**Study Area and Methodology**

**Research Approach**

- Map and quantify LCUC at two spatial scales: (1) inter-regional scale for the Greater Accra, Central, and Ashanti regions of southern and central Ghana, and (2) intra-urban scale for Kumasi, Obuasi, Cape Coast, and Obibi, the four major cities within the study area.

- Intra-regional identification of LCUC based on spatial resolution, multi-temporal image data from Landsat ETM+, Terre ASTR and SPOT HRV optical satellite systems, and IRS-2 synthetic aperture radar (SAR).

- Intra-urban identification of LCUC based on high spatial resolution image data from QuickBird, WorldView, IKONOS, and Geoeye commercial satellites.

- 2000 through 2010 study period coincides with a period of available demographic and health survey data for Ghana.

- Urban quantitative spatial analysis techniques to examine relationships between LCUC and magnitudes and changes of demographic, socioeconomic, and health variables using generalized linear and multi-level regression models, non-linear logistic models, regression tree analysis, and agent-based models.

- Emphasis on the effects of LCUC on quality of life indicators such as child mortality, slum indices, and food security, within four of the major cities of Ghana.

**Inter-regional Land Cover/Land Use Classification Scheme**

1. Agriculture to Built – expansion of urban edge, urban sprawl, new village or urban dwelling clusters; 
2. Forest to Industrial Agriculture – intensification of agricultural land use through change in land ownership and mechanization; 
3. Natural Vegetation to Agriculture – smaller private plots, large agriculture farms; 
4. Natural Vegetation clearing – initial stage of agricultural or urban development; 
5. Natural Vegetation to Built – forest to dwelling cluster or village.

**Inter-intra Urban Land Cover/Land Use Classification Scheme**

1. Soil or Natural Vegetation to Residential – urban to residential dwellings; 
2. Soil or Natural Vegetation to Non-Residential Built – unskilled to industrial buildings or infrastructure; 
3. Agriculture to Residential – urban periphery or conversion of urban agriculture; 
4. Agriculture to Non-Residential Built – urban periphery or conversion of agricultural land and; 
5. Urban Demolition – increase in density of buildings or infrastructure.

**Moderate Spatial Resolution**

**Optical and Radar Satellite Data**

**Preliminary Results**

**Preliminary Results (cont.)**

**Benefits of Studying Ghana**

- Abundant demographic and health data sets relative to rest of Sub-Saharan Africa
- Stable and democratic government and reasonably safe environment
- Leader in science and technology for Western Africa
- Research team has almost 10 years of experience working there
- Relevance of health and quality of life relation to other West African countries

**Challenges Studying Ghana**

- Persistent cloud cover and water limitation and dust storms
- Limited high spatial resolution satellite image coverage for early 2000s
- Limited LandSat TM 5 receiving capability
- Census bureau files lacking of geospatial and substantial editing by OSB team

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