MSc. Geographic Information Systems

Forest Management using GIS: Case Study of Koibatek Forest Station

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Outline

- Introduction
- Objective of the study
- Methodology
- Results and Analysis
- Conclusion and Recommendations
Introduction

Background of the study

• Since the recognition of the need to increase forest cover and reduce forest destruction and degradation, the Government has recognized the critical role of ensuring that tree cover in the country increases.
Study Area
Statement of the problem

- The Kenya Forest Service is in need of a method of monitoring the status of conservation projects within the forest which can enable the managers make accurate and timely decisions to maintain balance in the ecosystem. Hence there is need to move away from the current manual cartographic methods being used to capture and draw maps to more digital methods where processing of data, map reproduction and analysis are accurate and faster.
Objective of the study

- The main objective of this study is to develop a geodatabase that will facilitate continuous evaluation and monitoring of forest plantations for effective forest management.

Specific objectives

- To map the forest plantations and include important attributes of each plantation.

- To establish and present the area occupied by the various categories of forests and their other significant attributes.

- To demonstrate how the database can be used.
Methodology

Spatial Data
- Management maps

Data Identification

Data Assessment

Non-Spatial Data
- Data sheets

Data Preparation

ArcGIS Environment

Data Processing
- Data entry
- Georeferencing
- Subsetting
- Mosaicking

Database Development

Results

Interpretation

Conclusion & Recommendation

Attributes

External

Conceptual

Logical

Physical

Prototype Database

Full Implementation

Operational Geodatabase
Results and Analysis

Method of Data Analysis

• Bar Chart
• Database query
Forest Plantation map
Mapping Forest Categories
<table>
<thead>
<tr>
<th>No of Plantations</th>
<th>Stand Species</th>
<th>Area in Ha.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>CASUA. EQUIST.</td>
<td>8.6</td>
<td>0.2</td>
</tr>
<tr>
<td>56</td>
<td>CUP. LUS.</td>
<td>889.8</td>
<td>24.4</td>
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<tr>
<td>16</td>
<td>EUC. SAL.</td>
<td>161.7</td>
<td>4.4</td>
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<tr>
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<td>4</td>
<td>0.1</td>
</tr>
<tr>
<td>1</td>
<td>MIXED HARDWOOD</td>
<td>5.4</td>
<td>0.1</td>
</tr>
<tr>
<td>1</td>
<td>MIXED SPECIES</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>27</td>
<td>P. PAT.</td>
<td>414.4</td>
<td>11.4</td>
</tr>
<tr>
<td>1</td>
<td>P. PAT./ P. RAD.</td>
<td>7.9</td>
<td>0.2</td>
</tr>
<tr>
<td>4</td>
<td>REGENERATION</td>
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<td>1.1</td>
</tr>
<tr>
<td>8</td>
<td>UNSTOCKED</td>
<td>120.7</td>
<td>3.3</td>
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<tr>
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<tr>
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<td>INDIGENOUS FOREST</td>
<td>1532.39</td>
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<tr>
<td></td>
<td>OTHERS (ESTABLISHMENTS)</td>
<td>444.1</td>
<td>12.2</td>
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<td></td>
<td>TOTAL</td>
<td>3646.29</td>
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Forest area Analysis of Koibatek
Database Query
Database Query
Report generation
# Unstocked Plantations

<table>
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<tr>
<th>Comp</th>
<th>Sub_comp</th>
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<th>Area_1</th>
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<tr>
<td>5 W</td>
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<td>UNSTOCKED</td>
<td>9.5</td>
</tr>
<tr>
<td>11 M</td>
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<td>11 I</td>
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<td>7 J</td>
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<tr>
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<tr>
<td>8 E</td>
<td></td>
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<td>16.1</td>
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</table>

Sum Area_1: 120.699999
Conclusion

• Satellite positioning systems (such as GPS) will play an important role in augmenting traditional forest survey activities.

• Analysis by way of query, bar chart and calculations on the data it becomes more evident how GIS can benefit the resource manager as an organizing mechanism

• Forest management maps were used satisfactorily as base maps for the mapping process
Recommendations

• Training of the Forest managers in the use of basic GIS technology such as the handheld GPS

• Data collected from the field using the handheld GPS would be better retrieved using data cable other than manual writing to avoid errors which later translate to inconsistencies in the maps

• Different factors in the field such as climate, soil and other parameters that are highly interactive with each other should be incorporated in future studies.

• Remote sensing technologies could be incorporated into many areas related to sustainable forest management in future research especially in areas where accessibility is a challenge.
Questions?

Thanks for your attention!