



# FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:  
Resilient Environment  
and Sustainable  
Resource Management  
for All

## Optimizing Locations for Best Management Practices in Watershed Zones in Developing Societies (A Case Study of Edim Otop Area in Calabar, Nigeria).

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Keywords: Erosion, Flooding, Watershed, Conservation

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## INTRODUCTION



A Picture speaks more than a thousand Words

What we can deduce:

- Soil Degradation
- Gully Erosion
- Water Quality
- Waste Disposal
- Poverty



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## THE PROBLEM

- Lack of Understanding of our Environment – Activities that contribute to Soil and Water Degradation
- Poor Planning Implementation
- Poor Practices – Sand Mining, Poor Agricultural Practices, Poor Sanitary and Waste Disposal Practices
- Climate Change

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## TWO SIDES TO A COIN

- PROFERRING SOLUTIONS TO ENVIRONMENTAL CHALLENGES BY IDENTIFYING BEST MANAGEMENT PRACTICES AND HOW BEST TO IMPLEMENT THEM USING GIS TECHNIQUES
- GETTING THE END USER TO UNDERSTAND AND PARTICIPATE IN IMPROVING SOIL AND WATER QUALITY THEREBY REDUCING ADVERSE ENVIRONMENTAL HAZARDS

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## BEST MANAGEMENT PRACTICES (BMPs)

- Flowpath Identification
- Open Space Selection
- Riparian Buffer
- Rainwater Harvesting
- Bioswales and Tree Planting



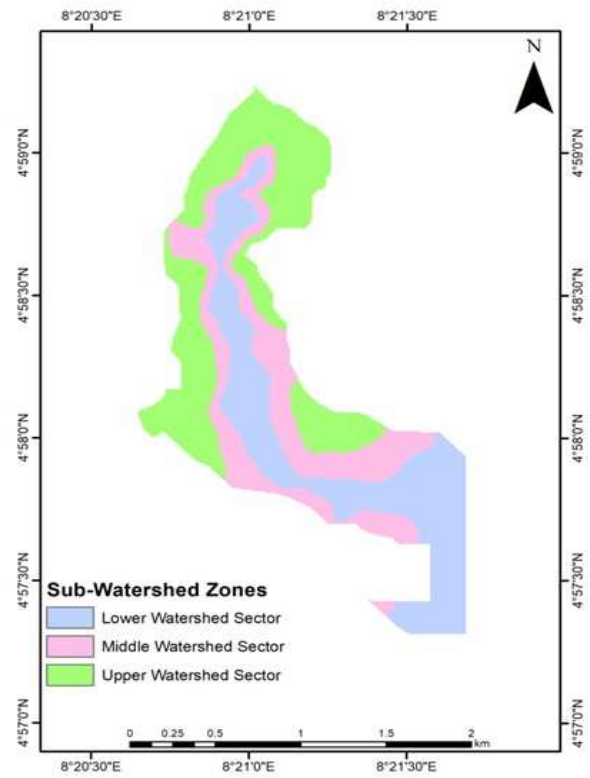
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## SECTORISING THE WATERSHED



Sub-Watershed zone	BMPs	Remarks
<b>Upper Watershed Sector</b>	Rainwater Harvesting, Waste Management	Areas with the highest concentration of buildings. Storm water gathers its momentum at this sector hence the need to prioritize harvesting of rainwater.
<b>Middle Watershed Sector</b>	Soil Stabilization using bio-remediation strategies, for example tree and grass planting; landscaping etc.	Areas with highest run-off capacity.
<b>Lower Watershed Sector</b>	Open Spaces for water bio infiltration measures; Impervious area reduction; flood reduction.	Depositional area with emerging landscape due to settling of soil.

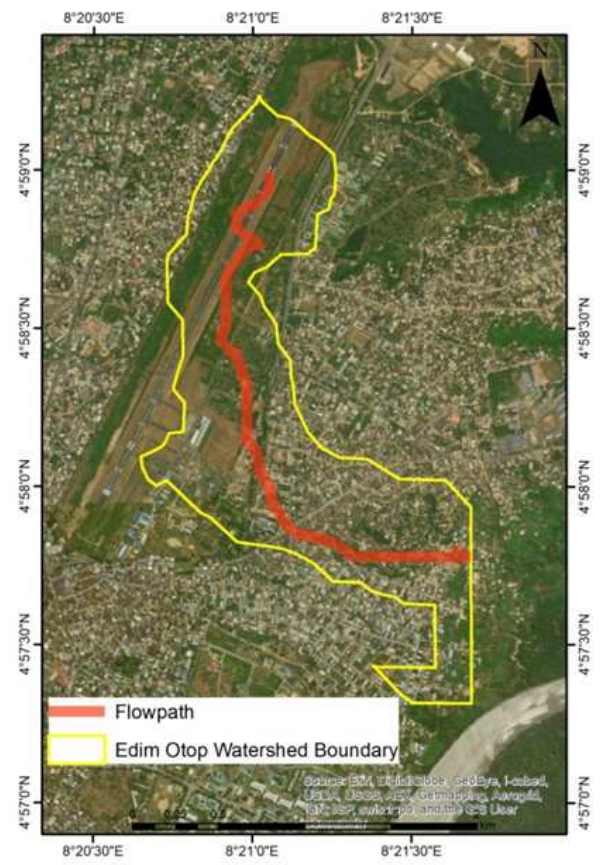


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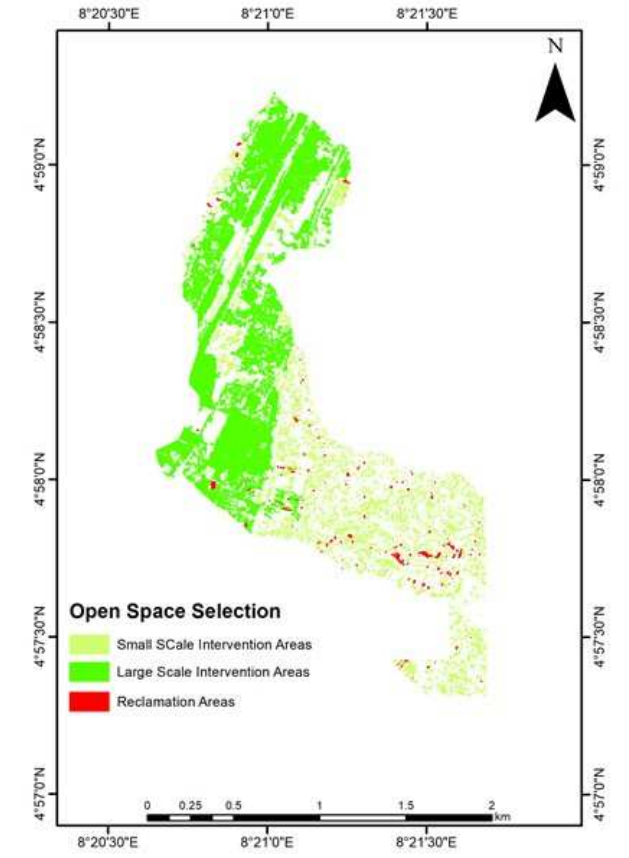
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A

A) **Flowpath Identification** derived from Hydrology watershed tools highlighting drainage paths. Useful in Planning BMP for drainage and building control.

B) **Open Space Selection** from classification of Land Cover prioritizing bare soils for reclamation and implementation required BMP.



B

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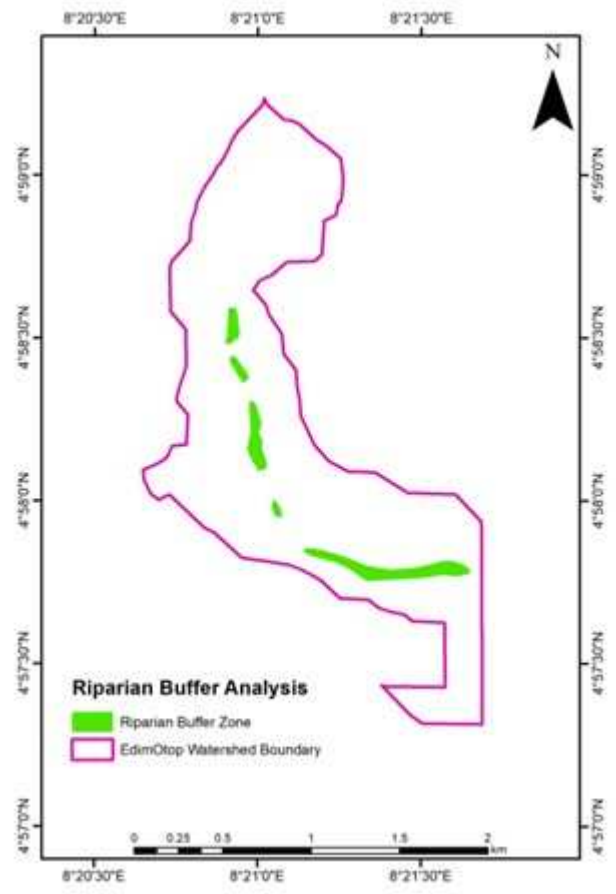


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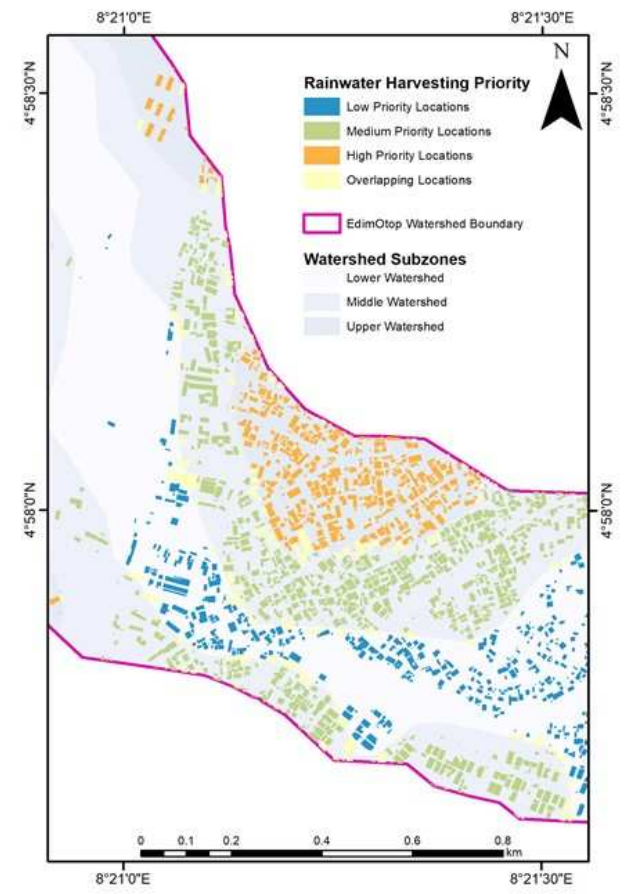
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C

C) **Riparian Buffer** derived using overlay of Topographic Wetness Index and Erosion Index. This area provide stability to channels and river banks, in addition to promoting bio-diversity and aesthetics to the watershed.

D) **Rainwater Harvesting:** Sectorization and prioritization of buildings for stormwater harvesting based on their location on the watershed.



D

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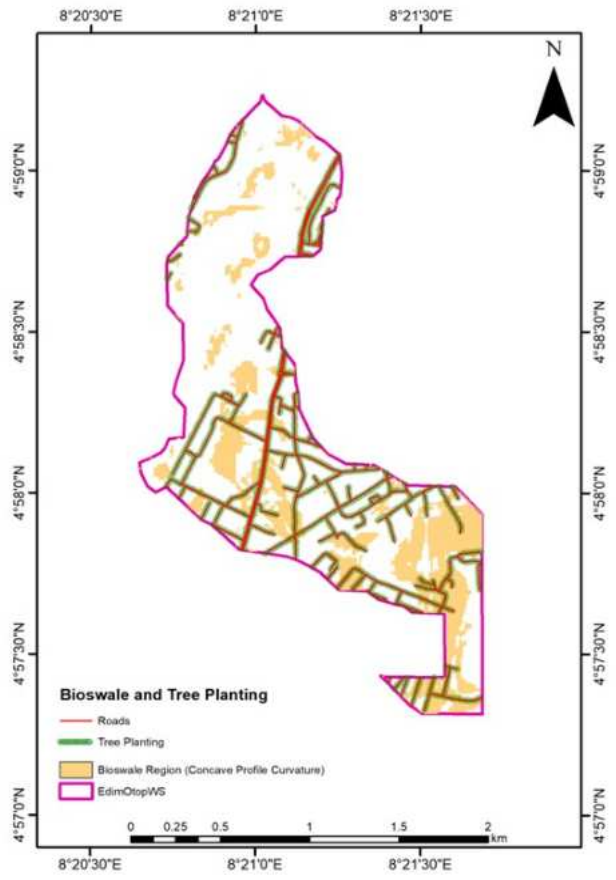


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E

E)

**Tree Planting:** provide aesthetics, provides infiltration points and serve as wind breakers hence reducing pollution and erosion from wind factor. Locations optimized to lie along access roads

**Bioswales:** Bioswales reduce surface runoff with the adaptation to store storm water for some hours. They also add to aesthetics on the watershed landscape. The Positive Profile Curvature values were used to optimize locations for bioswales as these regions are characterized by accelerated flows during heavy rainfall and the concave nature allows for easy implementation of the Bioswale design.

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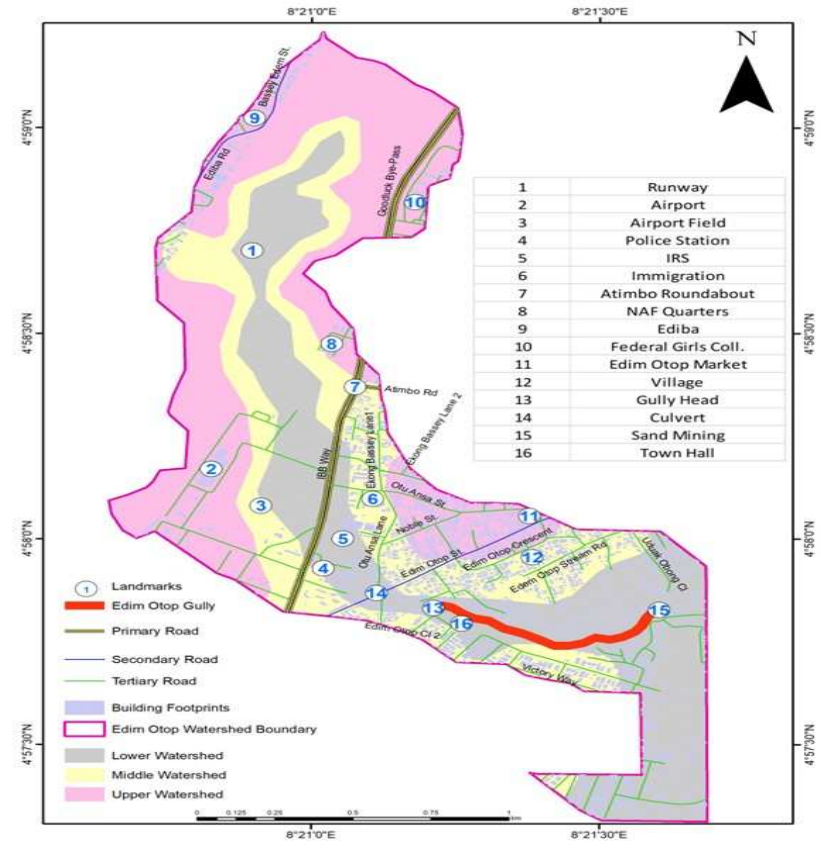


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### COMMUNITY INCLUSIVITY

- Use of paper maps
- Selection of Landmark by community representatives
- Identifying Optimized locations on ground in the company of the representatives
- Updating the maps and reproducing paper maps
- Community enlightenment and education.



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SUSTAINABLE DEVELOPMENT **GOALS**

International Federation of Surveyors supports the Sustainable Development Goals

## Commission

### 8 Spatial Planning and Development

Serving Society for the Benefit of People and Planet



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