A parcellary approach to mapping existing land uses: The case of Nairobi city

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Introduction...

- Land use mapping continues to play a major role in formulation of land use plans
- **Land cover vs land use:**
  - *land cover* - a physical description of the earth's surface (e.g. grass, trees, building and asphalt)
  - *land use* - a functional (socio-economic) description of the earth's surface (e.g. agricultural, residential, commercial and industrial)
About the parcellary approach...

- This is a community based "walk through" approach of determining individual uses of parcels in the locality

- **Advantages:**
  - It is possible to validate and update the land information status of the locality faster
  - Reliable because boundaries of land uses can be located on their exact position on the ground
  - Local Government units can be able to monitor with ease the developments happening in a given locality and problems such as unwanted/undesirable developments can be avoided

- **Disadvantages:**
  - Tedium and time-consuming process
  - Requires up to date cadaster boundaries
Methodology in implementing the parcellary approach [1]...

**Base map preparation**

- Use a GIS to prepare a cadastral base map of the city of Nairobi
  - secure all the complete list of cadastral maps pertaining to the city
- Overlay the ward boundary maps to the cadastral map to show which parcels are located or belonging to a certain ward
  - It is important to note that, in most cases, ward boundaries do not necessarily correlate with the boundaries appearing in the cadastral sheets. This is because they have a different basis of boundary delineation where ward maps are used for administrative purposes.

Methodology in implementing the parcellary approach [2]...

- All over features shall be inputted to the computer including the waterways, road network and other important landmarks, which can be of help to the land use planners in locating parcels in the ground.

**Field work survey**

- Training personnel to be involved in the survey
  - How to read maps/ aerial images
  - Land use color-coding (must be strictly observed as not to confuse different uses of parcels)
  - Individual ward printouts to be distributed to the research assistants for their reference with the ward/ administrative boundaries.
Land use categories[1]...

- In general, land is classified according to its physical characteristics and/or the present activity that occurs on it.
- The two major divisions in a land use classification system are "Developed" and "Undeveloped" uses.
- Each of these divisions can be further subdivided into specific land uses.
- The following is a listing and description of the standard land uses categories (based on the physical planning handbook)

<table>
<thead>
<tr>
<th>Code</th>
<th>Land use categories</th>
<th>Practical examples</th>
<th>Color codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Residential</td>
<td>All land and/or structures used to provide housing for one or more households</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>High density (01) / Medium density (02) / Low density (03)</td>
<td>Slums/ apartments</td>
<td>Dark brown/ Mid brown/ Pale brown</td>
</tr>
<tr>
<td>1</td>
<td>Industrial</td>
<td>Light or heavy industrial, motor garages, airport warehouses</td>
<td>Purple</td>
</tr>
<tr>
<td>2</td>
<td>Educational</td>
<td>Schools, colleges, universities (public &amp; private), research institutions</td>
<td>Orange</td>
</tr>
<tr>
<td>3</td>
<td>Recreational</td>
<td>Municipal and community parks, golf courses, designated/restricted open spaces, protected forests</td>
<td>Green</td>
</tr>
<tr>
<td>4</td>
<td>Public purpose</td>
<td>Hospital, post office, library, fire station, cemetery, churches, mosques, temples, stadiums, theatres, police stations, prisons, administrative offices</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Commercial</td>
<td>Office parks, retail, wholesale, furniture shops, banks, hotels, petrol service stations, restaurants, grocery stores; establishments oriented towards providing professional and personal services to the public</td>
<td>Red</td>
</tr>
</tbody>
</table>
Land use categories[3]...

<table>
<thead>
<tr>
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<th>Colour Code</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>Public utilities</td>
<td>Power stations, mobile phone masts, waste water, landfill</td>
<td>Blue</td>
</tr>
<tr>
<td>7</td>
<td>Transportation</td>
<td>Roads, streets, municipal parking lots, railway lines, airports, terminals</td>
<td>Grey</td>
</tr>
<tr>
<td>8</td>
<td>Undeveloped land</td>
<td>All parcels with no interpretable building/structure (undetected)</td>
<td>Pale yellow</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All parcels with no obvious land use category as listed above</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Agriculture</td>
<td>Cultivated land or land used to support livestock and poultry</td>
<td>Pale yellow</td>
</tr>
<tr>
<td>10</td>
<td>Mixed use</td>
<td>This category identifies parcels having more than one land use</td>
<td>To be determined</td>
</tr>
<tr>
<td>11</td>
<td>Special purpose</td>
<td>Government security installations</td>
<td>To be determined</td>
</tr>
</tbody>
</table>

Methodology in implementing the parcellary approach [3]...

- Research assistants to be deployed in areas/localities where they are more familiar with. This hastens and facilitates the mapping activity (*Local knowledge*).
- After the fieldwork, all ward maps used will be turnover to the technical person for integration into the land use database.

**Validation**
- Random checks to ascertain/validate the data quality and correctness will be carried out independently shortly after the completion of mapping and will involve personnel who had not participated in mapping.
Methodology in implementing the parcellary approach [4]...

- Outputs
  - This stage involves the finalization of the land use dataset, final report including metadata, validation reporting and quality assurance