A Presentation on

Web-Based Geospatial Information System to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

Presented by:
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Date:
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WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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In 1-2 sentences, describe the authors of the report. You may include their years of service with the organization and the degree of their involvement in the report.

WebGIS to Access
Land Suitability for
Arable Crop Farming
in Ekiti State, Nigeria

Date:
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Part 1:

Introduction

WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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How it relates with the 17 Sustainable Development Goals

WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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Aim & Objectives

The aim is to design, and develop a web-based application for accessing land suitability and capability for cassava, maize and yam in Ekiti State, Nigeria

01

to acquire variables that affect arable crop farming

02

to develop a web-based system that can convey information on Land Suitability for arable crop farming to farmers

Impact

Impact # 1

Provide land suitability for arable crop farming information to **farmers** (large and small scale) is important.

Impact # 2

Making the data available to **prospective** farmers with little or no knowledge on agriculture is as well necessary.

Impact # 3

Accessibility, **Interoperability** and **Scalability** are key advantages of web-based systems.

Part 2:

Methods

WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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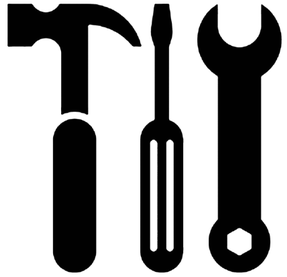
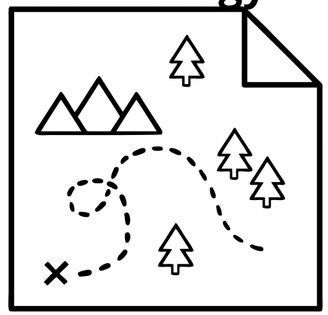
Methods

Suitability Determination



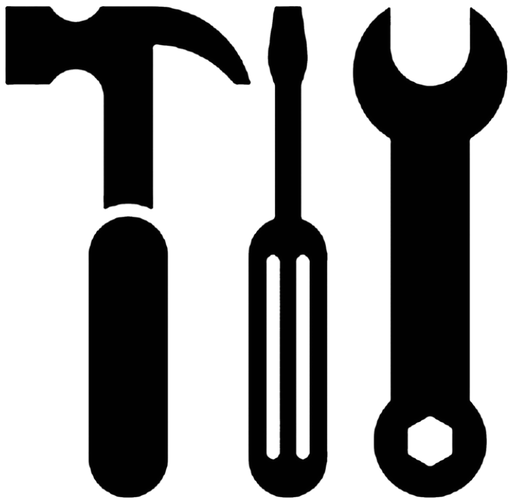
Crop Growth Requirements

Web-based GIS Technology

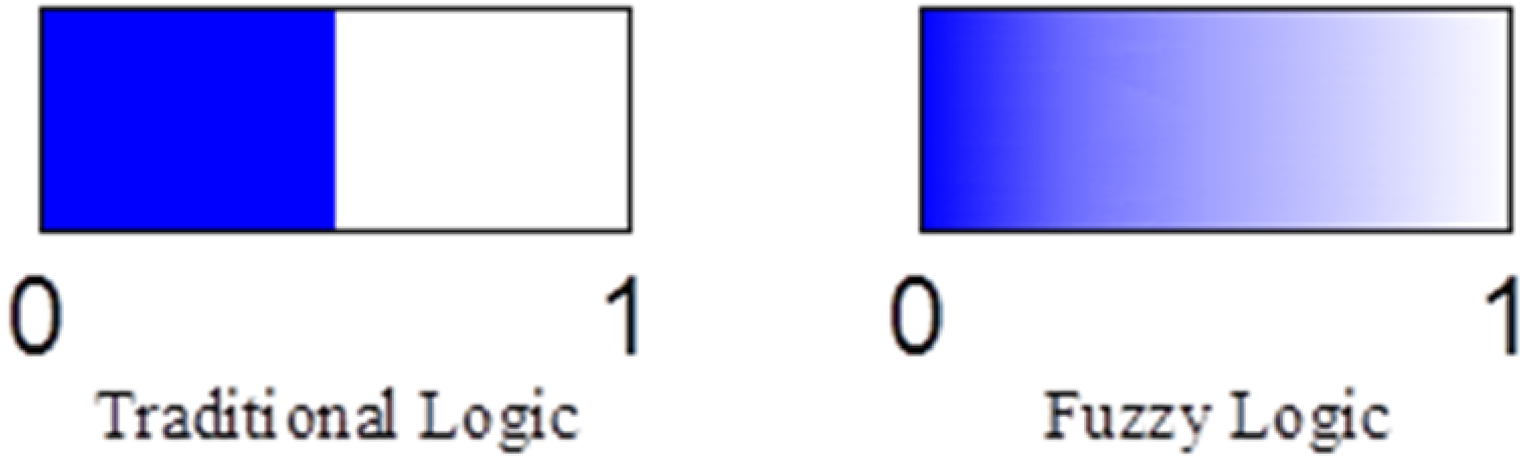


Developing the Web-Based Geospatial Information System to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria was based on the above factors

Suitability Determination



- **Fuzzy logic**
- Analytical Hierarchy Process
- Multi Criteria Decision Analysis
- Simple Limitation Method (SLM) and Parametric Method – Storie and Square root Methods
- Genetic Algorithm (GM)



WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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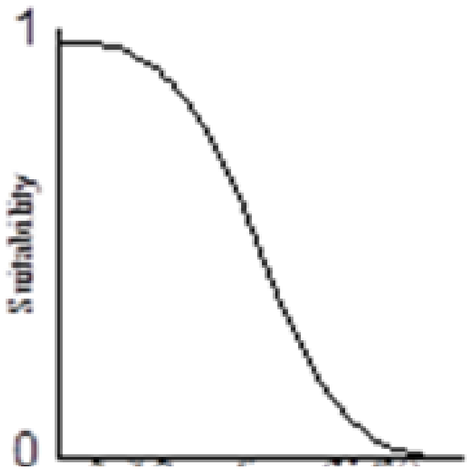
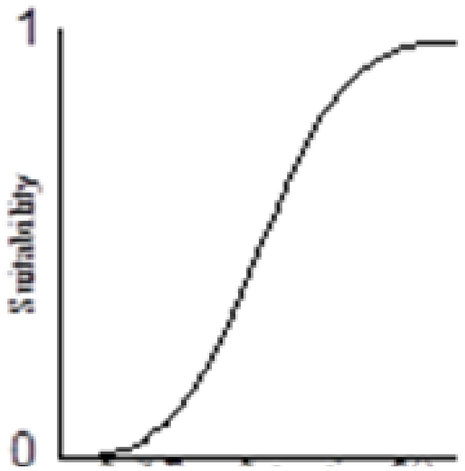
Crop Growth Requirements

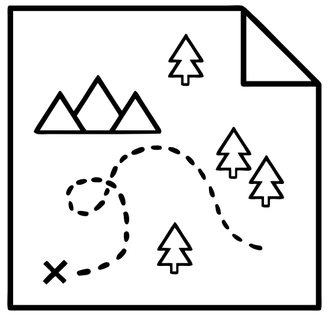
Precipitation
Temperature
USDA Soil Textural Class
Soil pH



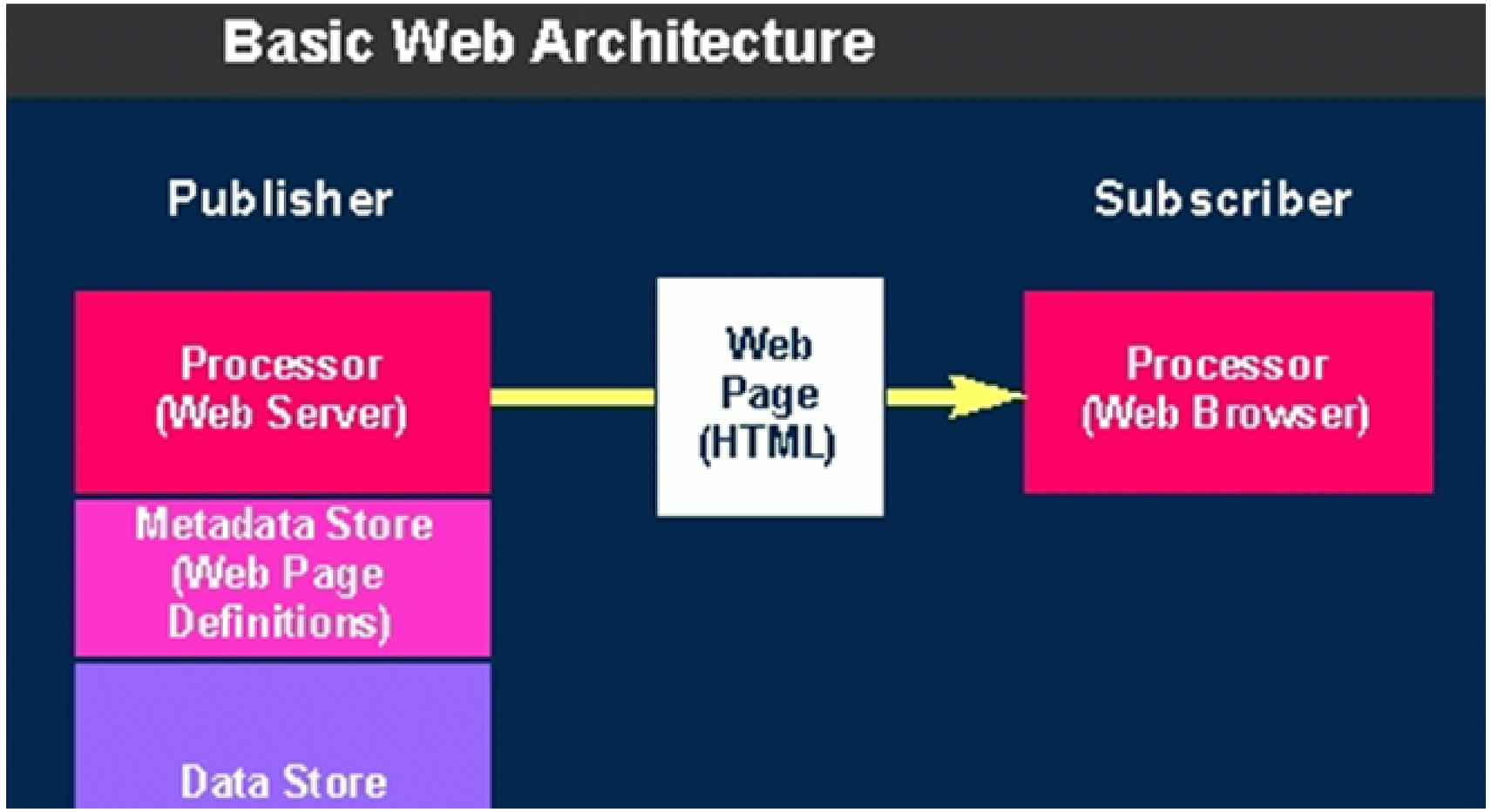
Slope

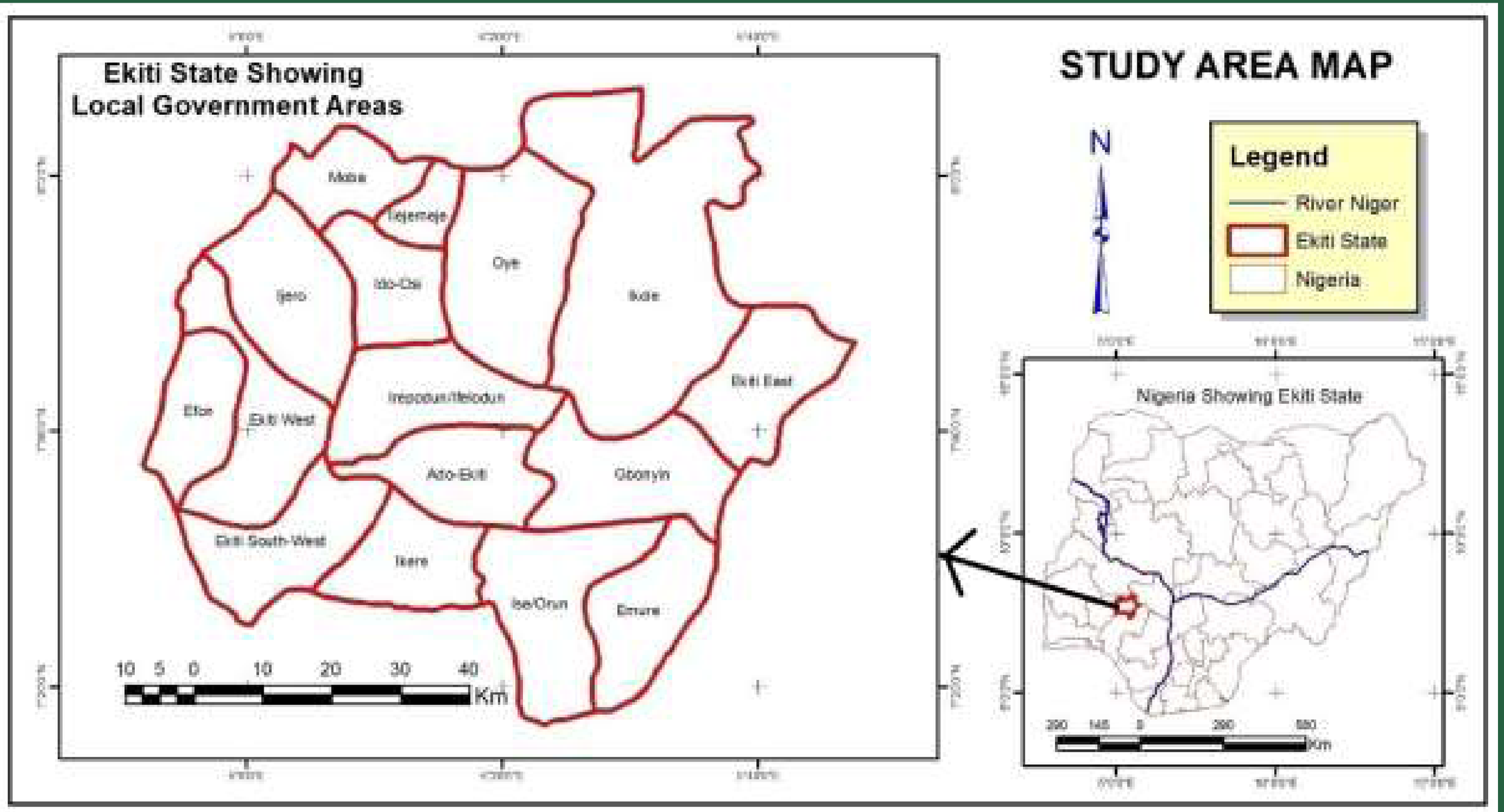


Soil Organic Carbon Content



Web-based Information Systems




STUDY AREA MAP
Ekiti State Showing
Local Government Areas
Moba
Irepodun/Ifelodun
Ido-Osi
Oye
Ikole
Ijero
Ekiti East
Ekiti West
Emure
Ado-Ekiti
Gbonyin
Ekiti South-West
Ikere
Ise/Orun
10 5 0 10 20 30 40
Km
N
Legend
River Niger
Ekiti State
Nigeria
Nigeria Showing Ekiti State
390 195 0 390 780
Km

Part 3:

Results

WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

Date:
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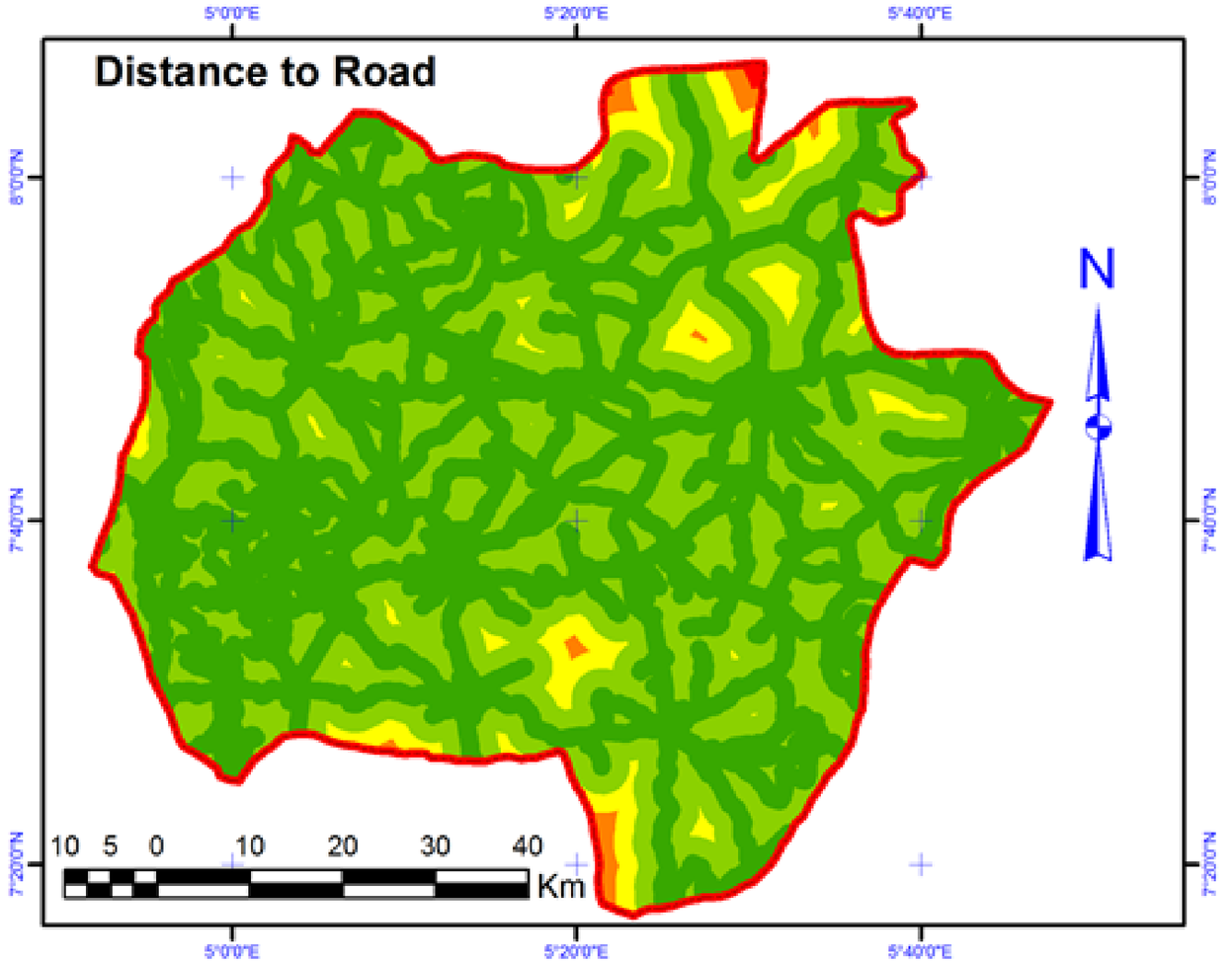
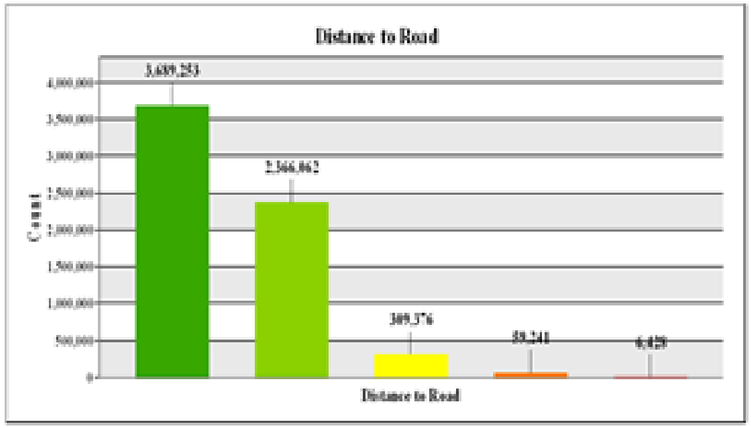
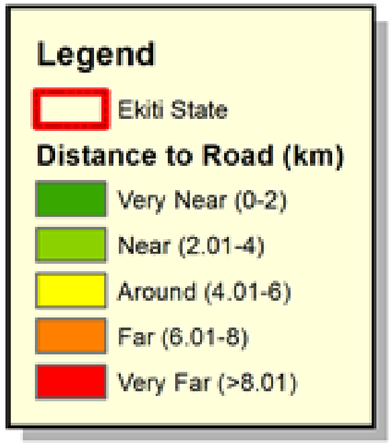
Distance to road

- 57% of the area lie very close to a road.
- 94% of the area is at least 4km from a Road







WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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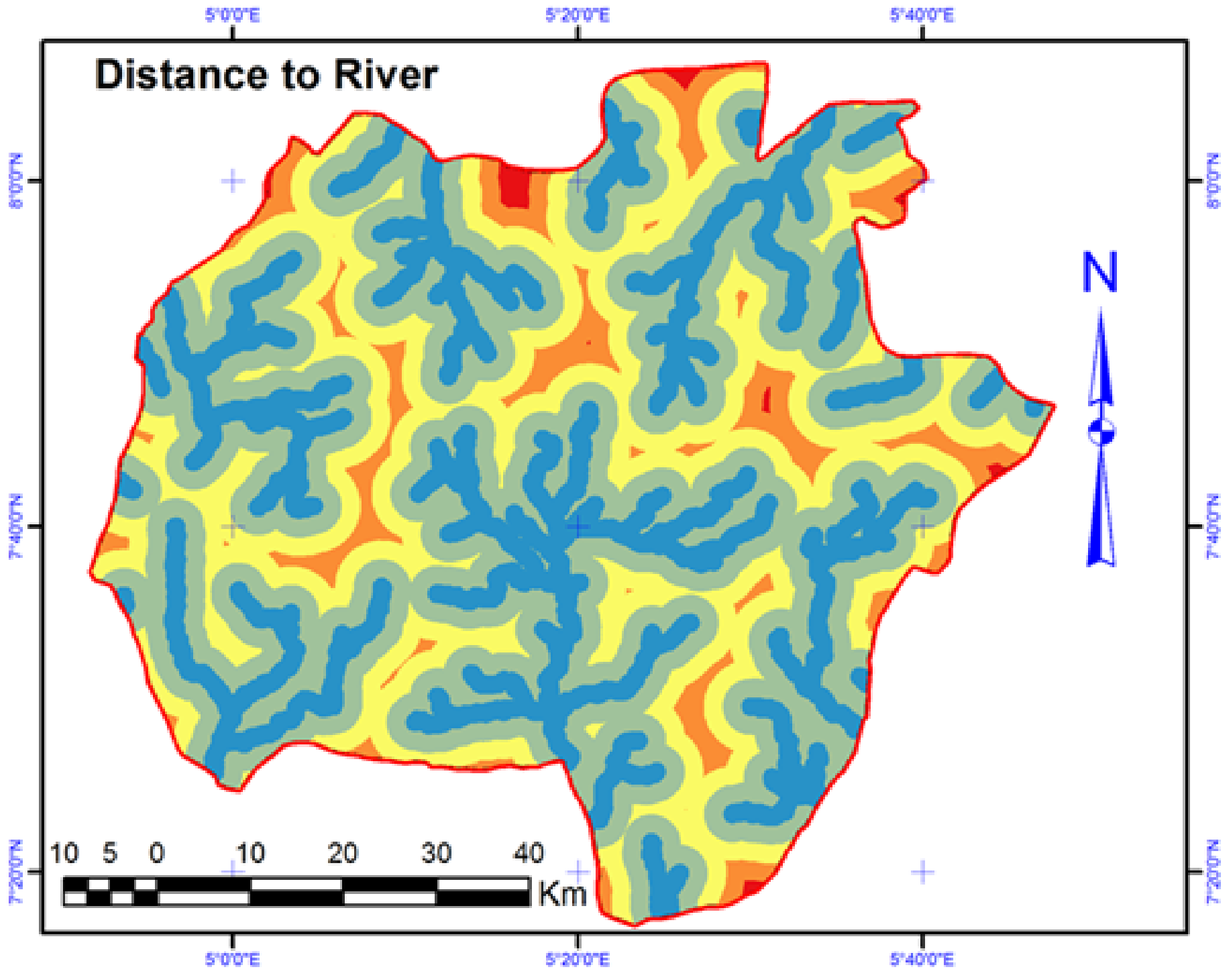
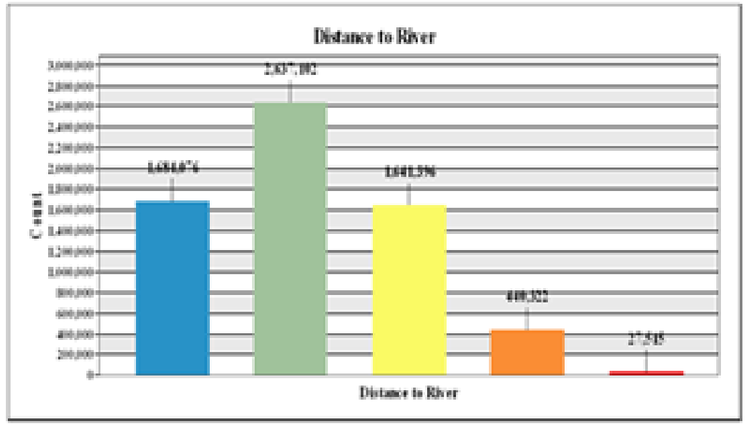
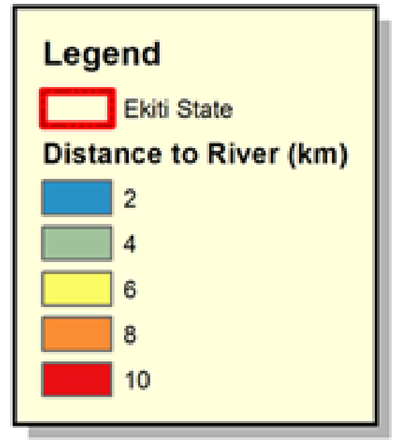
Distance to river

67% & 26%of the area falls within 4km and 2km radius of a water body.







WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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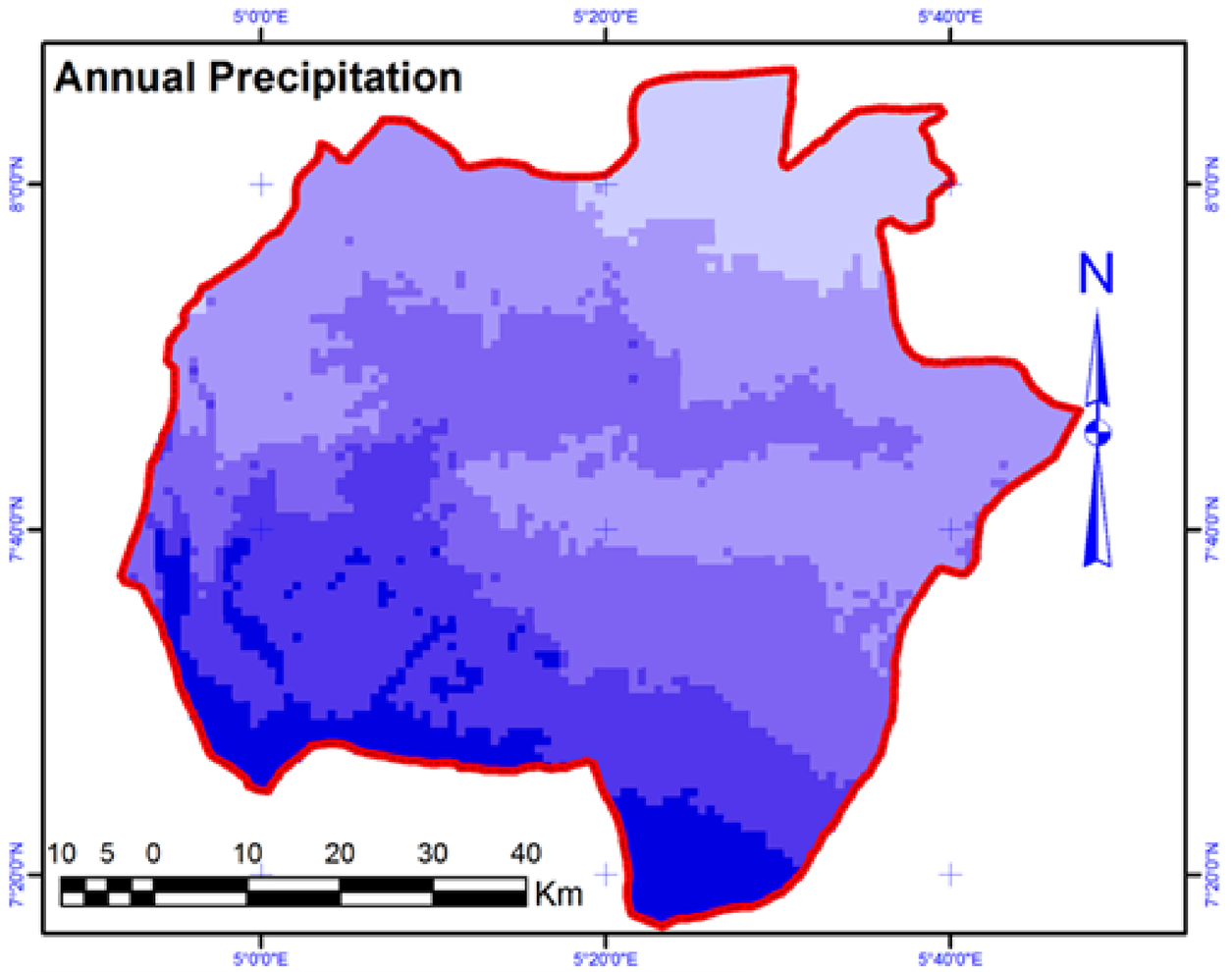
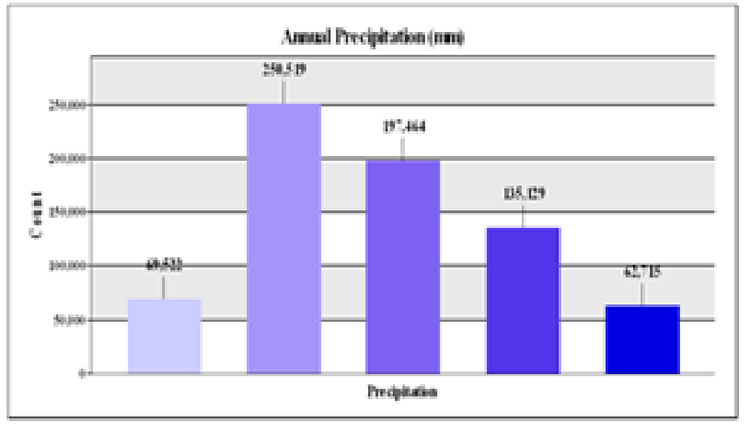
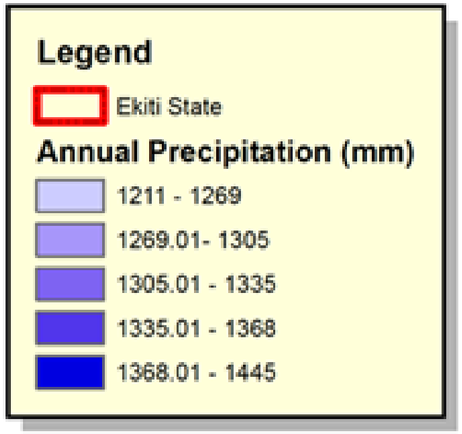
Annual Precipitation

Annual precipitation varies between 1211mm and 1445mm in the state.







WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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Annual Mean Temperature

- Annual Mean Temperature varies between 23.5 and 26.1oC within Ekiti state.
- The central part of the state is observed to be cooler, while the southern and northern parts are hotter.

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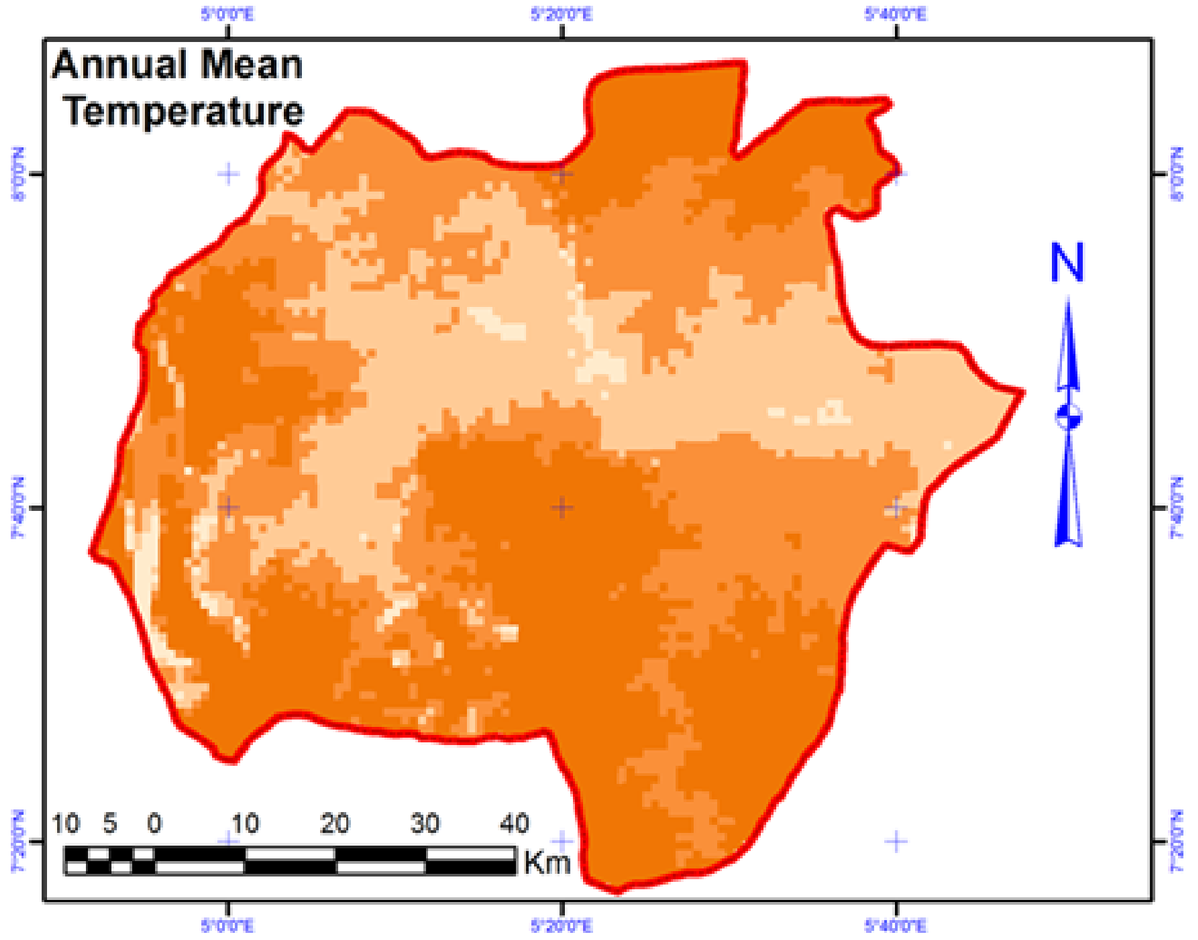

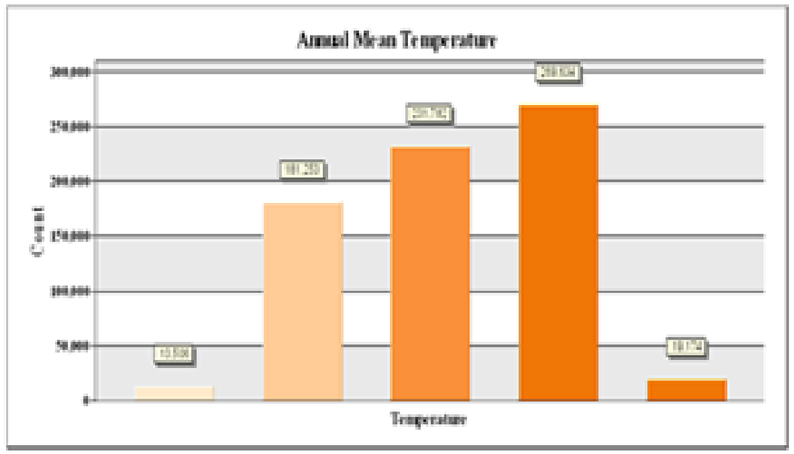

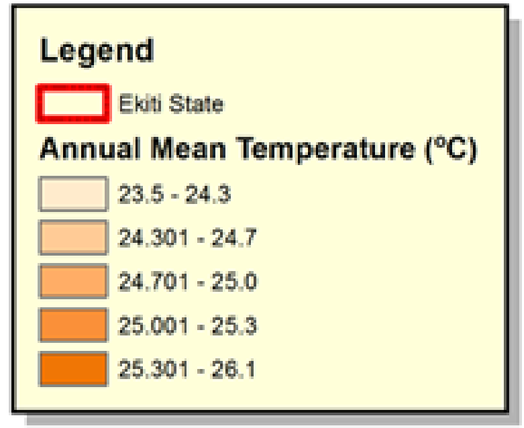

Land Use / land Cover

Land Use	Area Covered	Percentage Coverage
Light Vegetation	25606.35	39.81%
Thick Vegetation	21011.13	32.66%
Wetland	9430.92	14.66%
Rock Outcrop	4445.91	6.91%
Built-Up	2595.24	4.03%
Bare Surface	1138.86	1.77%
Water body	96.21	0.15%

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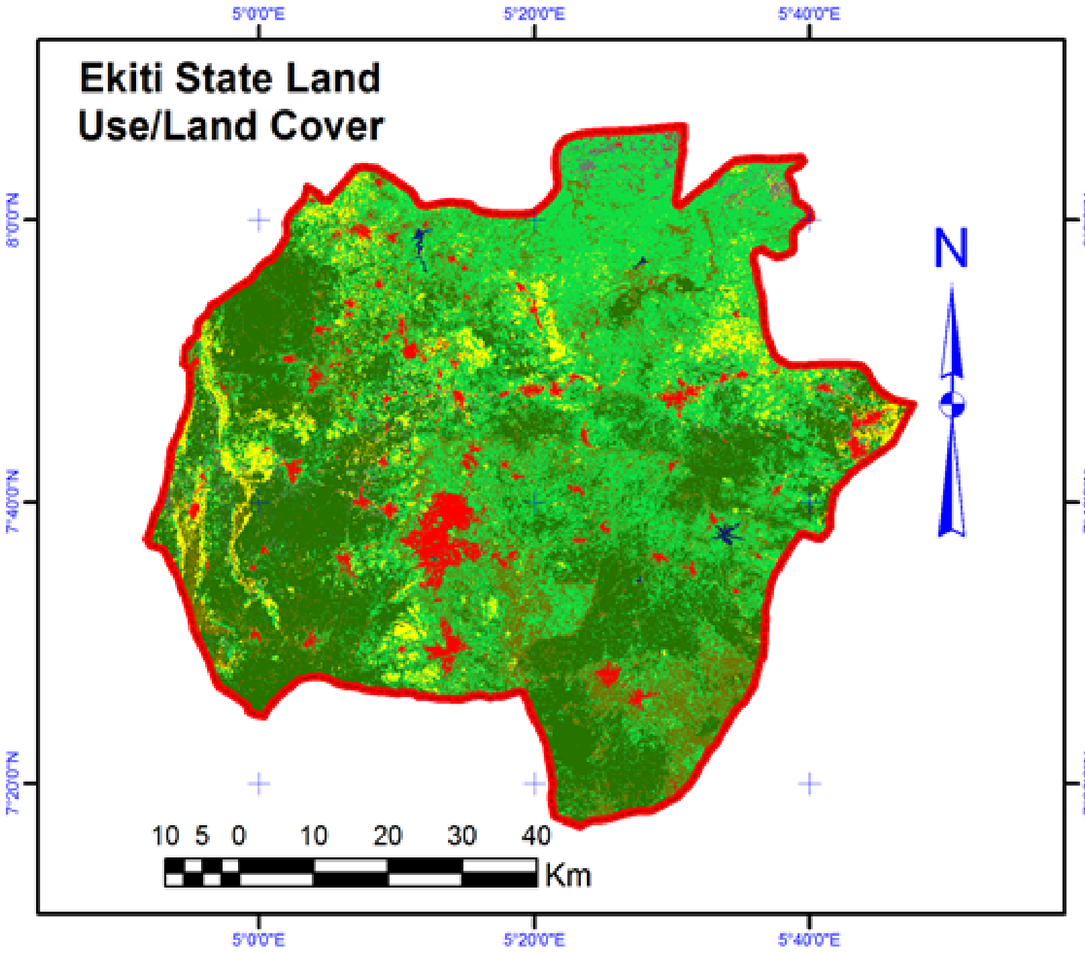
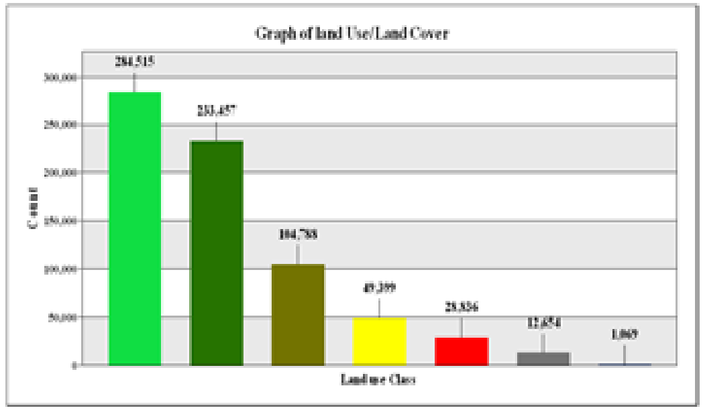
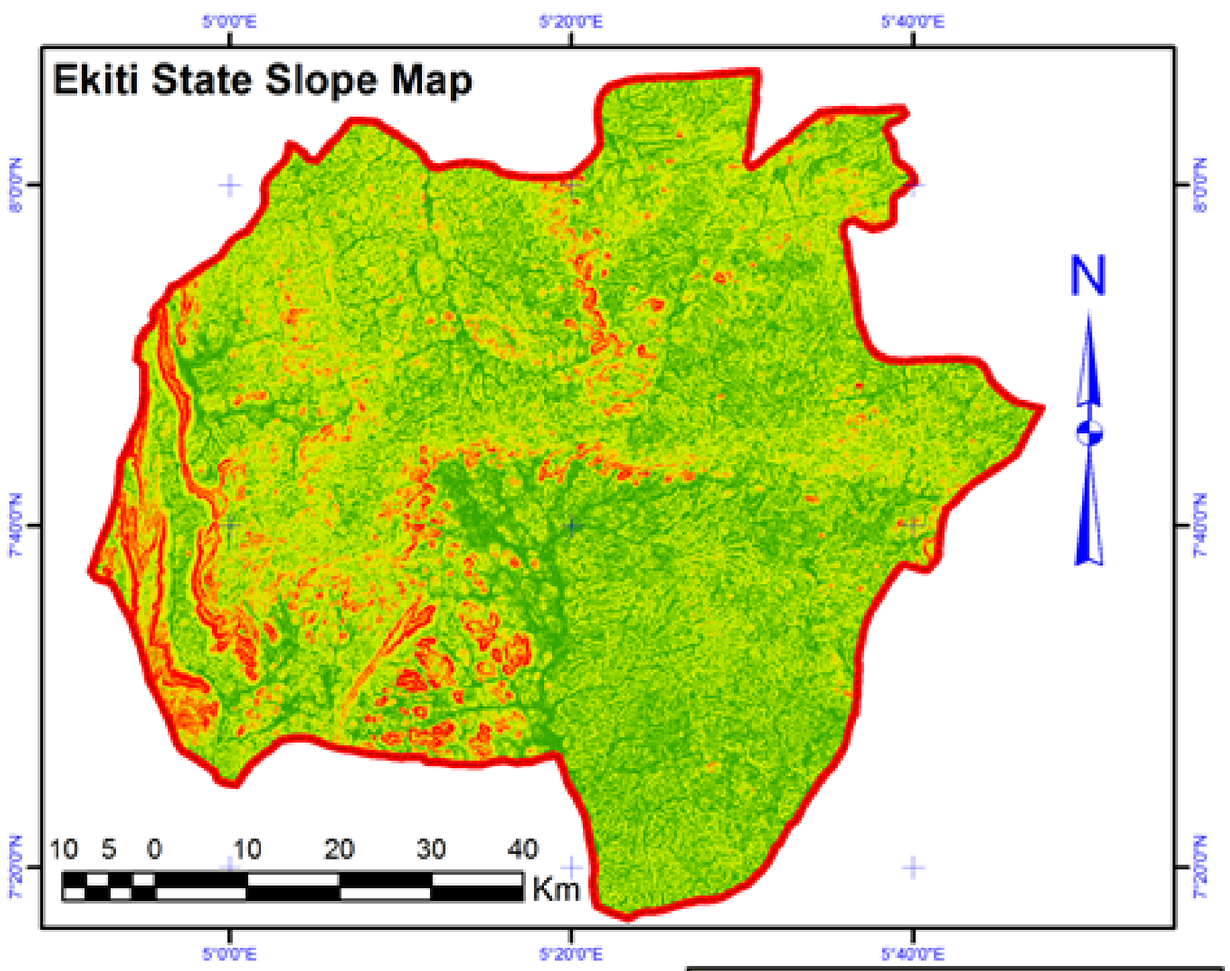
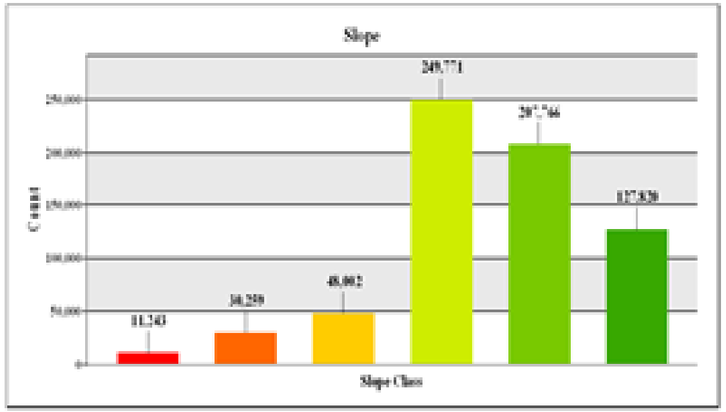
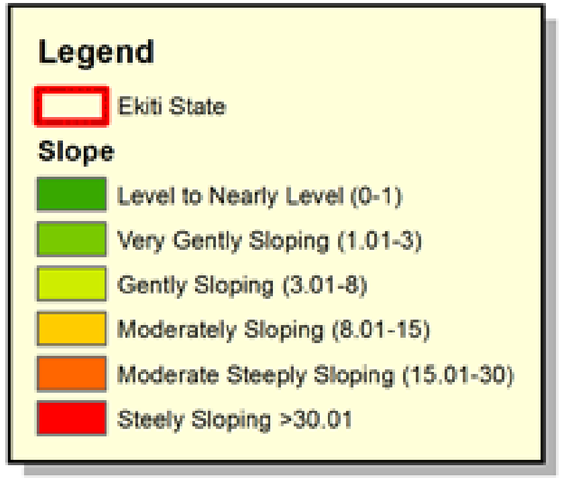




Soil Slope







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Suitability for Cassava

•65.03% of the area is highly suitable for cassava, 4.82% is moderately suitable, 18.51% is marginally suitable, 1.95% is currently not suitable, while 2.63% is permanently not suitable for cassava.
•Areas classified as steeply sloping and rock outcrop contributes largely to the non suitability of some areas.

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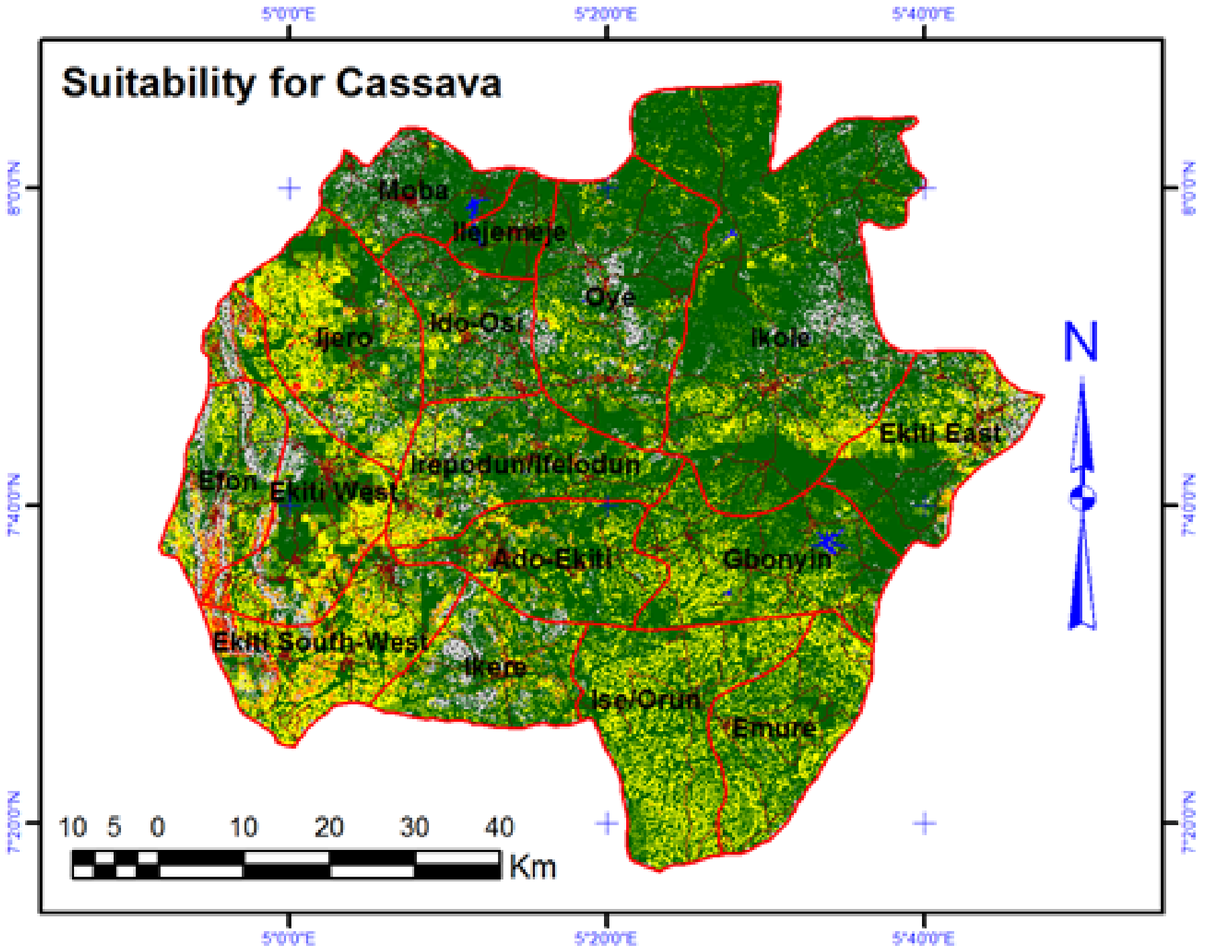

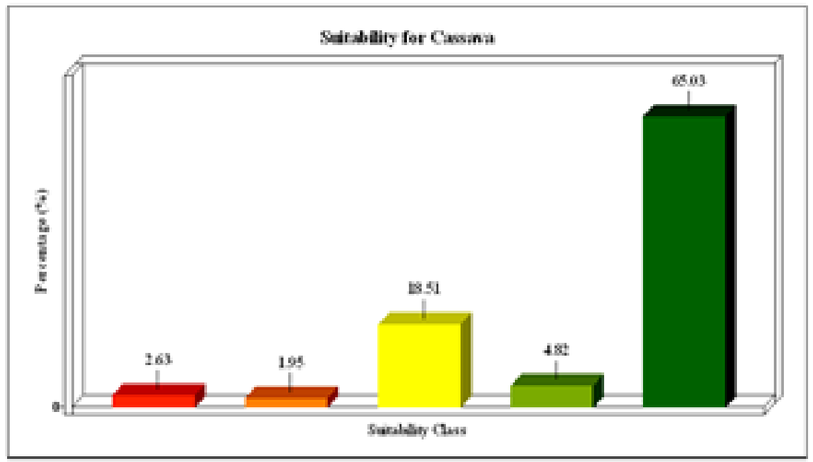

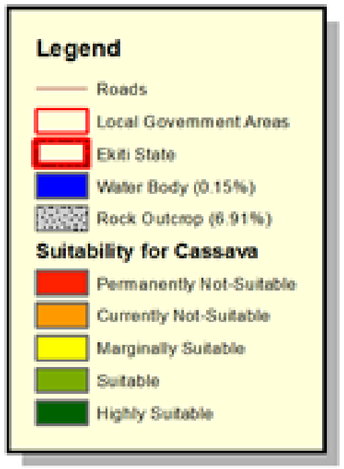

Suitability for Maize

64.64% of the area is highly suitable for maize, 24.81%, 1.1% and 1% is exclusively moderately, marginally and currently not suitable for maize, while only 1.72% is permanently not suitable for maize.

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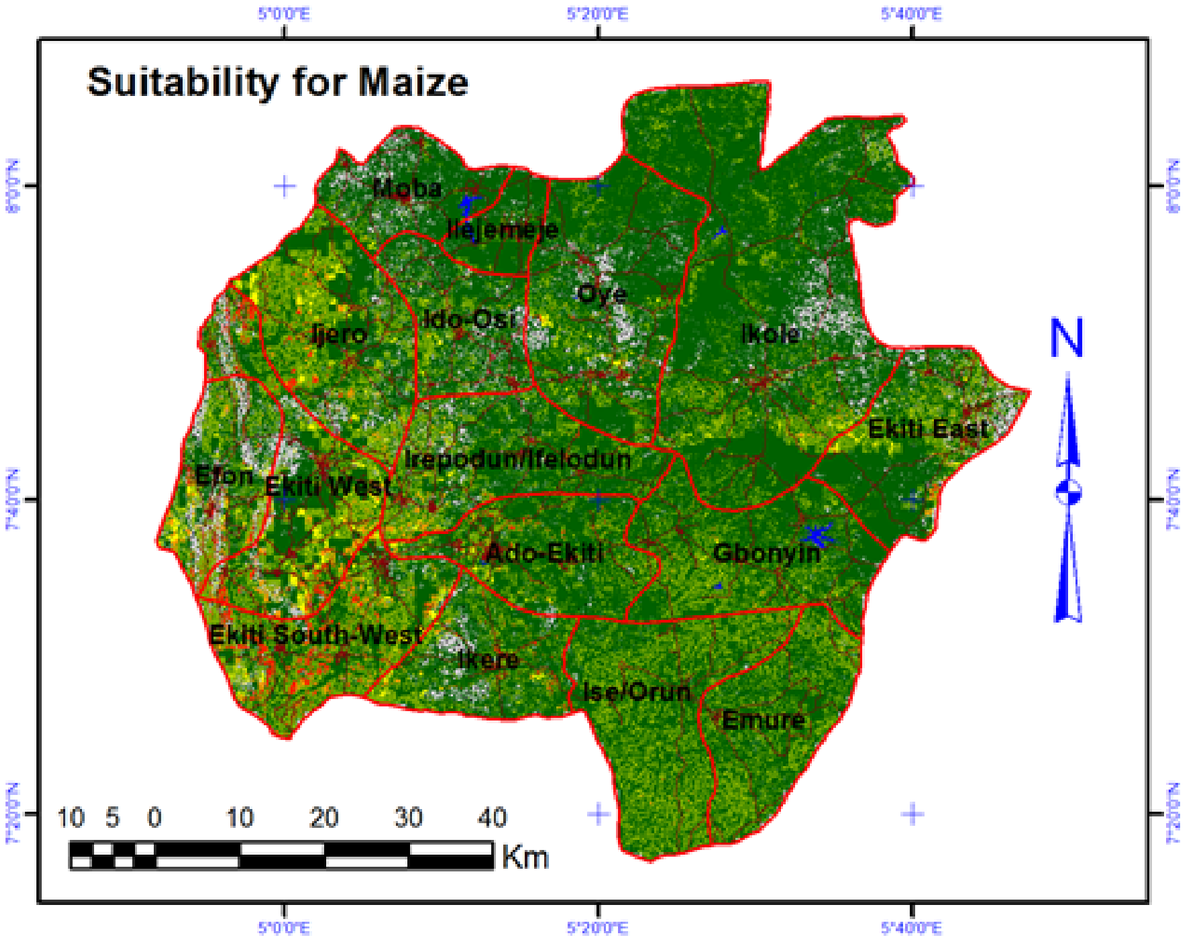

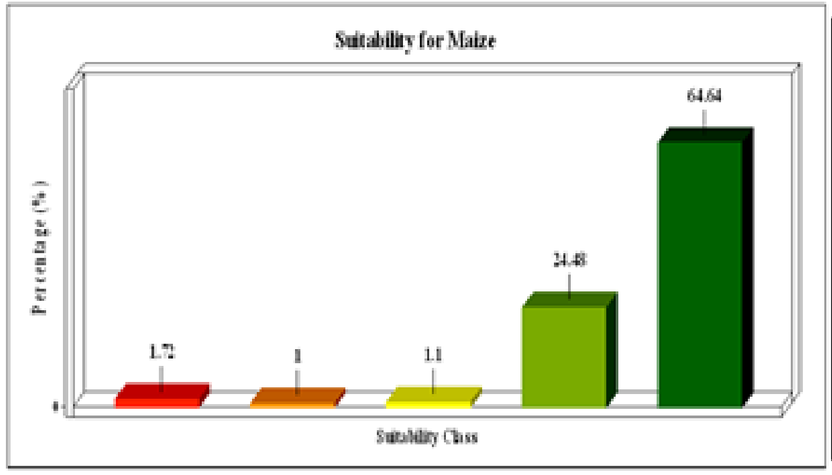

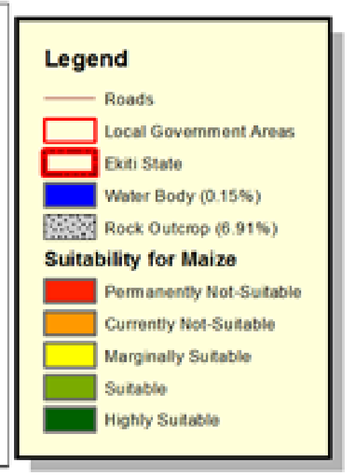

Suitability for Yam

•70.63% of the area is highly suitable for yam, 4.67% is moderately suitable, 13.9% is marginally suitable, 1.78% is currently not suitable, while 1.97% is permanently not suitable for yam.

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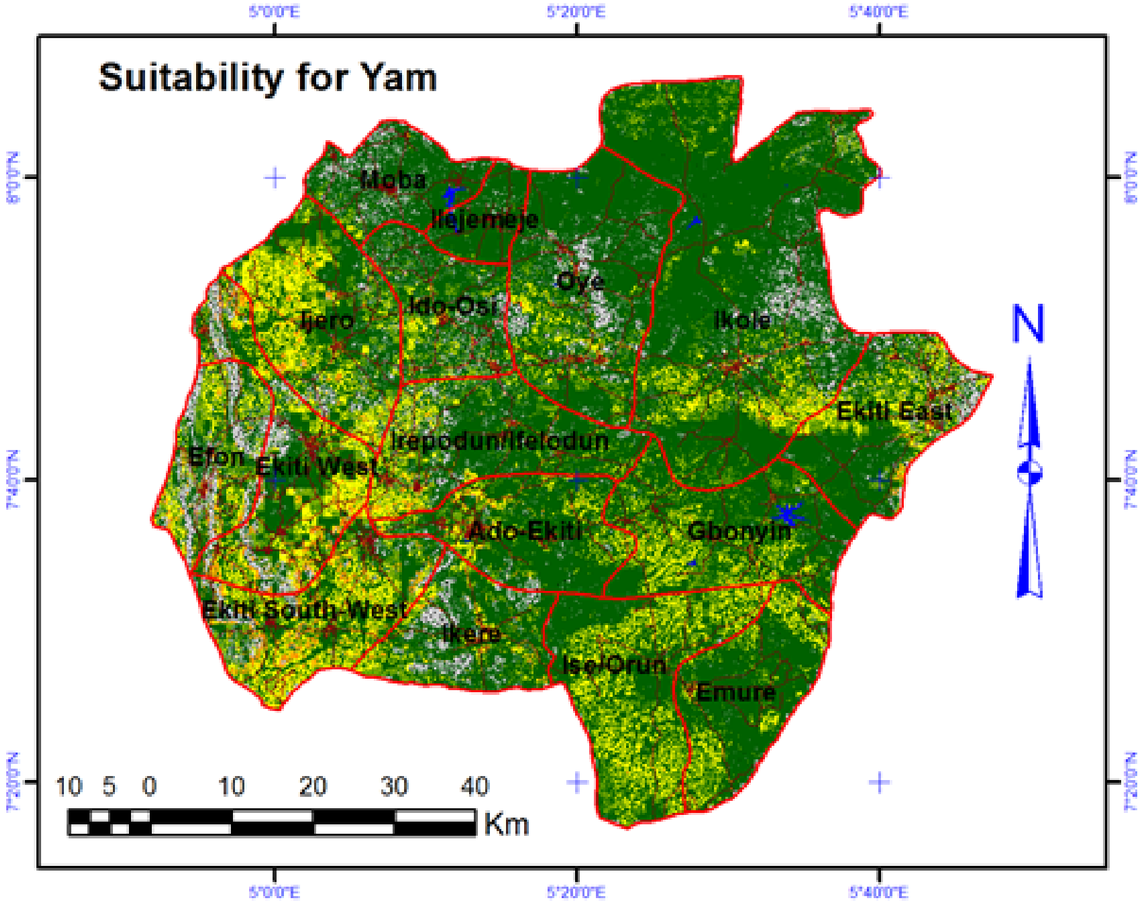
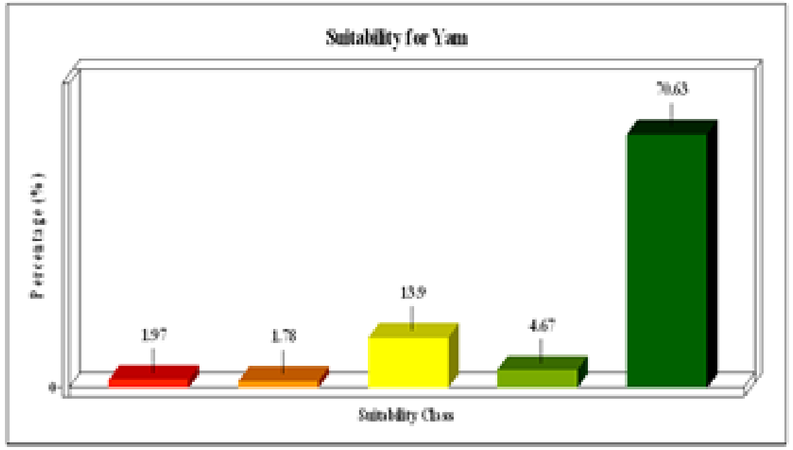
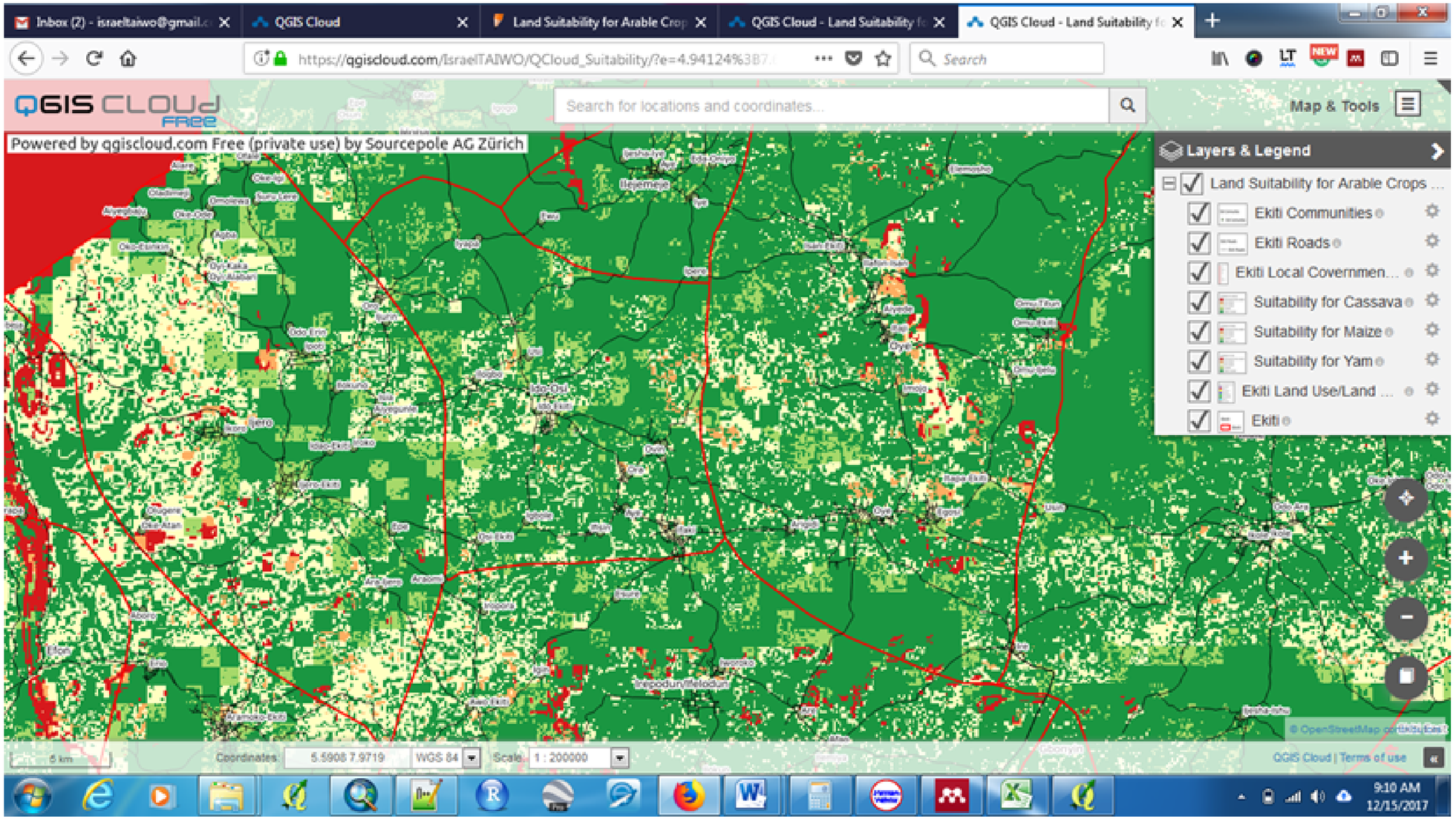




WBGIS-LSA Home Page.



https://qgiscloud.com/IsraelTAIWO/QCloud_Suitability/

Conclusion

Land suitability for cassava, maize and yam was determined for Ekiti land with a combination of fuzzy logic, weighted and fuzzy overlay operations.

The information produced will serve as a guide for farmers and agriculture extension workers about where to plant certain crops.

As observed from the system, the web-based interface for conveying suitability information will aid easy accessibility of the information to farmers and agricultural extension workers among others.

Recommendations

A system to dynamically determine land suitability by agriculture extension workers on the web is recommended for further researches, such that site-specific constraints can be modelled into the system, and that better accuracy can be achieved.

Consequent on the need for the above, the need for better architectures and algorithms for designing and developing such systems without the limitations of processing time is recommended. E.G. Google Earth Engine

Thanks