Introduction

- Urban Land Use (ULU) Mapping i.e. discriminating the built-up area into different ULU types (e.g. residential, industrial, commercial, public etc.) remains a challenge due to spectral confusion in urban environments.
- The challenge is bigger in Sub-Saharan African (SSA) Cities due to their highly complex spatial structures and spectral mix-up.
- In this study, we developed an expert-based approach for mapping ULU in a developing SSA City of Lusaka, Zambia.

Methodology

Study Area

Remote Sensing Data
- Google Earth Imagery

Ancillary Spatial Data
- Detailed roads network data
- Cadastral spatial data
- Detailed land use data

Other Reference Data
- 1985 topographic map (scale 1:50,000)
- 2004 partial Quick Bird imagery (0.6m resolution)
- Administrative boundary
- Urban development plans

Objective(s)

To map the ULU of Lusaka City, Zambia over time (1990 - 2010) using remote sensing and GIS techniques

ULU Maps

ULU Changes

Performance of ULU Mapping Approach

- LUC classification accuracies were 89.2%, 91.3% and 93.0% for 1990, 2000 and 2010 respectively - built-up area was accurately identified and extracted
- Accuracy of final ULU maps ranged from 91.2% to 92.8%, above the recommended minimum standard of 85%.

Challenges and Limitations

- Expert knowledge requirement limit use of approach by non-experts
- Limited to local and regional scales due to huge time consumption and increased potential for error at larger scales
- Ancillary data unavailable, especially in developing countries

Conclusion

- Overall, the proposed approach shows good potential for ULU classification at local and regional scales.
- Our approach provides a new insight for ULU mapping especially for complex urban environments in third world urban cities (e.g. SSA).
- The study has also revealed some interesting results relevant to land use policy makers and urban development planners.