



# Using Geospatial Technologies to Monitoring Land Degradation to Support Sustainable Land Management:

A Case Study of Narok County.

By  
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# Presentation Outline



1

Why Geoid Technologies on GIS Day ?

2

Introduction to global Land Degradation challenges.

3

Use of Geospatial Technology to support sustainable land management

4

Conclusions and Recommendations

# Why Geoid Technologies on GIS Day ?

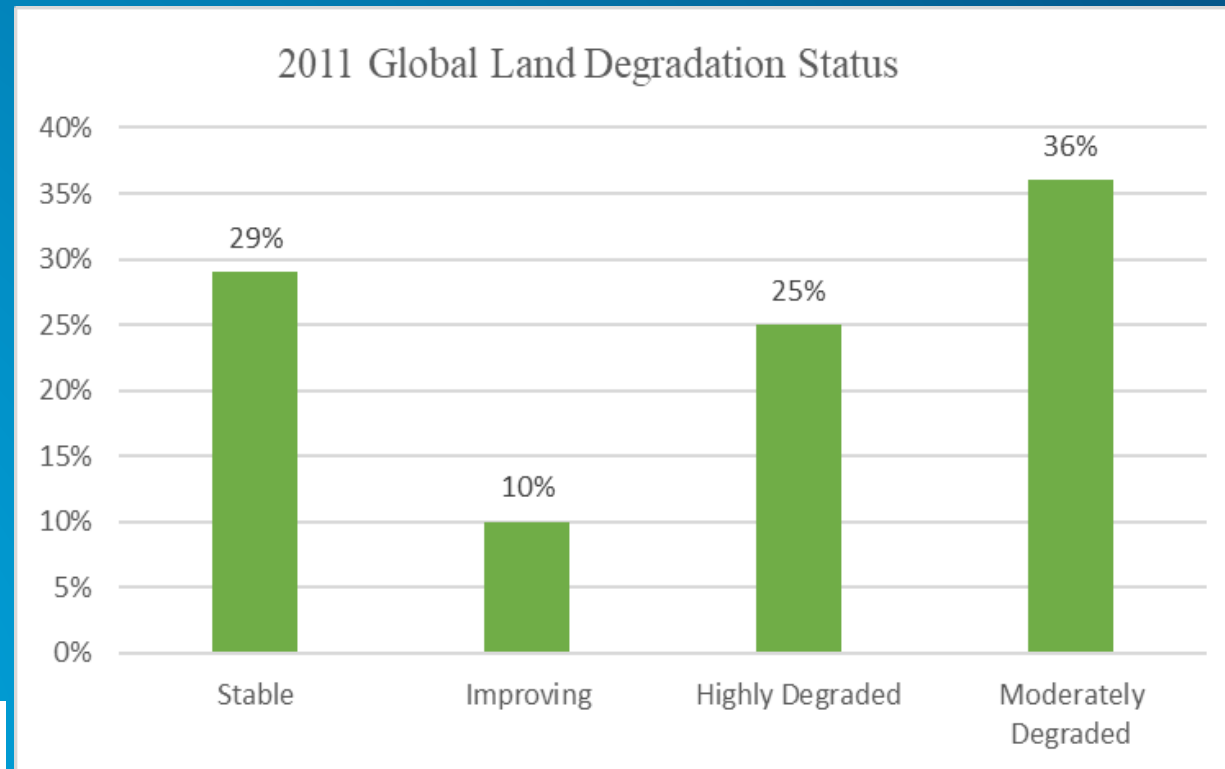
- Geoid Technologies Limited is a reputable firm in the fields of Cadastral surveys, Topographical surveys, Geographic Information Systems(GIS), Geodetic GPS control surveys, Engineering Surveys and Asset Mapping.
- We provide diverse products in measurement solutions for engineering, surveying, GIS and mapping Industries i.e. GNSS Receivers, Total Station, Theodolites, Level Machines, Marine Echo Sounders, Drones(UAV's) ,Hand held GPS and Accessories.
- We offer maintenance, Calibration, repairs and training of surveying instruments.
- <https://www.geoidtechnologies.com/>



# Land Degradation Challenges

What is land degradation?

It is a gradual reduction or loss in the biological or economic productive capacity of the land (UNCCD, 2016).



FAO, 2011



# Causes of Land Degradation

- Population growth
- Over exploitation of the land resources
- Urbanization
- Climate change

## Cause

Increased land degradation.



## Effect

Increased Environmental Challenges.



## Result



Increased land degradation is driving species to extinction, increasing Social and political instabilities, Increasing Poverty and migration, Increasing Land use competition, Intensifying climate change.

## SDG.15.3.1 Land degradation Neutrality (LDN)

“This is a state whereby the amount and quality of land resources necessary to support ecosystem functions, services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems” (UNCCD, 2018).

LDN was adopted by the UN under SDG 15.3 with a focus on obtaining a land degradation neutral world by 2030.



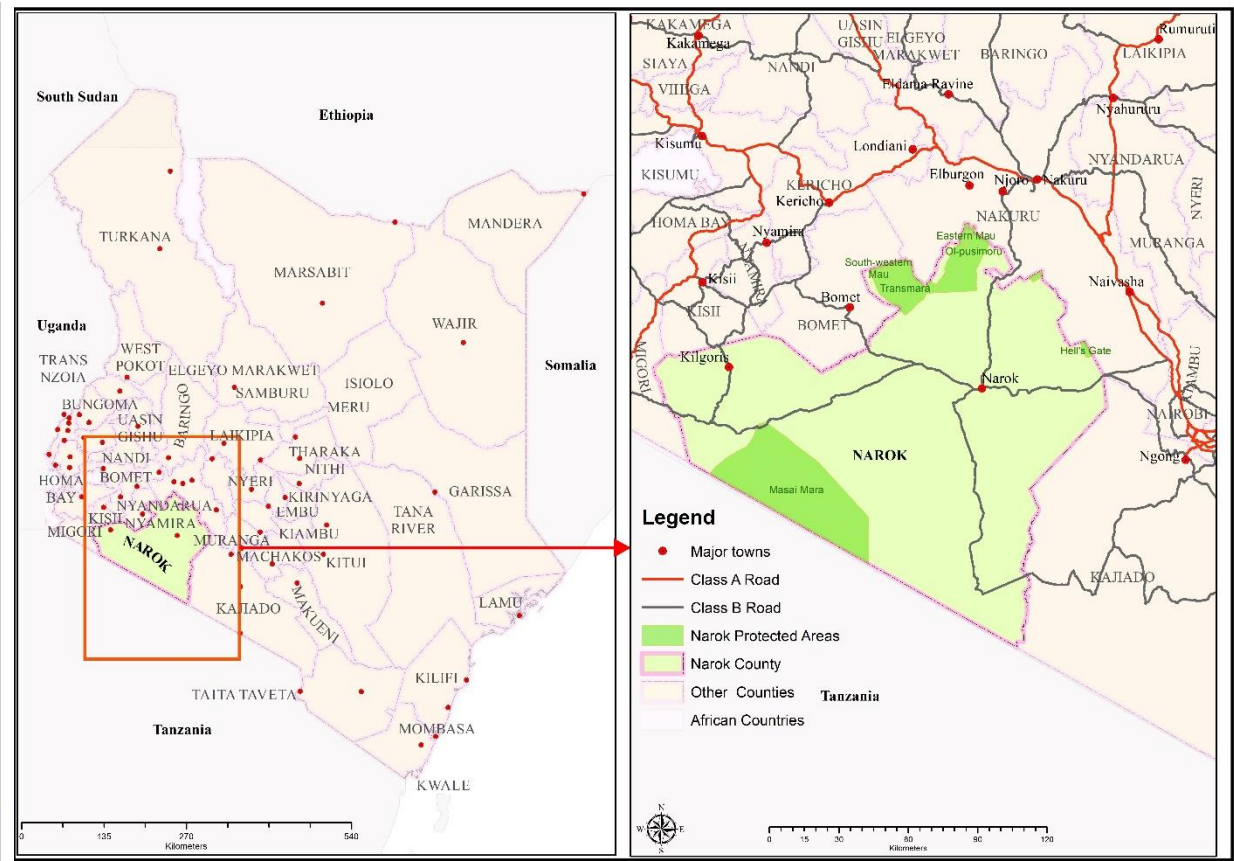
# Use of Geospatial Technologies to Monitoring LDN using

Geospatial techniques can be used to monitor LDN in order;

- To identify the degraded areas , stable areas and improving areas.
- To enable the forest managers to correctly direct the SLM practices and investments in the target areas.
- To improve the well-being of the ecosystems and biodiversity.
- To determine the progress on SDGs

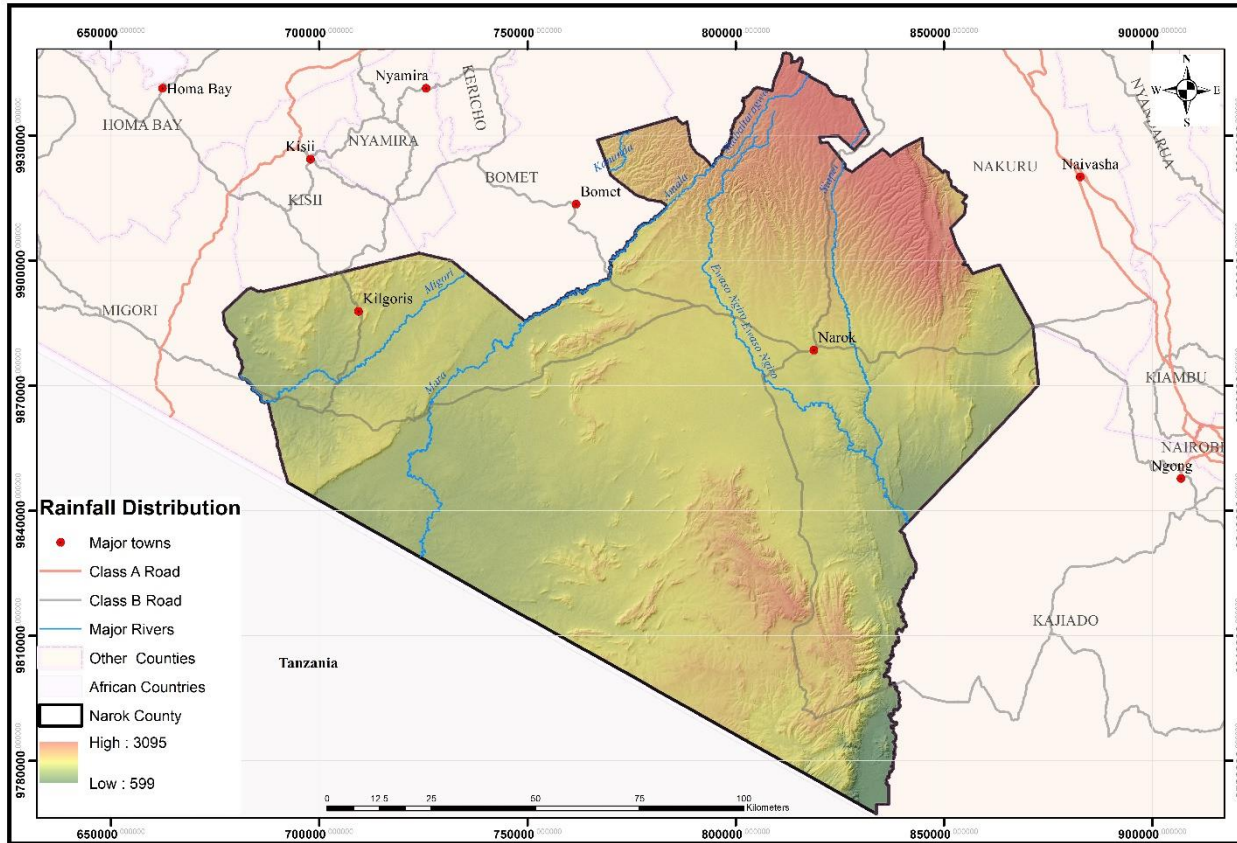


# Land Degradation Monitoring Case Study; Narok County

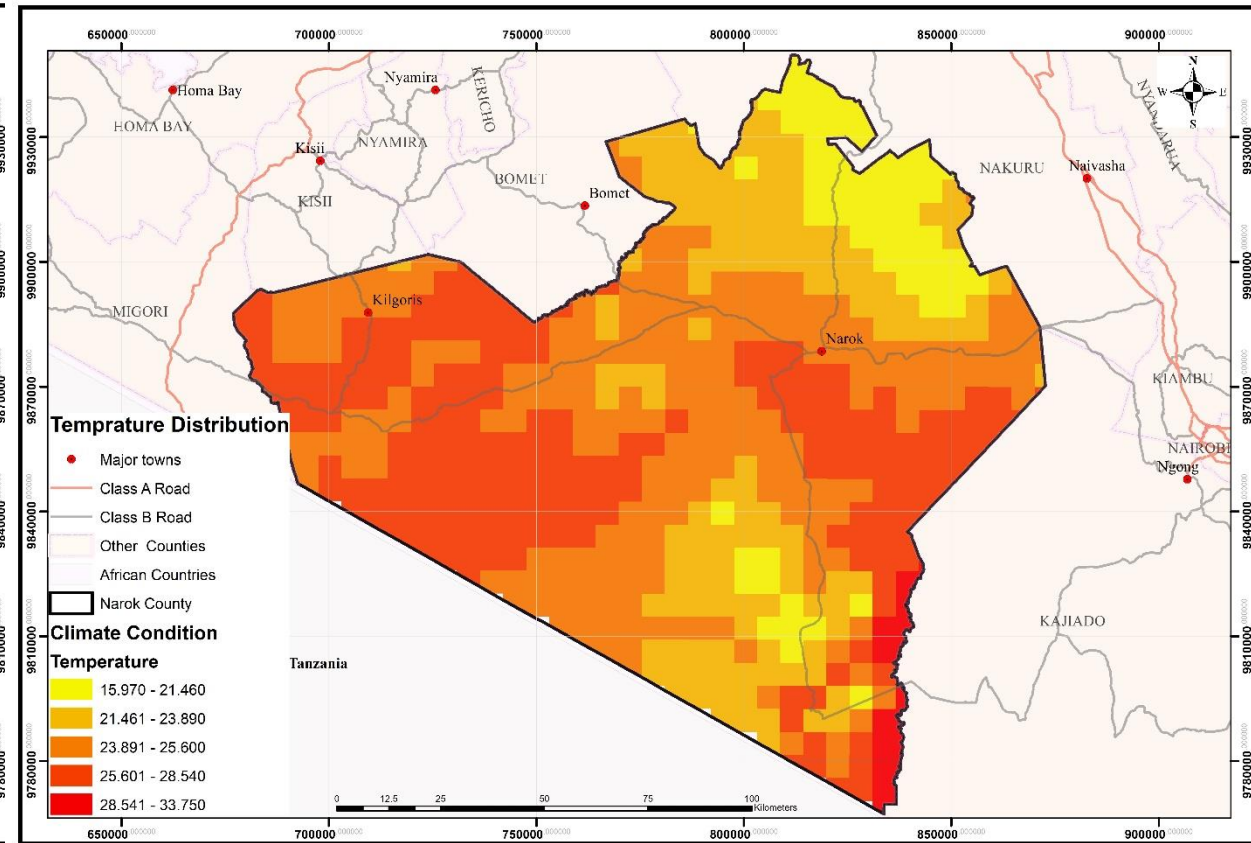


# Narok County Physiography

Topography and Drainage



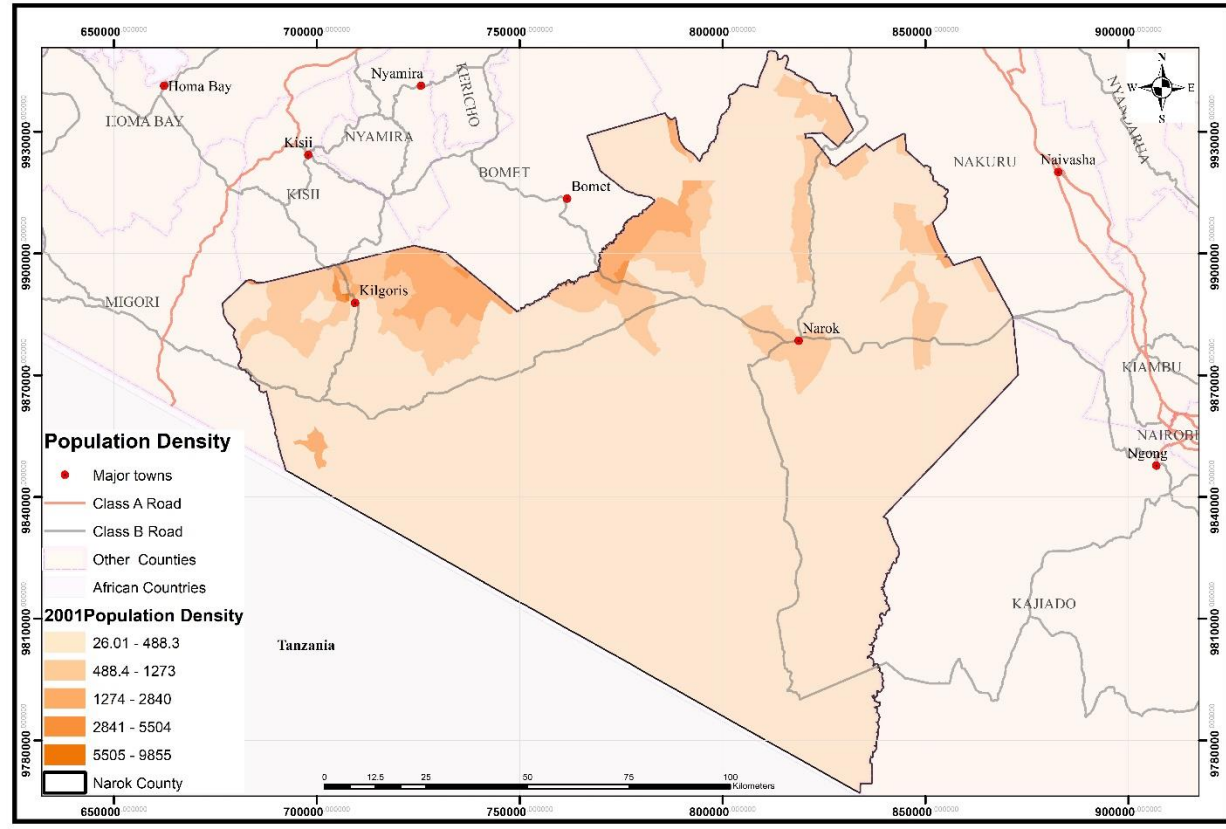
Temperature Distribution



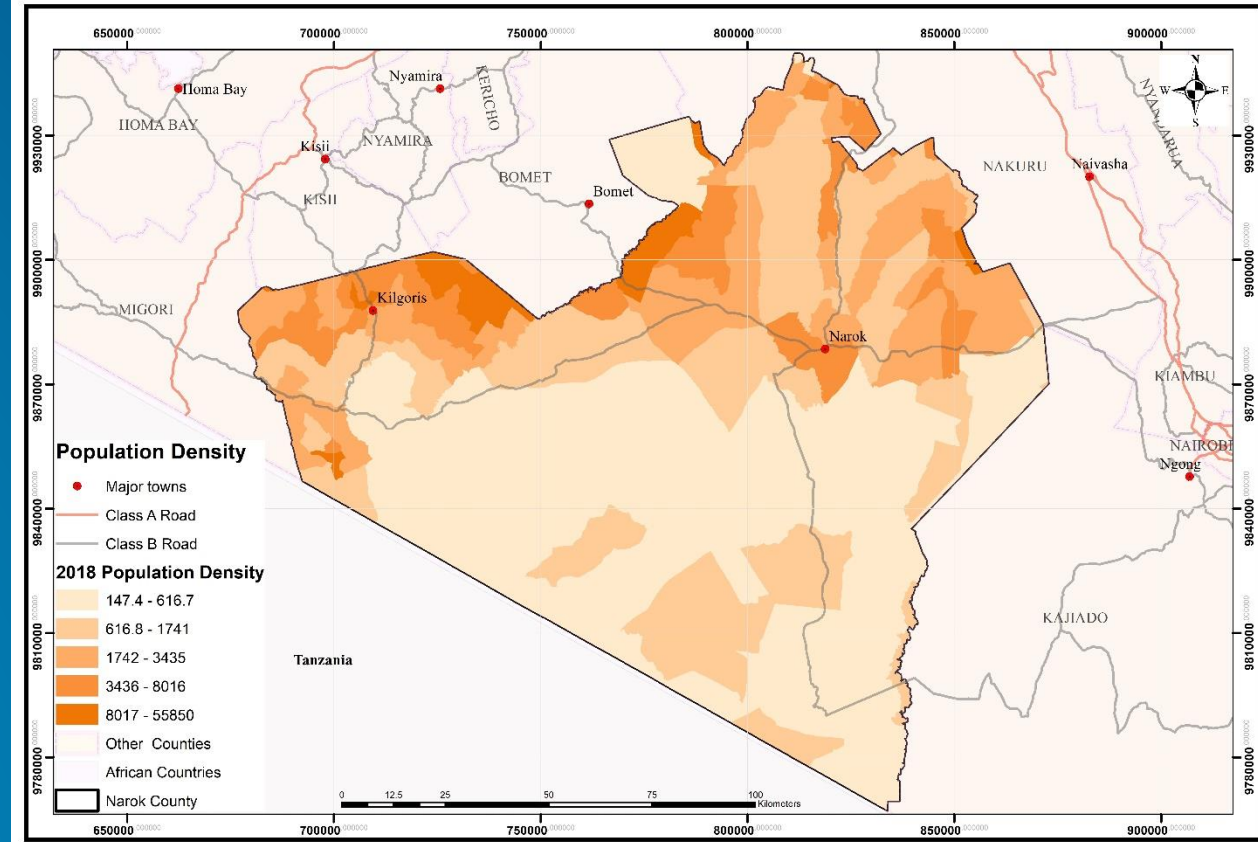


# Narok County 2001 and 2018 Population Density

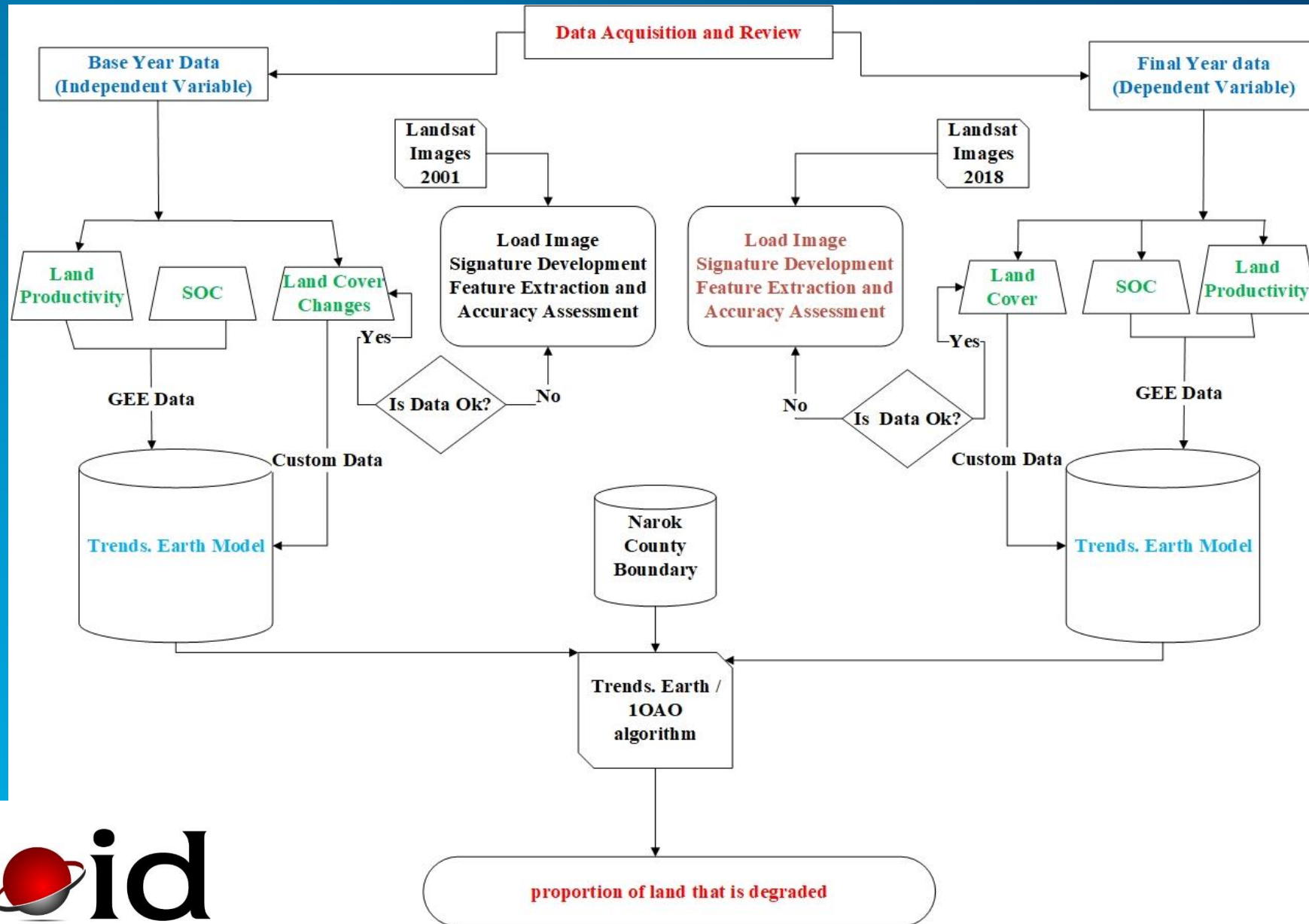
Population Density in 2001



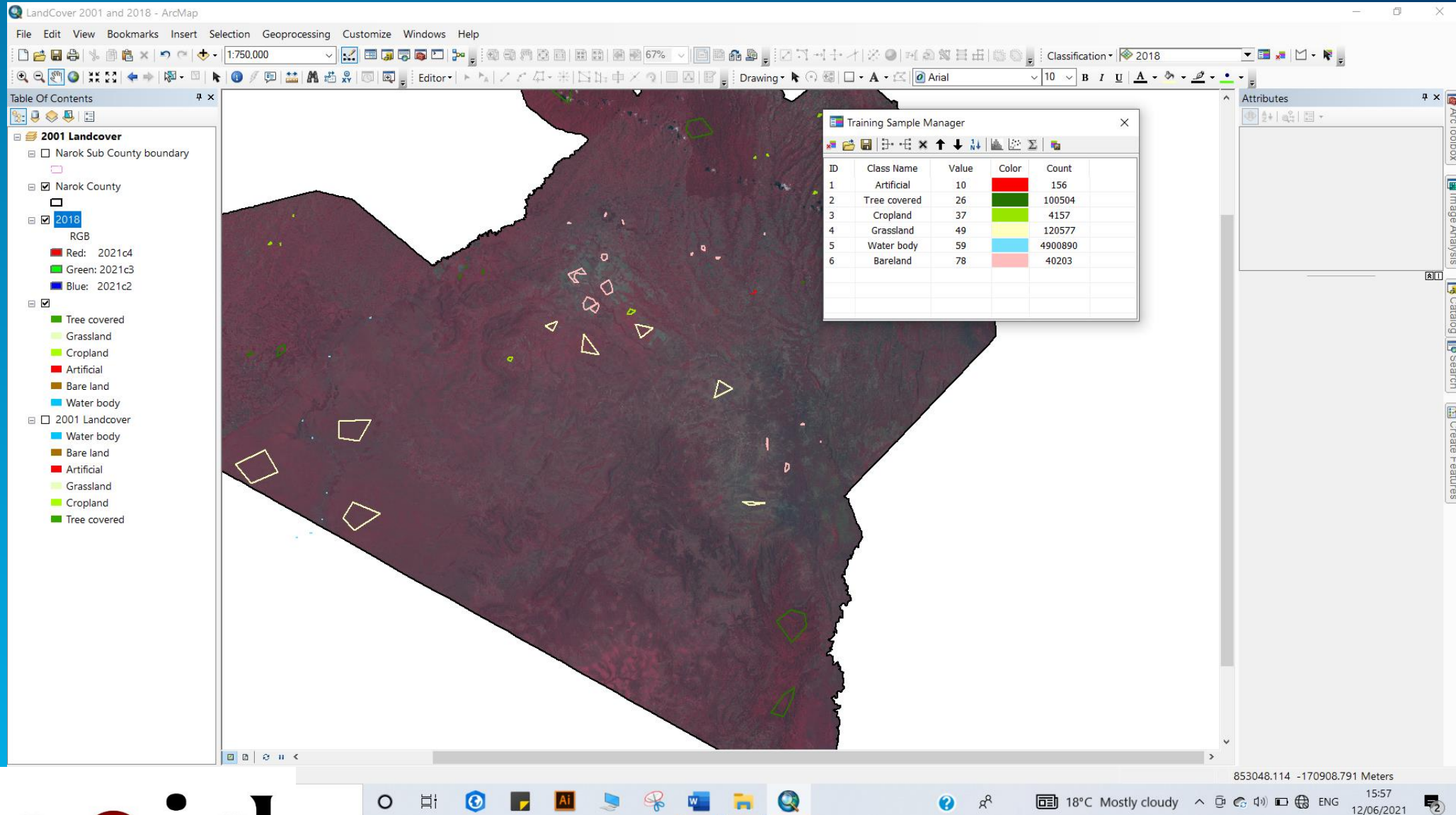
Population Density in 2018



# Methodology for Monitoring LDN

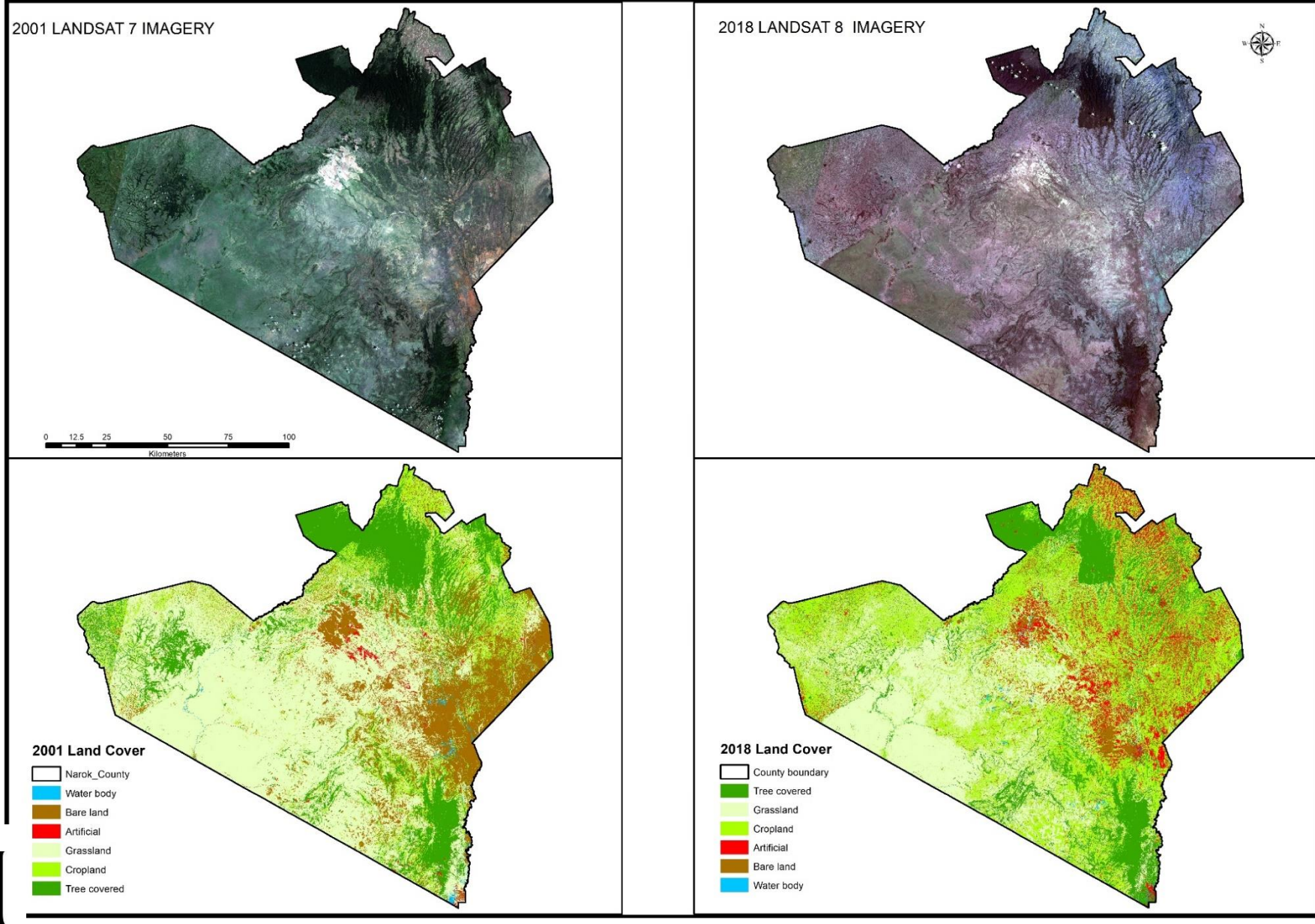


# Data Collection and Analysis

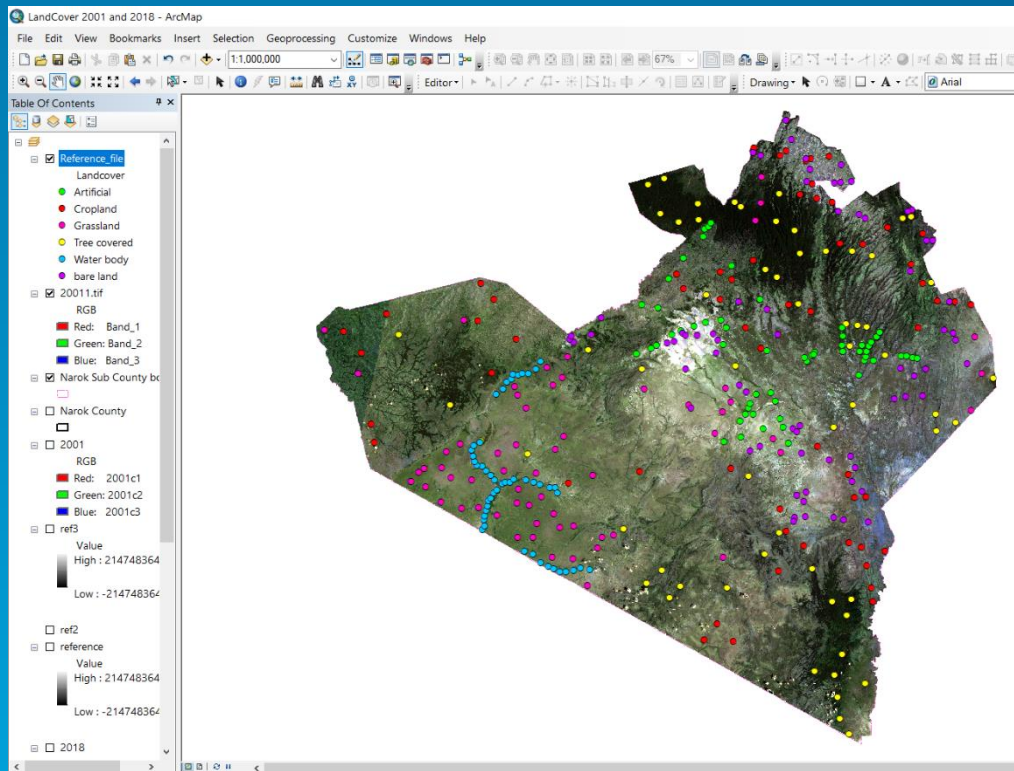




# Data Analysis Output



# Data Validation Using Drone Survey



- Risk reduction
- Better overview
- Survey of inaccessible locations
- Improved data density
- Faster data acquisition
- Lower costs



# Change in Land Cover Matrix

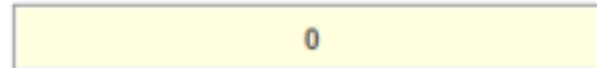
		Land cover in target year						
		Forest	Grassland*	Cropland	Wetland	Artificial area	Bare land	Water body
Land cover in baseline year	Forest	0	-	-	-	-	-	0
	Grassland*	+	0	+	-	-	-	0
	Cropland	+	-	0	-	-	-	0
	Wetland	-	-	-	0	-	-	0
	Artificial area	+	+	+	+	0	+	0
	Bare land	+	+	+	+	-	0	0
	Water body	0	0	0	0	0	0	0

## Legend

Degradation



Stable



Improvement



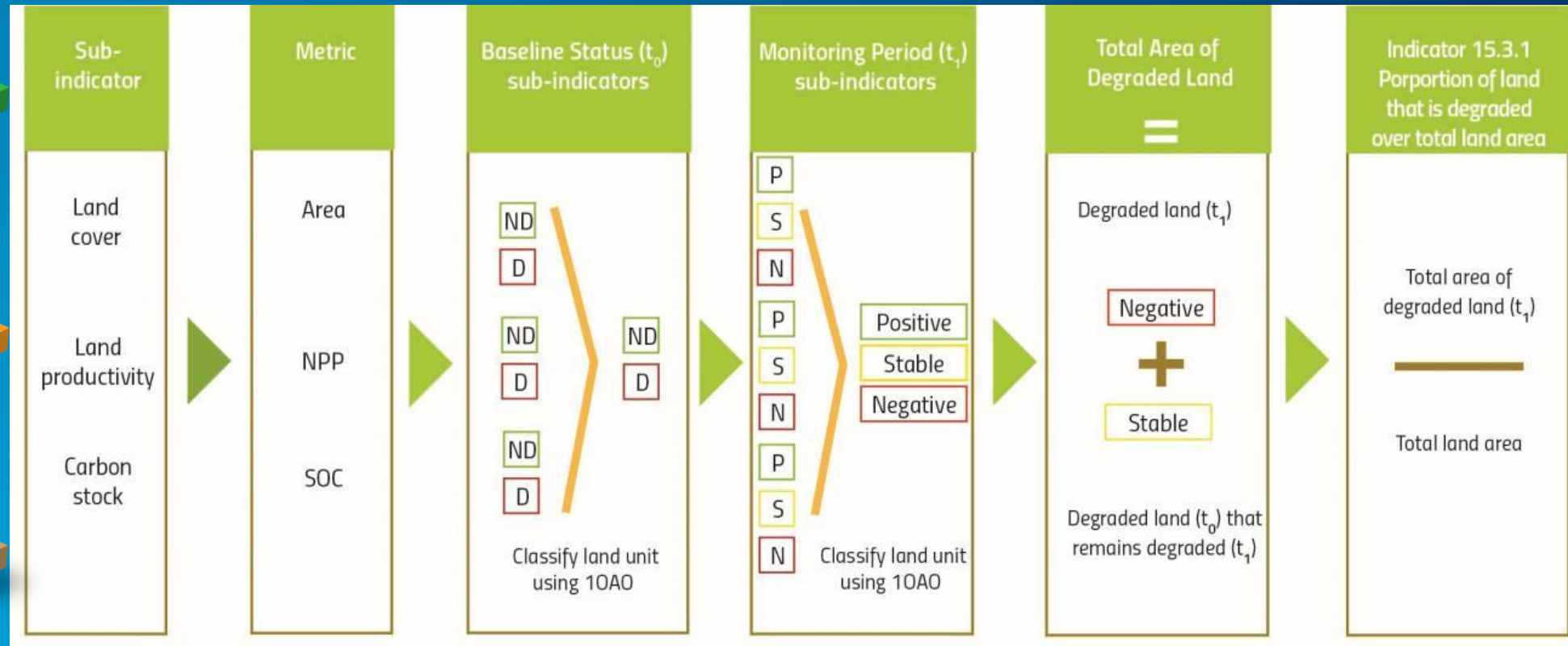
\*The "Grassland" class consists of grassland, shrub, and sparsely vegetated areas (if the default aggregation is used).

# Land Degradation Indicators Overlay Analysis

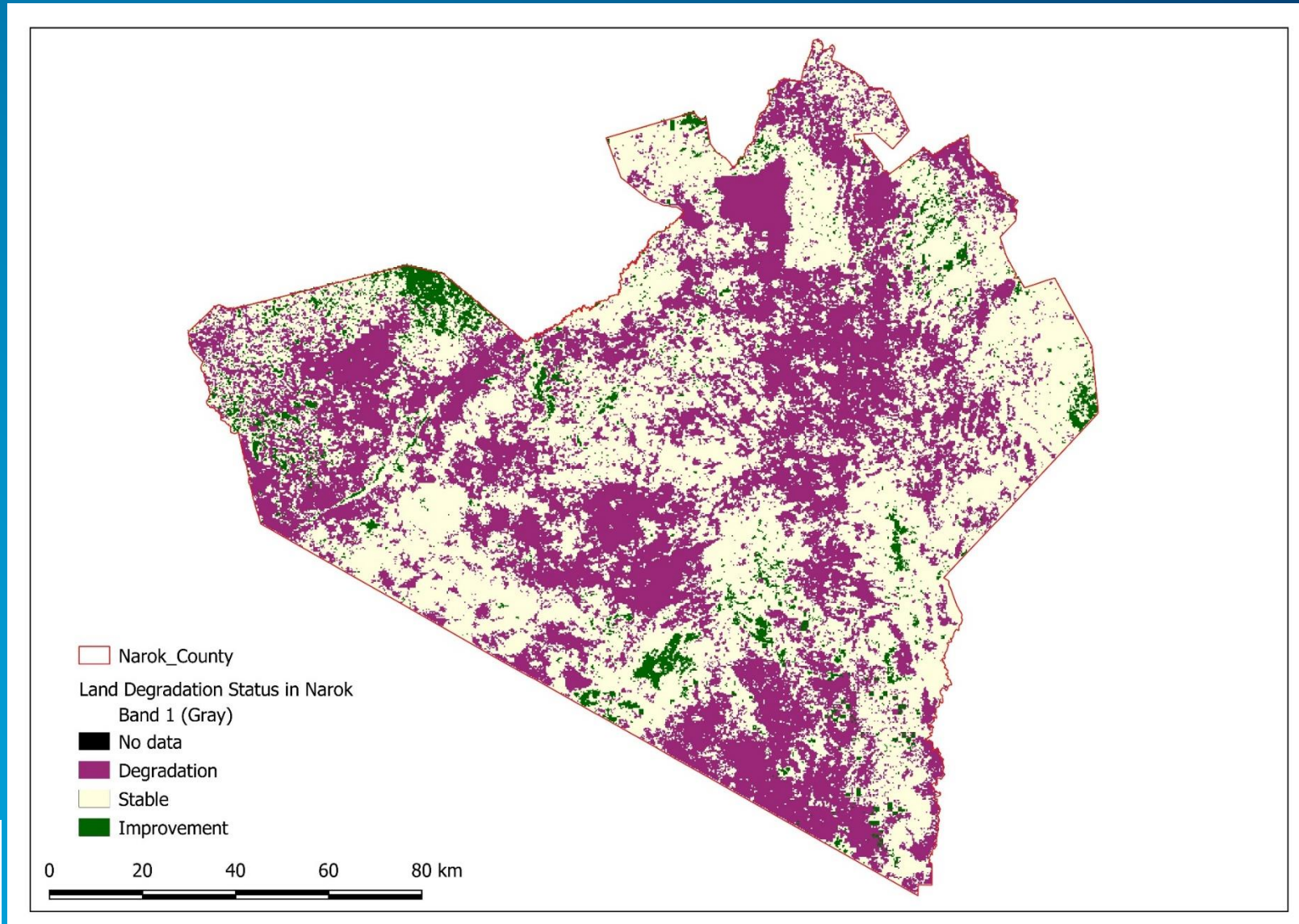
Change  
in Land  
Cover

Change  
in Land  
Productiv  
ity

Change  
in SOC

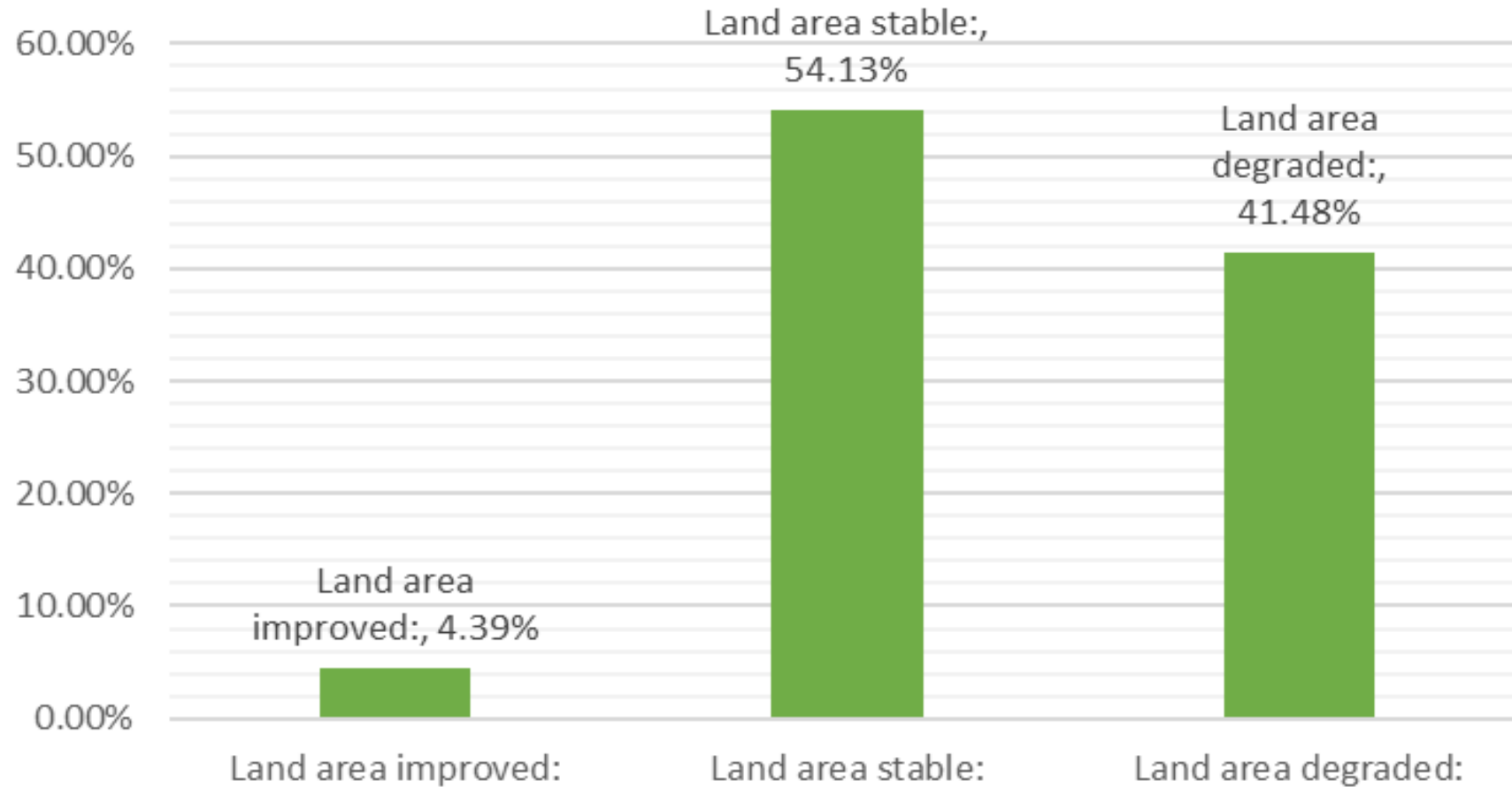


# Proportion of Land in Narok County that is Degraded





## Proportion of Land that is degraded in Narok County



**Thank you**