A Presentation on

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

Presented by: Israel TAIWO
Date: June 23, 2021
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WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

Date: June 23, 2021
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.
Introduction

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

Date: June 23, 2021
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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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.

Aim & Objectives

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 # 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.

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Part 2: Methods

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

Date: June 23, 2021
Methods

Suitability Determination

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.

Crop Growth Requirements

Web-based GIS Technology
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)

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Date:
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Crop Growth Requirements

- Precipitation
- Temperature
- USDA Soil Textural Class
- Soil pH
- Slope
- Soil Organic Carbon Content
Web-based Information Systems

Basic Web Architecture

Publisher

Processor (Web Server)
Metadata Store (Web Page Definitions)
Data Store

Web Page (HTML)

Subscriber

Processor (Web Browser)
Results

Part 3: WebGIS to Access Land Suitability for Arable Crop Farming in Ekiti State, Nigeria

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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.
Distance to river

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

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

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

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

Date: June 23, 2021
# Land Use / land Cover

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area Covered</th>
<th>Percentage Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Vegetation</td>
<td>25606.35</td>
<td>39.81%</td>
</tr>
<tr>
<td>Thick Vegetation</td>
<td>21011.13</td>
<td>32.66%</td>
</tr>
<tr>
<td>Wetland</td>
<td>9430.92</td>
<td>14.66%</td>
</tr>
<tr>
<td>Rock Outcrop</td>
<td>4445.91</td>
<td>6.91%</td>
</tr>
<tr>
<td>Built-Up</td>
<td>2595.24</td>
<td>4.03%</td>
</tr>
<tr>
<td>Bare Surface</td>
<td>1138.86</td>
<td>1.77%</td>
</tr>
<tr>
<td>Water body</td>
<td>96.21</td>
<td>0.15%</td>
</tr>
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Date: June 23, 2021
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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Date: June 23, 2021
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.

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

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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