

Population Distribution from RS/GIS

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September 2003

*Conference on Migration, Urbanization, and Health – The Role of RS/GIS
Princeton University, Program in Urbanization and Migration*

Themes

- RS/GIS: Technological solutions to inadequate data

- Strengths

- spectral, spatial, and temporal resolutions increasing
- increased attention to RS of urban areas
- health context: vector-borne, process models
- global image databases

- Weaknesses

- spectral versus attribute detail
- complex urban processes / nature of exposure
- construct / measure agreement
- static distributions versus population dynamics
- inability to generate regional to global products

Themes (cont.)

- Data integration solutions to inadequate data
 - Remote versus traditional sensing
 - official statistics: surveys and enumerations
 - admin. records: IRS matching, DMV, building permits,...
 - LBS/digital tracking: cell phones, detailed space-time
 - Issues in data integration
 - validity / reliability / model-based estimates
 - What is the appropriate spatial scale?
 - How to combine measures from different supports?
(points, regular lattices, irregular lattices)

Themes (cont.)

- Geography perspective
 - pattern, process, & connectivity
 - pattern subjected to aggregation (censoring)

- Demography perspective →
 - connectivity migration intra-urban space-time paths

- Social science / policy perspective
 - policy variables and social science policy

Example 1: Weeks and Larson - *Urban Gradient Index*

- Objective

- Define an index of urbanization ('urbanness') based on remote sensing and census enumeration data

- Why?

- Covariation between urban and demographic processes/outcomes
- Satellite data may serve as proxy for intercensal estimation of census-based measures.

Weeks and Larson, *Urban Gradient Index* (cont.)

- Conceptual issues

- Construct validity

- What is the nature of the connection between urbanness and demographic process?
 - Does the index adequately measure that connection?
 - “...urban places are associated with different kinds of social activities and behavior than are non-urban places. Life is qualitatively and quantitatively different.”

CONSTRUCT	CENSUS	IMAGERY
<ul style="list-style-type: none">• Ecological - <i>urban form, density variation</i>	<ul style="list-style-type: none">• Ecological - <i>POP/AREA</i> - <i>POP</i>	<ul style="list-style-type: none">• Ecological - <i>Density proxied by imperviousness</i>
<ul style="list-style-type: none">• Economic - <i>nature of production</i>	<ul style="list-style-type: none">• Economic - <i>Non-agr. emp.</i>	<ul style="list-style-type: none">• Economic ---
<ul style="list-style-type: none">• Social - <i>nature of socio-cultural interaction</i>	<ul style="list-style-type: none">• Social ---	<ul style="list-style-type: none">• Social ---

Example 2: Lobitz et al. *Cholera epidemics / RS Bay of Bengal*

- Objective

- Link remotely sensed ocean features (surface temperature/height, chlorophyll concentration) to time series of Cholera cases.

- Why?

- Process theories link climate, ocean, plankton, and v. cholerae
- Real time monitoring and intervention

- Issues

- Scaling regional results to local populations
- Relation to urban hierarchy, interregional connectivity, and exposure