, cocoyam, maize plantain, tomatoes and vegetables) ii. Local industrial landuse (oil palm mill, cassava flour production) iii. Residential/Domestic landuse (bathing, washing, fetching)
Downstream	i. Agricultural landuse (maize, pineapple, vegetables) ii. Residential landuse

Source: Field survey, 2019

The table above shows the major landuse within the riparian corridor of Ogangan River. The landuse classes were examined at the three important segment of the river; upstream, midstream and downstream. The major landcover and landuses were identified to be forest, agricultural land, industrial and residential land. The landuse types were also identified.

Table 2: Distribution of Landcover and Landuses

Land uses	Area cover (Meters)	Percentage (%)
Forest	28.8	20
Agricultural Landuse	72	50
Residential Landuse	14.4	10
Industrial Landuse	28.8	20
Total	144	100

Source: Field survey, 2019

Table 3. Farming System within the Riparian Corridor

Agricultural System	Area cover (meters)	Percentage (%)
Mono cropping	21.6	30
Shifting cultivation	7.2	10
Mixed farming	36	50
Animal husbandry	7.2	10
Total	**72**	**100**

Source: Fieldwork, 2019

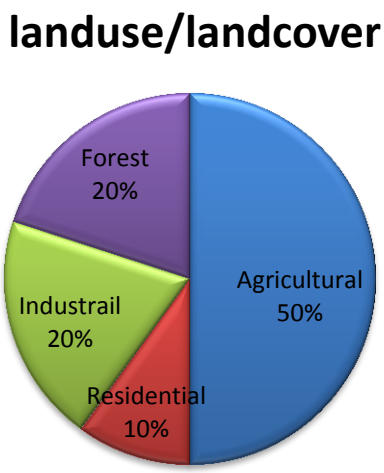

Fig 1: Percentage Distribution of Landuse/ Landcover

Agricultural land use dominated the classification as shown in the table 2 and fig 1. Apart from the river channel covered by water, indigenous natural forest is another land cover noticeable in the riparian zone.

The major types of agricultural system practiced in the riparian zone of Ogangan River are shown in the Table 3. Variety of cash and food crops are cultivated. Some domestic animals such as goats, sheep's and fowls are also reared in the area.

1.9 Summary of findings

This study was set to asses various classfications of landuse within Ogagan River riparian corrridor, with the view of presenting landuses inventory within the riparian zone. Agricultural, residential, industrial landuse were identified in this study to be dominant in the riparian zone of Ogangan river. These landuses are attached with various uses of the river for domestic purposes, for irrigation, for recreational purpose, religious purposes and so on.

1.10 Recommendations

There is a critical need to implement nationwide, land-use practices that are "riparian friendly" and that are effective at eliminating or significantly reducing many of the potentially adverse effects of existing and future land uses; Such as enforcement of the watershed management regulation for protection of 150m from the sides of rivers. The state government should implement law for the protection of riparian habitat. This law should be accompanied with implementing mechanism for its sustainability.

1.11 Conclusion

Riparian areas are among the most degraded ecosystems in the world with agricultural land use considered the broadest stressors (Sala, 2000).Sediment, nutrients, and pathogens from various landuse activities are the top three pollutants responsible for water-quality impairment, followed by anoxia, metals contamination, and habitat destruction. Properly functioning riparian areas can reduce the level of these contaminants in nearby streams and rivers. Unfortunately, riparian areas adjacent to impaired streams or rivers are also suffering from quality degradation.

References

Allan, J. D. (2004). Landscapes and riverscapes: the influence of land use on Stream ecosystems. *Annual Review of Ecology, Evolution, and Systematics,* 35, 257-284.

Arizona Riparian Council Fact Sheet #I. 1988. Arizona State University, Center For Environmental Studies, Tempe, AZ 85287-1201

Arthington, A. H. &Pusey, B. J. 2003. Flow restoration and protection in Australian rivers. *River Research and Applications*, 19, 377-395.

Burley, T.M. (1961). Land Use or Land Utilization. Journal of Professional Geographer. Volume 13, Issue 6. November 1961. Pages 18-20.

Clawson and Stewart, (2015). Water quality in Walnut Creek watershed: nitrate-nitrogen in soils, subsurface drainage water, and shallow groundwater. Journal of Environmental Quality 28: 25-34.

Erickson and Fay, (2011*). Great basin riparian ecosystem, ecology, management and restoration*. Washington D.C: Society for ecological restoration international.

Mira, O. (2004). Land Use Changes in Central Kenya from the 1950s—A Possibility to Generalise? GeoJournal, 51, 203-209.

National Research Council, U.S. (2002). *Riparian areas, functions and strategies for management.* Washington D.C.: The National Academies Press.

Olaloye, D. (2015).*Influence of Land Use Activities on Riparian Vegetation, Soil and Water Quality*: An Indicator of Biodiversity Loss, South West Mau Forest, Kenya. Open Journal of Forestry , 6 , 373-385.

Sala, O. E., F. S. Chapin, J. J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L. F. Huenneke, R. B. Jackson, A. Kinzig et al. (2000). Global biodiversity scenarios for the year 2100. Science 287:1770 1774.

Sparovek, (2002). An overview of riparian forests in California: Their ecology and conservation Pp. 98-99 in Importance, preservation and management of riparian habitat: A symposium (proceedings), R. R Johnson and D. A. Jones (tech. coords.), Tucson, *Ariz.* July 9. USDA For. Sew. Gen Tech. Rep. RM 43.

Willy H.V. (2009). *Landuse and Land Management.* Encyclopedia of Land use, Land Cover and Soil. Oxford: EOLSS, 2009. https://enviroliteracy.org//land-use