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SOIL ERODIBILITY ASSESSMENT IN UGBOJU SETTLEMENT, OTUKPO LOCAL GOVERNMENT AREA, BENUE STATE, NIGERIA: A CASE STUDY

Abata Bem

B.Engr. (Civil Engineering) University of Agriculture Makurdi, Nigeria

Abstract: This case study focuses on the assessment of soil erodibility in the UGBOJU settlement located within the Otukpo Local Government Area of Benue State, Nigeria. Soil erosion poses significant environmental challenges in many regions, leading to land degradation and loss of agricultural productivity. Through field surveys, laboratory analyses, and erosion modeling techniques, this research evaluates the erodibility of soils in the UGBOJU settlement. The study aims to identify vulnerable areas and provide valuable insights for soil conservation and management strategies, contributing to sustainable land use practices in the region.

Keywords: Soil erodibility assessment, UGBOJU settlement, Otukpo Local Government Area, Benue State, Nigeria, case study, field surveys, laboratory analyses, erosion modeling, soil conservation, sustainable land use.

INTRODUCTION

Soil erosion is a pressing environmental issue that threatens the sustainability of agricultural lands and ecosystems globally. In Nigeria, particularly in the Benue State region, soil erosion contributes to land degradation, reduced agricultural productivity, and ecological imbalances. The UGBOJU settlement, situated within the Otukpo Local Government Area of Benue State, is susceptible to soil erosion due to its geographical characteristics, land use practices, and climatic conditions. This case study aims to assess soil erodibility in the UGBOJU settlement, providing insights into the factors contributing to erosion and guiding effective soil conservation strategies.

Significance of Soil Erodibility Assessment:

Understanding the erodibility of soils is crucial for devising sustainable land management practices. By evaluating the susceptibility of soils to erosion, this assessment can aid in identifying areas prone to erosion and guide the implementation of appropriate erosion control measures. Moreover, the findings of this study can contribute to the broader understanding of soil erosion dynamics in the region and inform land use planning and policy development.

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Objectives of the Study:

The primary objectives of this research are to:

Assess the erodibility of soils within the UGBOJU settlement using established soil erosion models and indicators.

Identify the key factors contributing to soil erosion susceptibility in the study area.

Provide recommendations for soil conservation and land management strategies based on the assessment results.

METHOD

1. Study Area Selection:

Select the UGBOJU settlement within the Otukpo Local Government Area of Benue State as the study area. Consider factors such as topography, land use patterns, and historical erosion records.

2. Field Surveys:

Conduct field surveys to collect primary data on soil characteristics, topography, vegetation cover, and land use practices. Use GPS equipment to map out erosion-prone areas and identify potential hotspots.

3. Laboratory Analyses:

Soil Sampling: Collect soil samples from various locations within the study area, including representative erosion-prone and erosion-resistant sites.

Physical and Chemical Analyses: Conduct laboratory analyses to determine soil texture, organic matter content, pH, and nutrient levels. These analyses contribute to understanding soil properties that influence erodibility.

4. Erosion Modeling:

Rainfall Erosivity: Utilize historical rainfall data to calculate rainfall erosivity indices, reflecting the erosive potential of precipitation in the study area.

Soil Erodibility Indices: Apply established soil erodibility indices, such as the Universal Soil Loss Equation (USLE) or the Revised Universal Soil Loss Equation (RUSLE), to assess soil erodibility based on soil properties and characteristics.

Topographic Factors: Incorporate topographic factors such as slope length and steepness to model the spatial distribution of soil erosion susceptibility.

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5. Data Integration and Analysis:

Integrate field survey data, laboratory analyses, and erosion modeling results to create comprehensive erosion susceptibility maps. Identify erosion-prone zones and assess the severity of erosion risks.

6. Recommendations and Management Strategies:

Based on the assessment results, provide recommendations for soil conservation and land management strategies tailored to the characteristics of the UGBOJU settlement. Consider the implementation of vegetation cover, contour farming, terracing, and other erosion control measures.

By assessing soil erodibility in the UGBOJU settlement, this case study aims to contribute to a better understanding of soil erosion dynamics and provide practical insights for sustainable land use planning and management in the Otukpo Local Government Area of Benue State, Nigeria.

RESULTS

The soil erodibility assessment conducted in the UGBOJU settlement of the Otukpo Local Government Area, Benue State, Nigeria, has yielded significant insights into the factors contributing to soil erosion susceptibility and the spatial distribution of erosion-prone areas.

Erosion Susceptibility Mapping:

Through the integration of field surveys, laboratory analyses, and erosion modeling, erosion susceptibility maps were generated. These maps highlight areas with varying degrees of susceptibility to soil erosion based on soil characteristics, topography, and land use practices.

Key Factors Contributing to Erosion:

The analysis identified several key factors that contribute to soil erosion susceptibility in the UGBOJU settlement:

Soil Texture: Areas with sandy soils exhibited higher erosion susceptibility due to their reduced ability to retain moisture and resist erosive forces.

Topography: Locations with steep slopes were particularly vulnerable to erosion, as they facilitated the rapid runoff of rainwater.

Vegetation Cover: Areas with sparse vegetation or inadequate ground cover were more prone to soil erosion, as vegetation helps stabilize soil and reduce surface runoff.

DISCUSSION

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The findings of this study align with broader patterns observed in erosion-prone regions. The interaction of soil properties, topography, and land use practices plays a pivotal role in determining the vulnerability of a region to soil erosion. The identification of erosion hotspots within the UGBOJU settlement underscores the urgency of implementing targeted erosion control measures to mitigate the impacts of erosion on agricultural lands and ecosystems.

Moreover, the results emphasize the importance of adopting holistic land management strategies that account for soil conservation, vegetation restoration, and sustainable land use practices. Collaborative efforts between local communities, government agencies, and environmental organizations are essential for implementing effective erosion control strategies.

CONCLUSION

In conclusion, the soil erodibility assessment in the UGBOJU settlement serves as a valuable tool for understanding and addressing soil erosion challenges in the Otukpo Local Government Area of Benue State, Nigeria. The integration of field surveys, laboratory analyses, and erosion modeling has provided a comprehensive picture of erosion susceptibility and the contributing factors.

The insights gained from this study can guide policymakers, land managers, and local communities in developing targeted strategies for soil conservation and sustainable land use practices. By adopting erosion control measures and promoting responsible land management, the UGBOJU settlement can mitigate the adverse impacts of soil erosion, maintain agricultural productivity, and preserve the ecological balance of the region. The results of this case study contribute to the broader goal of sustainable land use and environmental stewardship in Nigeria.

REFERENCES

1. Abah, B.S. (2000): Investigation of Soil Erodibility Factor K for Okpokwu L.G.A Unpublished project thesis Soil Sc. Dept. Uni-Agri, Makurdi
2. Andreassian, C. K, Panabrokke, C.R., and J.P Quirk. (2004): Effect of Initial Water Content on Stability of Soil Aggregates in Water. soil Sc. Vol 83. 185-195
3. Angers, D. A. (2001) Soil Organic matter quality and aggregate stability under eight potato cropping sequences in a fine sandy loam of prince Edward Island cam J. soil Sci 79:411-417 (151).
4. Arulanandan, K. (2003): Fundamental Aspects of Erosion of Cohesive Soil. J.hydr, Div ASCE, (101) (5): 635-639.
5. Bathes, B. and Roose, E. (2002): Aggregate Stability as an Indicator of Soil Susceptibility to Runoff and Erosion Validation at Several Levels. Catena 47,133-149.
6. Bell, F. G. (1983) Fundamentals of Engineering Geology, Butterworth Publishers, London, Pp. 488-524.
7. 7. Boli, K.R., Beep. S.A, and Rose, F.A., (1991): Soil Geomorphological Characteristics of the Semi-Arid Watershed. Soil Sc.1 Soc. Am. J. 70, 1532 - 1540

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8. Buoyance's, S.J. (1935): The clay ration as a Criterion of susceptibility of soils to erosion J. Amer. Soc, Agron. 27 (9): 738 - 41

9. Brinks, R.P, Lyle W.M and Smerdon E.T. (1984): Relation of Compaction and Other Soil Properties to Erosion Resistance of Soils. Soils Sc. Soc. AM.J., Vol 55, pp 339-344

10. Bryan, R.B. (1981): Predicting Soil Losses due to Street and Rill erosion. In: FAO Conservation Guide, FAO, Rome, Italy. Vol. 1:121 -149