IWRRI/IMCI Geospatial Modeling Working Group

November 5, 2019

Topics of discussion

- Problem Set
- Discuss project methodology
  - Methodology concept
  - Data collection
  - Data transformation
  - Model construction
- Timeline/Logistics for moving forward
- Extra: Literature

- Additional missing issues or ideas to discuss

Problem Set

- Explore spatiotemporal relationships of human health in comparison to related factors (environmental/socio-economic)

Project Methodology Concept

- Data assembly and organization
- Data transformation
- Modeling strategy
- Model construction
- Model runs
- Examine/repeat

Project Methodology: Data Collection

- Dependent
  - Pediatric cancers, preterm births, birth defects
- Independent

  environmental contamination, poverty, groundwater makeup, pesticides/fertilizers,

- Spatial considerations
  - Spatial mismatch of Dep vs. Ind., spatial autocorrelation issues, small sample size, population influences
- Temporal considerations
  - Temporal discrepancies, time lags, missing data

Project Methodology: Data Transformation

Project Methodology: Model Construction

- Spatial Autoregressive Modeling
- Conditional Autoregressive Modeling vs. Simultaneous
- Bayesian classifiers, Markov random fields (MRF)
- Spatial clustering (eg. dimensionality reduction combined with clustering algorithm)

- Python or R?

Timeline and Strategy Moving Forward

- Timeline?

- Logistics
  - Generalized content sharing amongst group
    - Citation sharing
    - Content communications/secure web site
  - Code collaboration: Github group (https://github.com/IMCI-GM)
  - Data access methods from NKN
  - Model code collaboration (CRC Jupyter? Rstudio? RMarkdown?

- Tasks moving forward

Extra: Literature

- Cressie, N. 1993. Statistics for Spatial Data. Rev. ed. New York: Wiley.
- Waller, L. A., and C. A. Gotway. 2004. Applied Spatial Statistics for Public Health Data. Hoboken, NJ: Wiley.
- Darmofal, D. 2015. Spatial Analysis for the Social Sciences. New York: Cambridge University Press.
- David M. Drukker, Peter Egger & Ingmar R. Prucha (2013) On Two-Step Estimation of a Spatial Autoregressive Model with Autoregressive Disturbances and Endogenous Regressors, Econometric Reviews, 32:5-6, 686-733