Reading Notes Summary

UCL Centre for Advanced Spatial Analysis

MSc Urban Spatial Science

Dissertation

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## Reference Title (Template)

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| --- | --- |
| Full reference |  |
| Article type  *(e.g., Empirical, Theoretical, Conceptual)* |  |
| What is the article about? |  |
| What is the main research question/argument? |  |
| How are the aims explored/tested/presented? |  |
| What are the main findings? |  |
| What gaps does it identify? |  |
| Limitations/critiques |  |
| How does it link to wider learning? |  |
| Additional notes  *(incl. useful quotes)* |  |

## Balk 2019 – Population and Urban Classification Grids for India 2011

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| Full reference | Balk, D. *et al.* (2019) ‘Urbanization in India: Population and Urban Classification Grids for 2011’, *Data*, 4(1), p. 35. Available at: <https://doi.org/10.3390/data4010035>. |
| Article type  *(e.g., Empirical, Theoretical, Conceptual)* | Empirical |
| What is the article about? | Development of a 1km scale population grid for India, to compare with official census urban designations (which underestimate urban population) |
| How are the aims explored/tested/presented? | * 3 sets of input data to generate a gridded population estimate: settlement level demographic data from 2011 census; spatial boundaries from proprietary (private) data product; global human settlement layer (remote sensing derived) * Method followed standard practice of removing waterbodies before creating grids of population distribution and urban areas 🡪 would this be necessary for diss. analysis? |
| What are the main findings? | * 2011 census predicts 31% India’s population live in urban areas; this is far lower than other estimates would suggest * Four urban categories in Indian census: statutory towns, census towns, wards, and outgrowths. Wards and outgrowths are subsets of statutory towns; census towns are defined anew with each census iteration (thus challenges in comparison over time) |
| Limitations/critiques | Boundary data for towns purchased from 3rd-party vendors; limits the reproducibility of this analysis > implications for relevance to dissertation? |
| How does it link to wider learning? | Example of incorporating remote sensing data with census settlement-level data to produce a gridded population estimate; dissertation project could theoretically follow very similar trajectory. |
| Additional notes  *(incl. useful quotes)* | * “Census towns are legally rural settlements but they are designated as urban for the purposes of an upcoming census and grouped with statutory urban areas in the official post-census tabulations” (p.3) * GHSL data available as binary (30m grid cell indicating built or not) or an aggregate at 250m resolution indicating proportion of cell classed as built. |

## Richardson 2013 – Spatial turn in health research

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| Full reference | Richardson, D.B. *et al.* (2013) ‘Spatial Turn in Health Research’, *Science*, 339(6126), pp. 1390–1392. Available at: <https://doi.org/10.1126/science.1232257> |
| Article type  *(e.g., Empirical, Theoretical, Conceptual)* | Conceptual |
| What is the article about? | Perspective piece on the evolution of spatial health research thanks to advances in spatially referenced data |
| How are the aims explored/tested/presented? | Discussion of recent advances in the field; examples of studies utilising novel methodologies |
| What are the main findings? | * Density, size and availability of geospatial data has facilitated new research in spatial and temporal analysis * Examples include:   + Wearable environmental/biometric monitors that capture geospatial information, for fine-scale exposure assessment.   + Spatial modelling of HIV transmission, that takes into accounts patient demographics, daily activities and local prevalence   + Mobile cell phone data providing spatiotemporal movement data; examples include researching interactions between human and animal movements in Kenya to track the spread of malaria   + GPS-enabled real-time air quality and radiation monitoring at fine spatial resolutions |
| What gaps does it identify? | The need for institutional standards and models for this new field, plus availability of distributed spatial data infrastructures (note this paper from 2013; how does the current data environment compare?) |
| Limitations/critiques | - |
| How does it link to wider learning? | Provides high level overview of the direction of research in this area as of 2013; provides a basis for further research to track the path of air pollution exposure |
| Additional notes  *(incl. useful quotes)* | - |

## Mubareka 2008 – Settlement location and population density estimation

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| Full reference | Mubareka 2008 – Settlement location and population density estimation using remote sensing |
| Related module | Dissertation (project proposals) |
| Article type  *(e.g., Empirical, Theoretical, Conceptual)* | Empirical |
| What is the article about? | Develops and tests a method for estimating settlement location probability, and population density, at 90m resolution using remote sensing data. Study area is a region in northern Iraq. |
| How are the aims explored/tested/presented? | Trains a model using 50% of a fieldwork collected dataset on settlements in Northern Iraq, combined with remote sensing data of the region. The remaining 50% is used to validate the model predictions. |
| What are the main findings? | * Can build the probability and pop density model using solely data from Shuttle Radar Topographic Mission (SRTM) digital terrain model (for elevation, etc.), and Landsat Enhanced Thematic Mapper (ETM). * Population density layer uses land cover and topographic features for input; Settlement probability layer uses distance from roads and water bodies, and land cover for input. * Model is validated using field collected data set from the Rapid Assessment Program (RAP), from humanitarian agencies. * R2 of approx. 0.3; is this sufficient for practice/application? (may need to look deeper into the interpretation of R2 in this context) |
| Limitations/critiques | Methodology is very complex, and requires extensive data cleaning calculations before incorporation in model; would be challenging to replicate in a different context. |
| Additional notes  *(incl. useful quotes)* | * “Surface modelling refers to allocating population or their attributes … to a fine scale in a regularly spaced grid” (p.2340) * Pop density estimates are more predictable in rural areas, compared with urban environments * Pioneers of remote sensing population estimation:   1. Deichmann & Eklundh 1991   2. Dichmann 1996   3. Sweitzer & Langaas 1995   4. Dobson et al. 2000   5. Tian et al. 2005 |

## Thenkabail 2009 – Irrigated area maps of India using remote sensing

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| Full reference | Thenkabail, P.S. *et al.* (2009) ‘Irrigated Area Maps and Statistics of India Using Remote Sensing and National Statistics’, *Remote Sensing*, 1(2), pp. 50–67. Available at: <https://doi.org/10.3390/rs1020050>. |
| Article type  *(e.g., Empirical, Theoretical, Conceptual)* | Empirical |
| What is the article about? | Comparison of remote-sensing derived maps of irrigated land with census-derived statistics of irrigated land. |
| How are the aims explored/tested/presented? |  |
| What are the main findings? | * Administrative data on irrigated area are produced separately by 2 departments: Ministry of Agriculture, and Ministry of Water Resources. There are large variations even between the statistics reported by these 2 bodies. * Two recent efforts in mapping global irrigation: GIAM by the International Water Management Institute (IWMI), and the global map of irrigated areas, GMIA, by the UN’s Food and Agriculture Organisation (FAO). GIAM is overwhelmingly remote sensing based, whereas GMIA is overwhelmingly based on national statistics. * In India, traditionally local revenue department officials report irrigation statistics that are in turn compiled at different levels. * Government administrative data is estimated to unreliably account for *minor* irrigation sources, such as ground water, small reservoirs, and tanks. |
| What gaps does it identify? | A need for better harmonisation between different irrigation estimates, and understanding of why the differences in estimates are so large. |
| Limitations/critiques | Uses existing remote-sensing research (the GIAM and GMIA), rather than own methodology; therefore less applicable to developing method for dissertation. |
| How does it link to wider learning? |  |
| Additional notes  *(incl. useful quotes)* |  |