



FIG Working Week 2024

19-24 May

Accra, Ghana

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

Geospatial Techniques in Mitigating the Effects of Climate Change to create a Sustainable Environment in Yilo Krobo Municipality (12779)

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Outline

Introduction

Problem

Objective

Methodology

Results and discussion

Conclusions and recommendations

Links with SDGs

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Introduction

- Have you ever experienced flooding in your community?
- How did you feel? What came to your mind?
- Did you feel that if your community was well planned probably the effects would have been reduced or prevented?
- Climate change as a global phenomenon that is affecting all facets of live (Abbass et al., 2022; Fujimori et al., 2023).
- To reduce its effects there is a need to incorporate geospatial tools in the planning process (Bora & Bora, 2023).

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Problem and objective

- Geospatial techniques have advantages over the traditional land use planning (Bekele et al., 2023)
- It can provide a better understanding to effectively manage various ecosystems (Mehmood et al., 2024).
- Despite the importance of geospatial techniques in planning ecosystems, there are limited studies on their applications especially in developing countries.
- Studies to explore the use of geospatial strategies (NDMI, NDVI, Aspects, contours) to plan our communities are critical
- **Objective**
- Explores geospatial techniques to study the physical environment to assist with the planning of our communities. (NDMI, NDVI -2002-2023, Aspects, contours - DEM).

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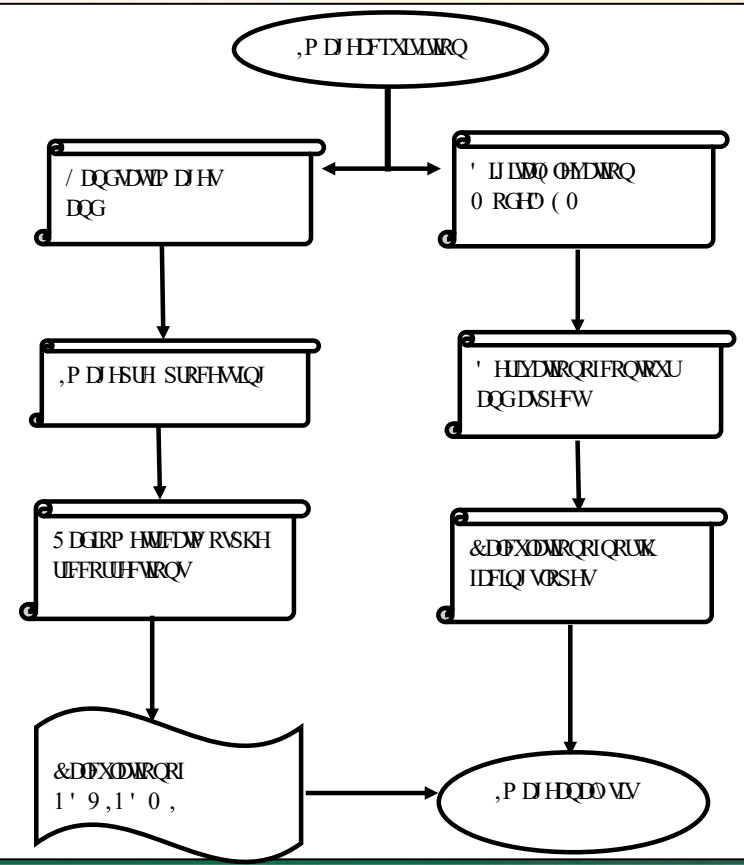
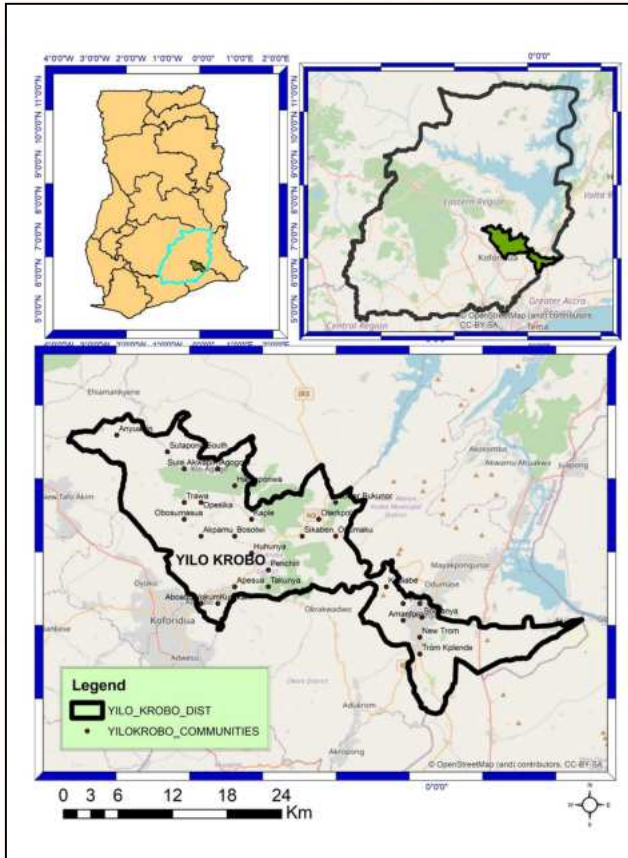
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Study area and methods



NDVI was performed with the formula:

$$\frac{\text{band4 (NIR)} - \text{band3 (RED)}}{\text{band4 (NIR)} + \text{band3 (RED)}}$$

NDMI was performed using the formula:

$$\frac{\text{band4 (NIR)} - \text{band5 (SWIR)}}{\text{band4 (NIR)} + \text{band5 (SWIR)}}$$

The aspect was calculated using the formula: $\text{aspect@1} \leq 90$ and $\text{aspect@1} \geq 270$ where aspect@1 is the raster of aspect extracted from the DEM.



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Results

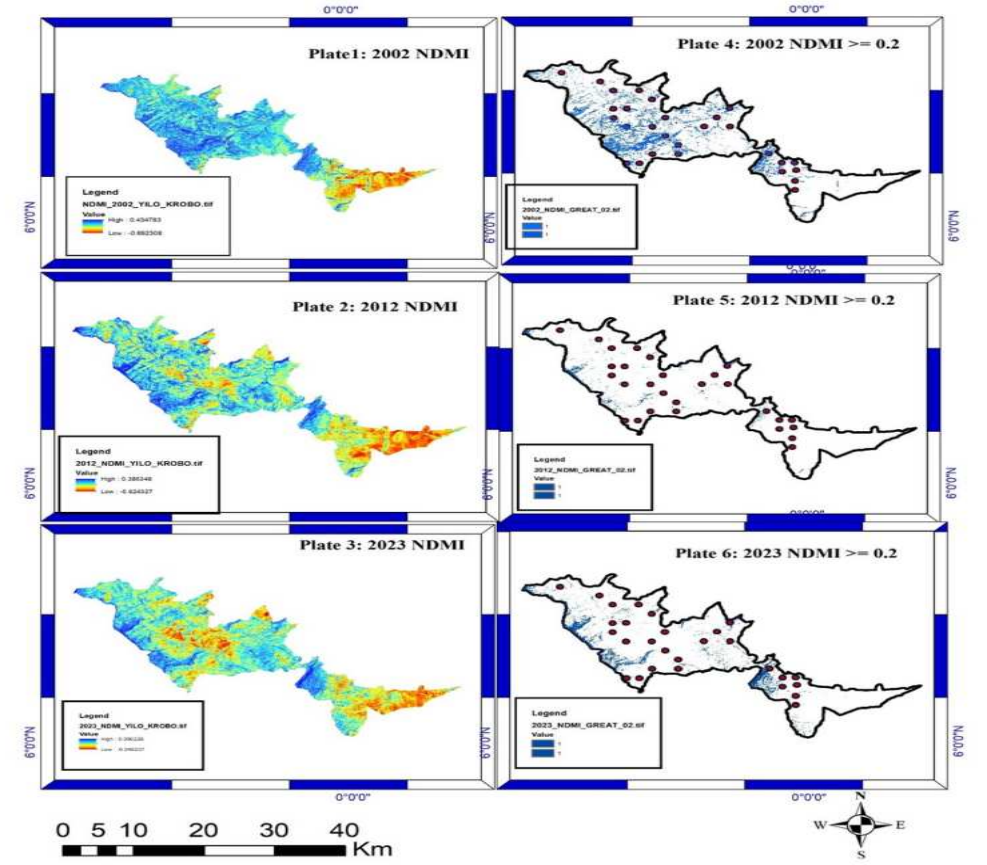
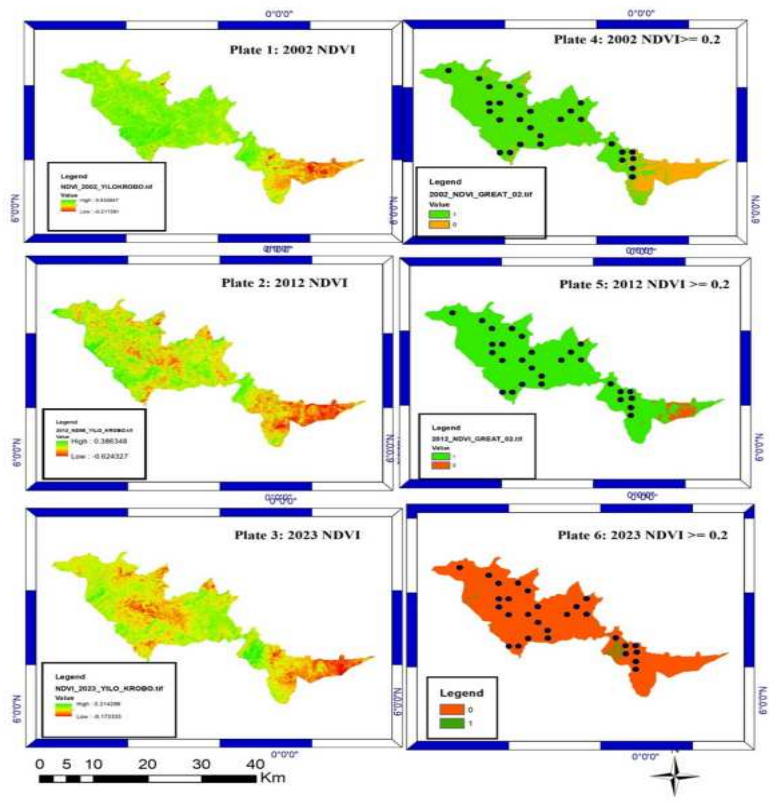




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Results

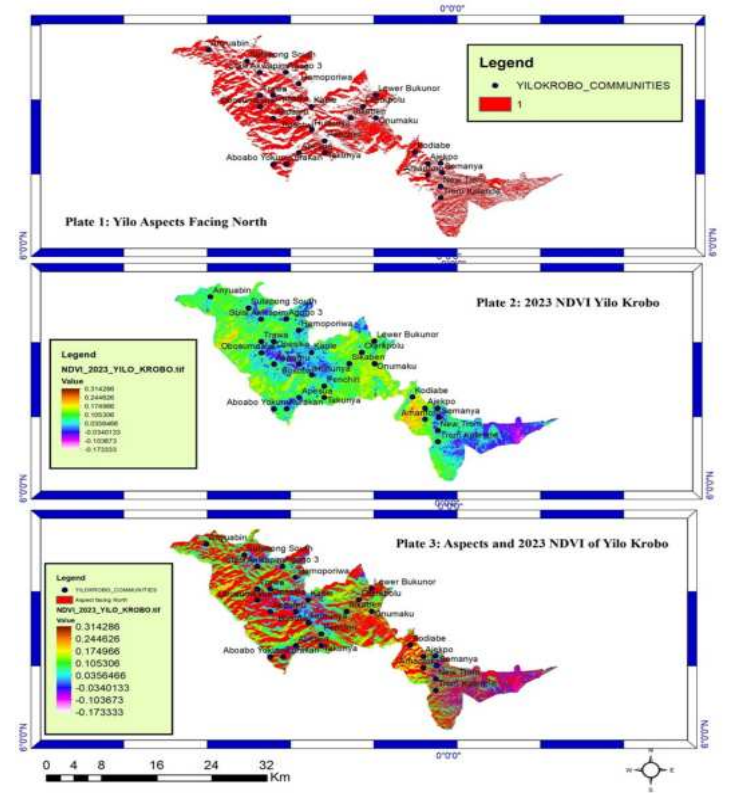
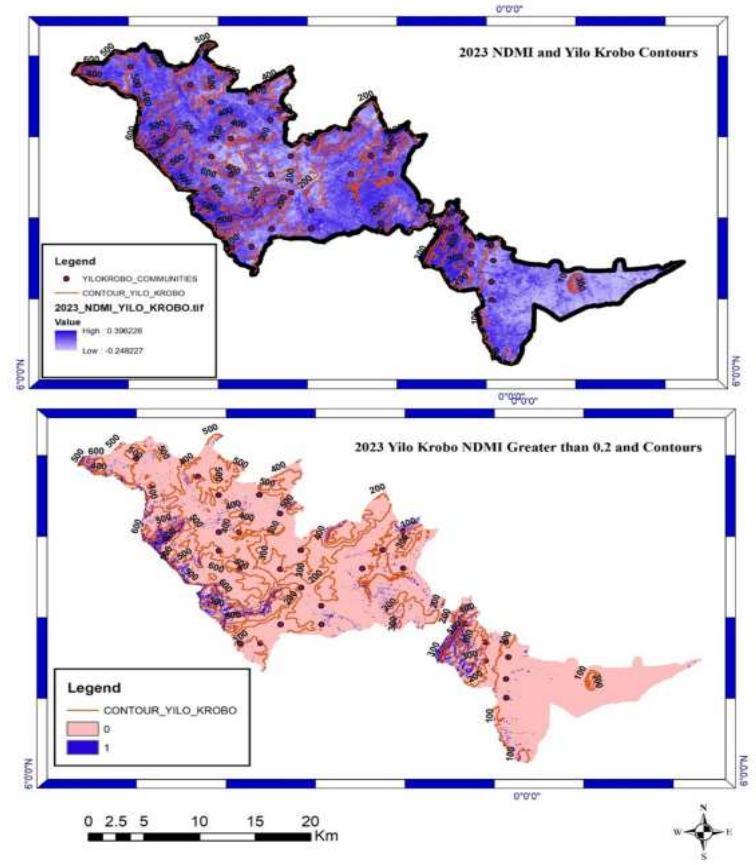
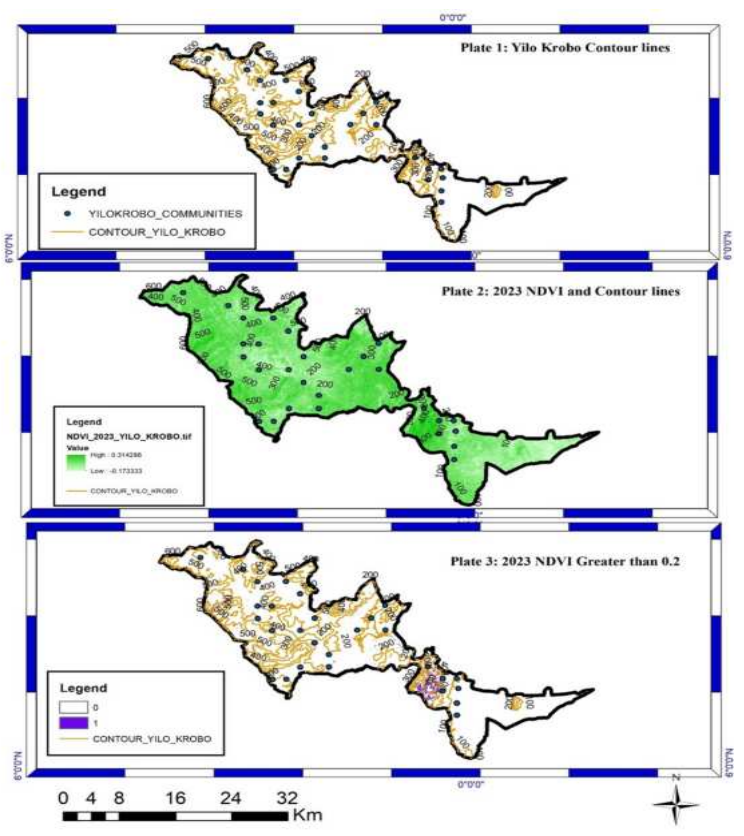




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Discussions

- Mitigating the effects of climate change goes beyond the use of a single approach and through the application of geospatial techniques, areas with severe impact could be identified on a large scale for the appropriate mitigation strategies to be employed (Bora & Borah, 2023; Mehmood et al., 2024).
- Having an idea about the aspect and contours of the areas can help planners become conversant with the terrain and perform suitability assessment of projects aimed at restoring the vegetation (Louhaichi et al., 2022; Singh, Yang et al., 2020).

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Conclusions

NDVI, NDMI, contours and aspects are useful in understanding the physical conditions of the environment and can help in planning our spaces.

Recommendations

- The municipality should collaborate with other stakeholders to employ geospatial tools in planning the area.
- Green and blue spaces should also be incorporated in the planning of the area.

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SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

Commission 4

TS03B: Facing the Changing Climate & Environmental Degradation: Hydrospatial Solutions
(~~2, 6, 9, 11, 13, 15, 16, 17~~)

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