Background

- Presently, earth state has changed in terms of biodiversity distribution over the years.

- As a result, the negative environmental implications warrant urgent actions from the decision makers and the civil society.

- There is need for combined efforts from the government, civil society and research institutions to join efforts in managing the environmental changes locally and international.

- While key stakeholder play a bigger role, technology communities also have a greater responsivity by developing with innovative solutions to counter climate changes.

- Earth observation techniques are essential tools for monitoring biodiversity changes.

Problem Statement

- Natural disasters like earthquakes, drought, hurricanes, and floods have significantly contributes to biodiversity disturbance.

- Due the extended and exceeded speed of biodiversity degradation policy makers have tuned their attention to climate change and biodiversity monitoring.

- Many earth observation techniques have been developed but still there remains a gap in real time monitoring for urgent decision making.

- As a results, we propose and develop a Google Earth Engine App for real-time monitoring of biodiversity changes in three selected counties in Kenya.
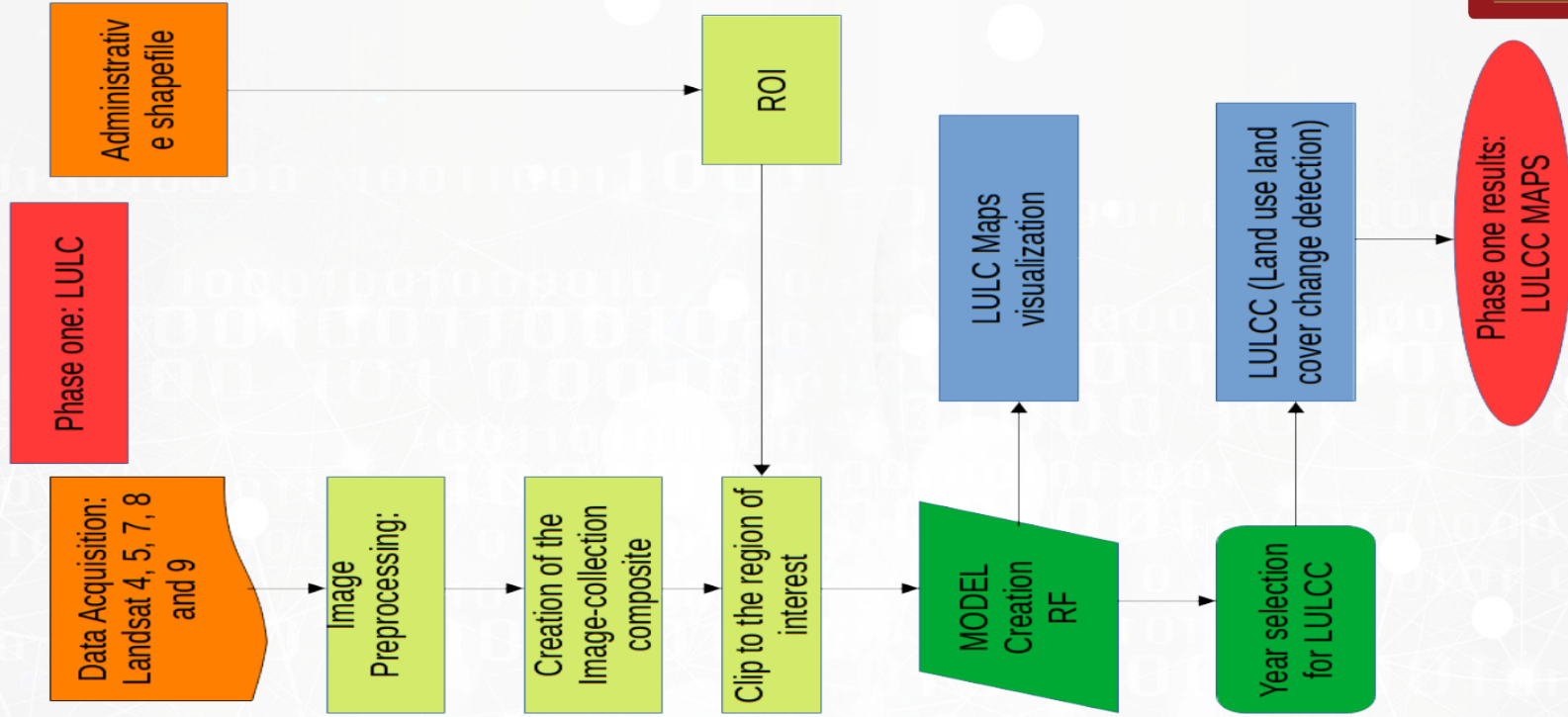
Project Objectives

- Our Study focuses on developing a cloud based solution to implement the following target objectives in Nakuru Barigo and Narok counties;

1. To investigate land use land cover change analysis over time for the three counties using machine learning.

2. To automate land use land cover change detection(LULCC) in google earth engine.

3. To assess land use land cover disturbances.

4. To predict the future LULC change.

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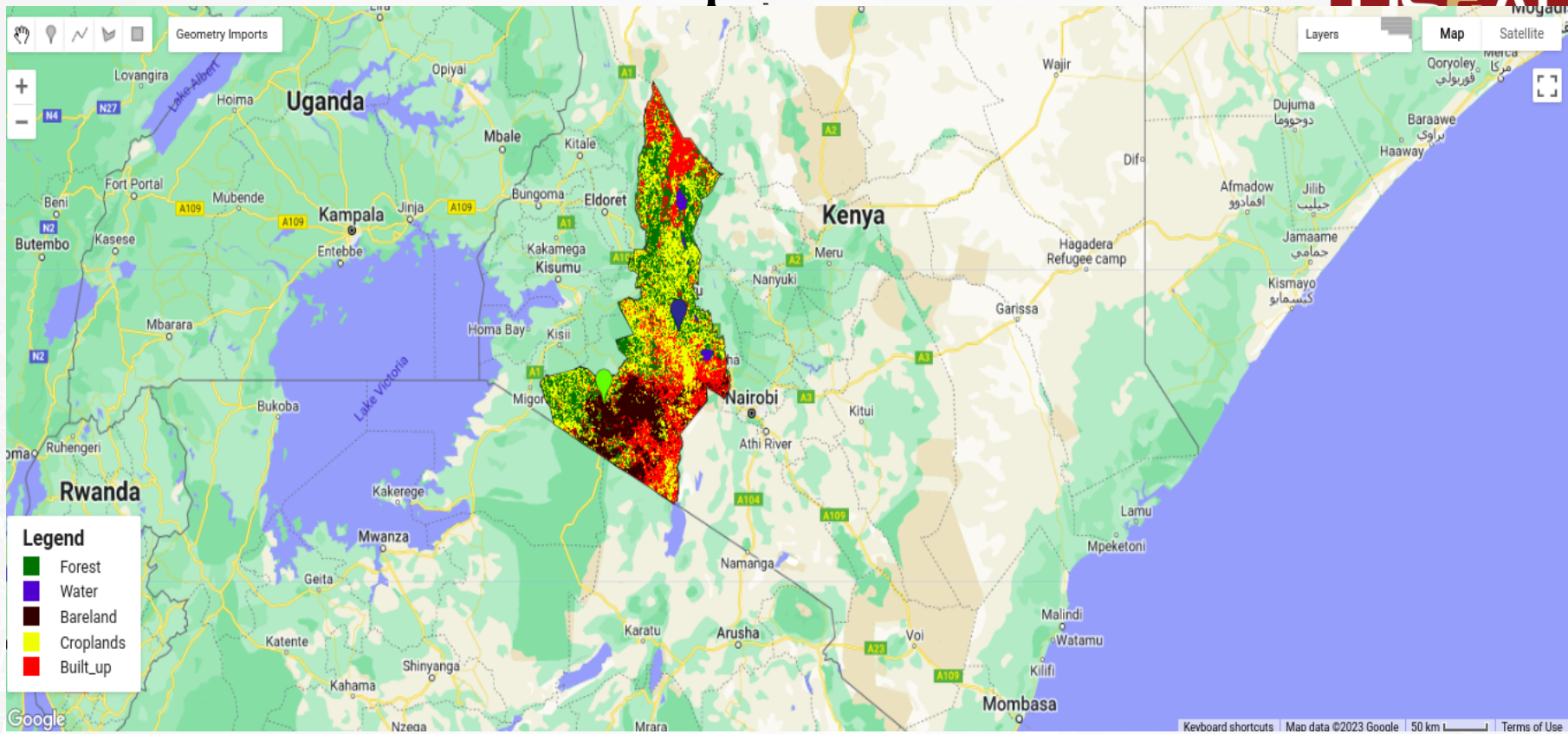JOURNAL
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Literature Review

- Land use land cover detection is a perfect approach to determine the trend of climate and human activities on the planet.

- According to Sidhu et al. (2018) note the modification of the earth's terrestrial surface is a major anthropogenic factor contributing to ecosystem change.

- The availability of technological solutions provides us with an options for individual targeted research. However, the available solutions differ based on the technological capabilities, and methodology used to develop them.

- Additionally, systems vary in the classification mechanics used to generate land use classes and their distributions.

- Land cover detection is particularly essential in the conservation and monitoring processes. Governing authorities require improved tools for better monitoring and appropriate enforcement strategies.

Methodology

Phase one: LULC

Administrative shapefile → ROI

Data Acquisition: Landsat 4, 5, 7, 8 and 9 → Image Preprocessing: → Creation of the Image-collection composite → Clip to the region of interest → MODEL Creation RF → Year selection for LULCC → LULC Maps visualization → LULCC (Land use land cover change detection) → Phase one results: LULCC MAPS

Outputs

Legend
- Forest
- Water
- Bareland
- Croplands
- Built_up

Cont..

COLUMN AREA COVERED By EACH OF THE CLASSES 2022

Baringo,Nakuru,Narok AREA COVERED By EACH OF THE CLASSES 2022
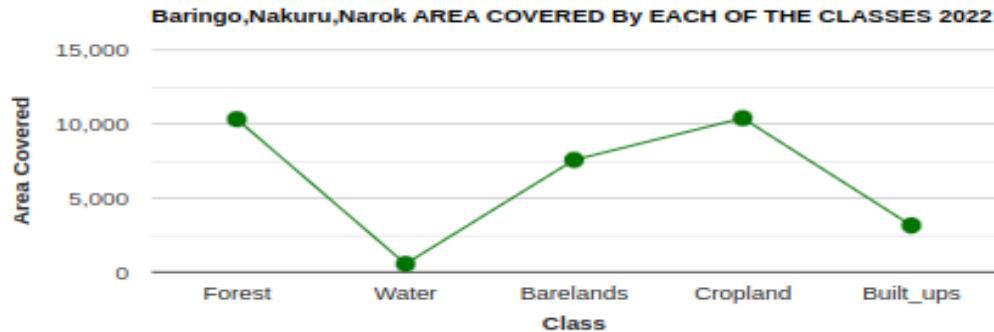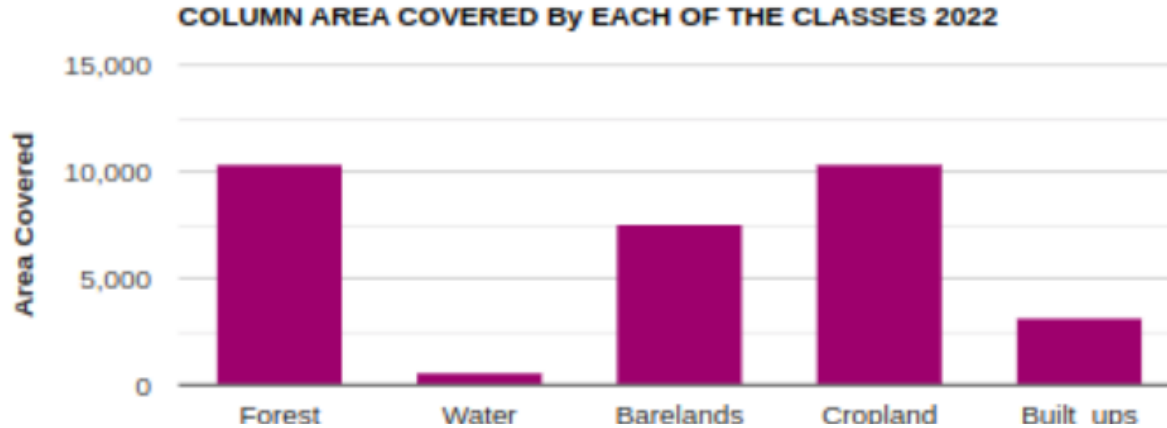
Implications

- From the line charts it is evident that land use land cover change detection in the three counties has greatly degraded over the three years covered in the study.

- All the five classification categories have reduced in terms of area coverage.

- Evident results showed low water catchment regions across the counties from 2009 to 2022 covering approximately 1000 square kilometers.

- The implication of this was signaling food insecurity, livestock thirsty, degraded biodiversity.

- Bare lands slowly increased from 2009 to 2013 and then in 2022 the area covered by bare lands increased significantly.

- The represented shows that drought or human activities have greatly influenced the increase of bare lands across the counties.

Future Work

The researcher aim to collaborate with relevant organizations to develop and deploy the biodiversity monitoring tool into production.

However, there's need for ground trothing and validation with ground data in before deployment of the application.

Improvement of the system to enhance accuracy and sustainability is required for greater societal impact.

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