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Use of Geographic Information Systems to Assess Literacy In Rural Communities in Kenya.

Authored by: Ms Mitchelle Chao Mtwanguo & Dr Collins Mwange

Contact : chaomtwanguo@outlook.com

This paper is scheduled for session TS05B/10530, on **RURAL URBAN LINKAGES.** In line with SDG 11: Sustainable Cities and Communities and FIG Commision 8: Spatial Planning and Development.

Held on: Tuesday 30th of May 2023 from 2.30pm- 4.30pm EST.

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Introduction

- This research was inspired by the impact of school libraries established by Chao and Friends Foundation in Taita Taveta, Kenya as targeted literacy interventions.
- Education and Literacy inequity is widely experienced by Communities in Kenya, gravely affecting their development into sustainable communities and cities.
- Globally, a staggering 758 million adults still lack basic literacy skills despite worldwide literacy and education interventions.
- In this presentation, we discuss the significance of GIS applications in assessing literacy factors and its overall application in implementing various literacy interventions .

Scope of the study

- This study highlights various literacy policy, assessment and intervention practices in Kenya.

- It investigates the literacy plight in Taita Taveta County, a rural community in Kenya's coastal region.It brings to light the role of GIS technology in literacy and education planning and management, discussing the opportunities and potential to enhance Quality Education.

- It concludes on the potential of school libraries as powerful literacy and education interventions, as evidenced by school libraries established by Chao and Friends Foundation in Taita Taveta County.
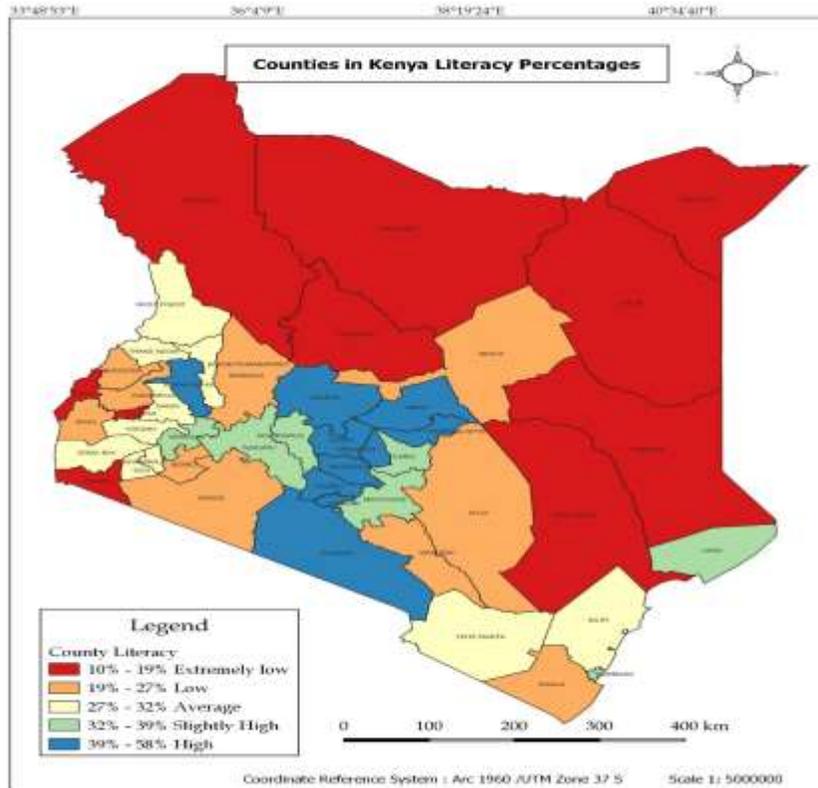
Role of literacy in developing Sustainable Cities and Communities

- The role of literacy and quality education remains significantly profound in the development of sustainable cities and communities.
- Education Institutions in Kenyan Rural Communities face huge disparities in access to quality education and services as compared to their urban counterparts. This is highly attributed to discrepancies in funding, distribution of resources and infrastructure, and varying social-economic factors further affecting learning outcomes.
- Bridging the literacy and education divide amongst rural communities requires targeted interventions and specially curated policies, reforms and interventions that fit dynamic nature of rural communities .
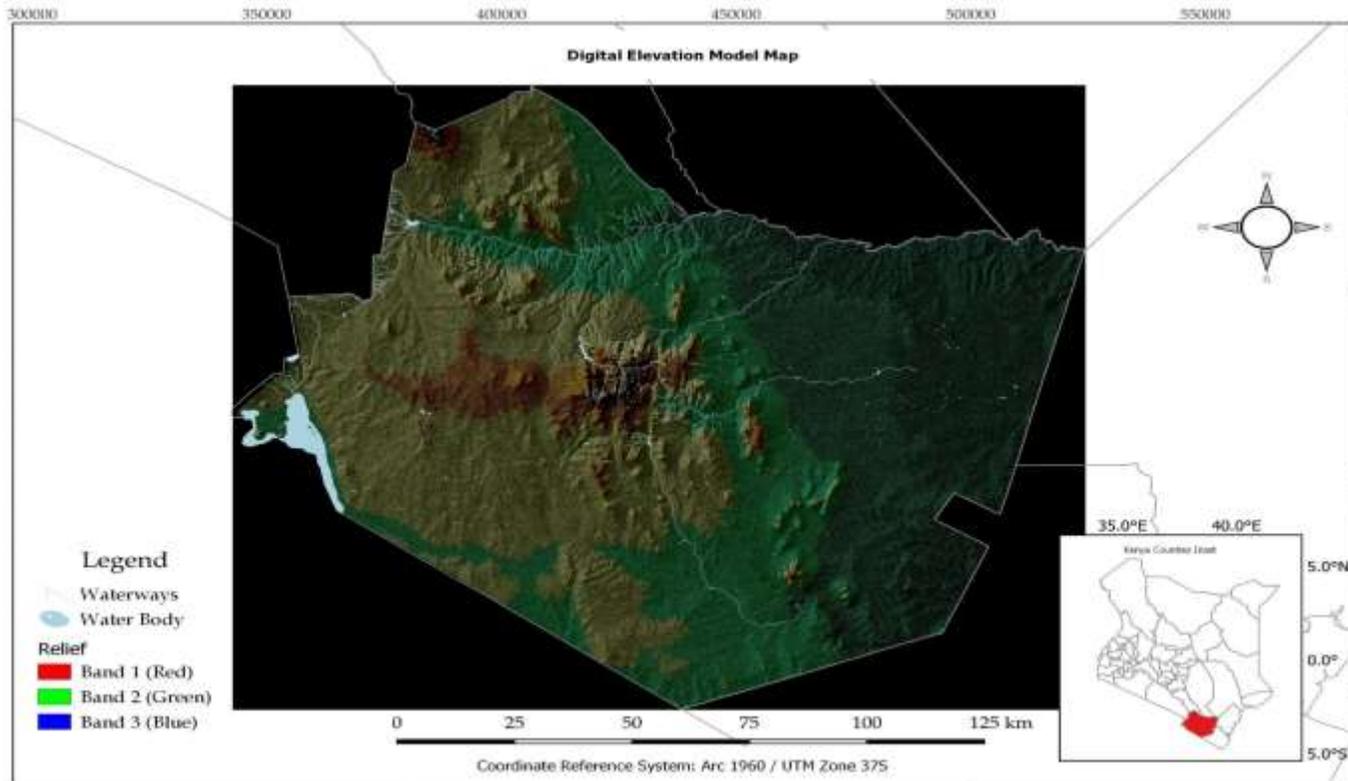
Role of GIS Technology in Literacy

- The dynamic role of GIS in today's technological world remains hugely understated.
- Throughout this study, GIS was used for both data analysis and visualization in delivering outputs. Imploring its application for monitoring & evaluation providing education management services to support policies, assessments and interventions.
- Different cartographic styles were explored within the study, representing all literacy factors and data in maps throughout the study.
- Through production of various map outputs, GIS was used to show nationwide literacy rates among all the Kenyan Counties and bring to light the factors affecting literacy in Taita Taveta

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Literacy Data Visualization – Nationwide Literacy Levels

Counties in Kenya Literacy Percentages

Legend
County Literacy
- 10% – 19% Extremely low
- 19% – 27% Low
- 27% – 32% Average
- 32% – 39% Slightly High
- 39% – 58% High

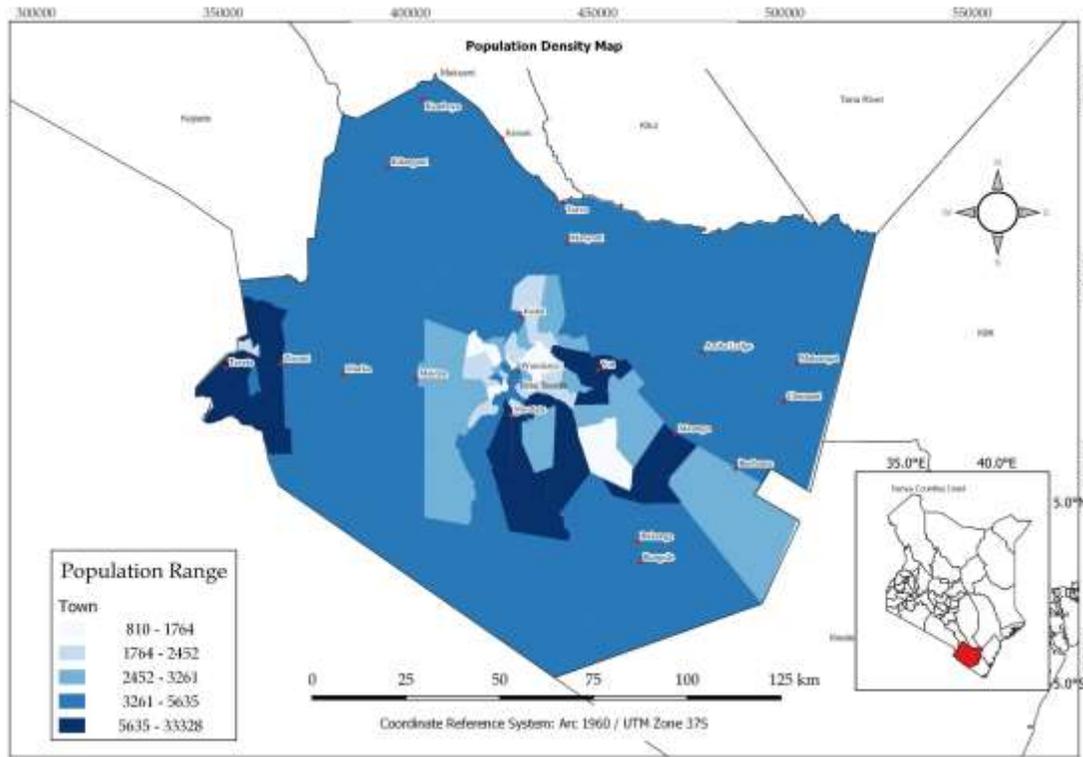Coordinate Reference System : Arc 1960 /UTM Zone 37 S   Scale 1: 5000000

- This map shows the nationwide distribution of basic literacy levels amongst Grade 3 children in all Kenyan Counties, as conducted by Uwezo Kenya in 2015.
- Color variation has been used to show the countrywide widespread literacy and education disparities
- Red Counties Ranging 10-19% have extremely low literacy levels.
- Orange Counties Ranging 19- 27% have low literacy levels.
- Yellow Counties Ranging 27-32% have average literacy level, a category the area of study falls within.
- Green Counties Ranging 32-39% have slightly high literacy levels.
- Blue Counties Ranging 39-58 % have the Highest literacy levels.

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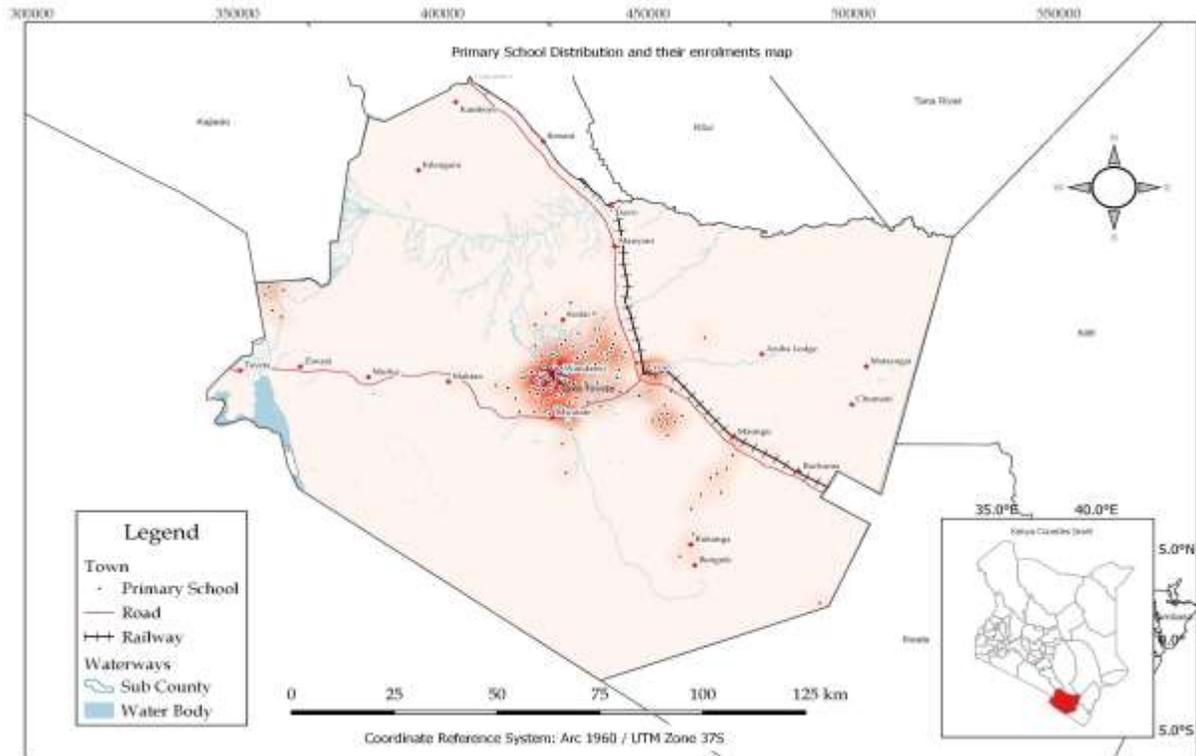## Factors Affecting Literacy - Terrain and Climate

- Terrain and Climate heavily influence the population and distribution of Taita Taveta County, influencing settlement of household, location of social amenities like schools and distribution of transport and infrastructure services.
- A Digital Elevation Model gives a 3D simulation of the surface and elevation of the county.

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Factors affecting Literacy in Area of Study – Population Distribution

Population Density Map

- A Choropleth map was used to depict population density of Taita Taveta County within sub-location administrative units. Population distribution significantly affects the distribution of amenities, resources and infrastructure.
- This can guide implementation of targeted community literacy interventions like school libraries and community libraries.
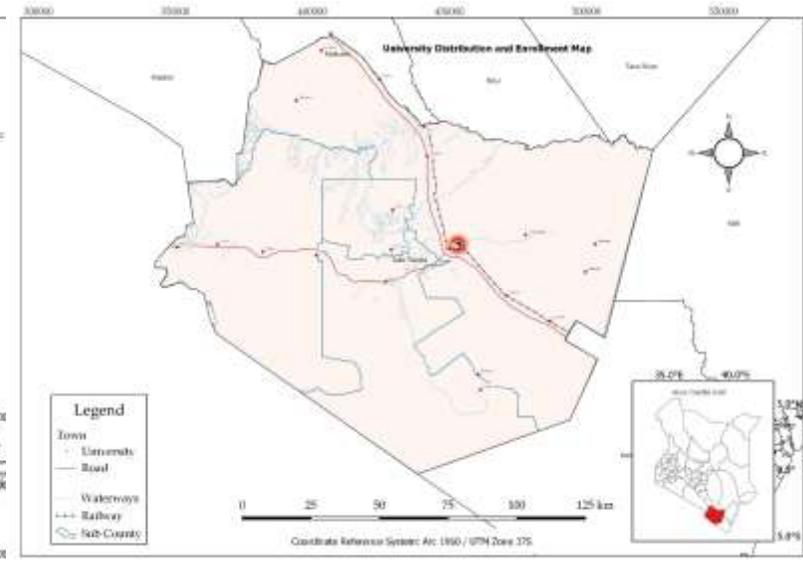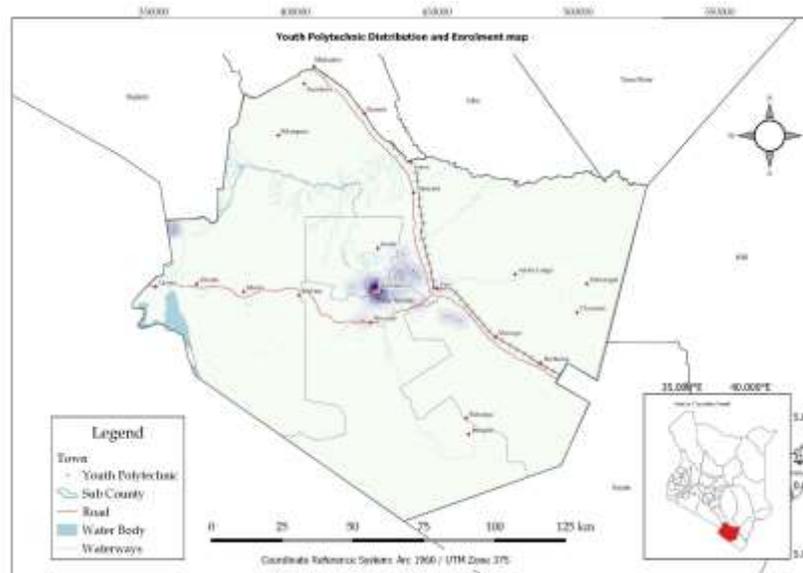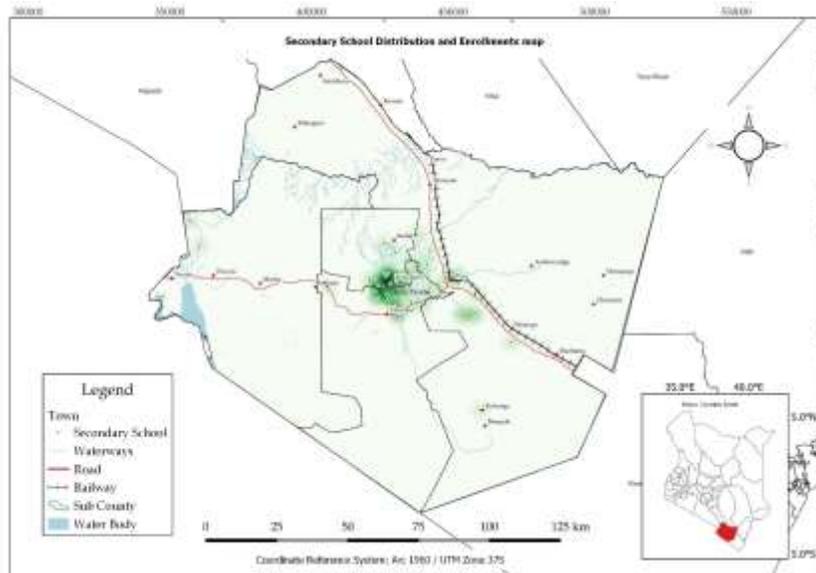
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Factors affecting Literacy – School Enrolment and distribution

Primary School Distribution and their enrolments map

- Heat Maps were used to depict the distribution of all education institutions and their enrollment within the area of study.
- This is particularly useful in monitoring and evaluation of education institutions, aiding in developing and monitoring various targeted literacy and education intervention methods.
- Heat maps were developed for Pre-Primary Schools, Primary, Secondary , Adult Education Centers, Youth Polytechnics and Universities within the study area

Heat Map of Secondary Schools, Youth Polytechnics and University

- There is a significant decrease in distribution and enrollment of the different education institutions within the area of study.

Conclusion

- GIS is a powerful tool, whose benefits can be leveraged to provide support, assessment, monitoring, evaluation and implementation of various literacy and education interventions.
- School libraries remain to be powerful transformative education and literacy tools that can be harnessed to improve learning and literacy levels in rural and urban communities.

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