Sustainable Development Goals and Geospatial Education

Yelena Ogneva-Himmelberger, Ph.D.
Clark University, USA
Clark University

- Private research University located in Worcester, Massachusetts
- Offers Bachelors and Ph.D. degrees in Geography
- Offers Masters of Science degree in GIS
Masters of Science in GIS

Four Concentrations

1. Geographic Information Science for Development and Environment
2. Conservation GIS
3. Environmental Remote Sensing
4. Global and Community Health
Capstone course: GIS for International Development

• Prerequisite: Intro to GIS
• Duration: seven weeks
• Each week: two lectures + one lab session
• Enrollment: ~20 Master’s students

How do you find the balance between technical GIS skills and the topical knowledge (i.e., “GIS&T Body of Knowledge” and “SDGs”)?
GIS&T Body of Knowledge

FC-FOUNDATIONAL CONCEPTS
The foundational concepts are the elementary building blocks and

PD-PROGRAMMING AND DEVELOPMENT
Computer programming and development are critical to the past.

KE-KNOWLEDGE ECONOMY
Knowledge Economy is the portion of the Body of Knowledge focused on

DC-DATA CAPTURE
The capture of massive quantities of spatial data, able to be

AM-ANALYTICS AND MODELING
This knowledge area embodies a variety of data driven analytics,

DA-DOMAIN APPLICATIONS
The Domain Applications knowledge area focuses on the linkages

GS-GIS&T AND SOCIETY
The connections and interactions between GIS&T and society range

CP-COMPUTING PLATFORMS
Computing Platforms provide the computational capabilities to apply

DM-DATA MANAGEMENT
Data management involves the theories and techniques for managing the

CV-CARTOGRAPHY AND VISUALIZATION
The Cartography & Visualization section encapsulates competencies

https://gistbok.ucgis.org/bok-basic-page/welcome-gist-body-knowledge
Weekly themes

• Poverty, hunger and food security (SDGs 1 and 2)
• Global public health (SDG 3)
• Access to safe drinking water & basic sanitation (SDG 6)
• Participatory mapping; Gender equality (SDG 5)
• Climate change vulnerability and adaptation (SDG 13)
• Conflicts, migration, and human rights (SDG 16)
• Disaster management and humanitarian assistance
Important course components

• Hands-on practice: during lectures and homework
• Weekly readings: online wiki responses and class discussions
• Final project
By the end of the course students should be able to...

• understand what spatial data are required for monitoring a SDG target or indicator
• find relevant spatial data and evaluate its quality
• work with multiple formats of data
• create new data (field data collection)
• know what analytical tools to apply
• work with multiple GIS software programs (“software-agnostic”)
• communicate effectively – make maps that “tell the story”
...understand what spatial data are needed for monitoring each SDG target or indicator
Chapter 16
Spatial Determinants of Poverty Using GIS-Based Mapping

Brandon Manalo Vista and Yuji Murayama

16.1 Introduction

In many countries, poverty has a geographic dimension (Bigman & Deichmann, 2000). Geography, particularly the physical environment, plays a significant role in the incidence of poverty in every local community, especially in developing nations (Bigman & Felack, 2000). Empirical evidences suggest a strong relationship between geography and poverty. Previous mapping studies in Vietnam (Minot, Bob, & Epprecht, 2006), in Uganda (Rogers, Emwani, & Robinson, 2006), in Nigeria (Legg et al., 2005), in Bangladesh (Khan, Hossain, Bost, & Villano, 2005), in Kenya (Kristjansson, Radeny, Balwenweick, Ogutu, & Notenbars, 2005), in Malawi (Benson, Chamberlin, & Rhinhardt, 2005), and in Sri Lanka (Amarasignhe, Samad, & Amuthas, 2006), among others, have shown that significant geographic variation in the incidence of poverty may be due to a variety of geographic factors. These include natural resource endowments and agro-climatic conditions, accessibility and proximity to markets, access to land, as well as aspects of public policy.

On this regard, geography cannot be regarded as a factor affecting the rate of poverty because it has a strong impact on the living standards of people living in the community. Poverty is not merely a socio-economic problem. Equally important, as Glasseker (2002, p. 158), puts it "poverty is an inherently spatial problem ..." However, debates on poverty and its causes often revolve around the socio-economic realm, not until recently when the role of geography in understanding and analyzing poverty has been increasingly recognized by scholars and development practitioners (Hyman, Lane, & Farlow, 2005). The passage of the Millennium Development Goals (MDGs) which advocates for poverty reduction triggered initiatives in the international arena to have greater interest in the geographic dimensions of poverty (Hyman et al., 2005). Correspondingly, the development of geographic information systems (GIS) together with advances in remote sensing has led to incorporate spatial data and satellite imagery as methods for poverty mapping and analysis.

R.M. Vista (85)
Department of Geography, University of Otago, P.O. Box 56, Dunedin, New Zealand 9054
E-mail: brandonvista@yahoo.com

© Springer Science+Business Media B.V. 2011

Using GIS and Spatial Statistics to Target Poverty and Improve Poverty Alleviation Programs: A Case Study in Northeast Thailand

Romanaee Thongdara - Lal Samarakoon - Rajendra P. Shrestha - S. L. Ramakrishanachchi

Received: 7 June 2010 / Accepted: 24 March 2011
© Springer Science+Business Media B.V. 2011

Abstract Various poverty alleviation programs have helped reduce poverty in Thailand; yet the poverty gap still remains, especially in rural areas in the north and northeast of the country. The major barrier to poverty alleviation policies and strategies is the weakness of identifying where the poor are, thereby targeting poverty interventions. This paper investigates the potential of descriptive statistics, the geographic information system (GIS), and spatial autocorrelation in recognizing poverty association of a site selected in the northeast Thailand, including identifying factors that influence rural poverty, and investigating underlying factors and spatial associations of poverty at the rural household level. Results showed that 70% of the households sampled in the study area were poor, and nearly half of their income generated was from farming. Factors influencing farm income were examined by regression statistics and it was found that farm income is related to area cultivated, rice yield, livestock and learning experience of farmers. It was demonstrated that GIS is a useful tool to identify environmental factors that influence poverty and spatial autocorrelation is an effective method in revealing similarities and dissimilarities of poverty in household units. Use of these two technologies to identify factors underlying rural poverty was analyzed and

R. Thongdara (92)
Remote Sensing and Geographic Information Systems, School of Engineering and Technology, Asian Institute of Technology (AIT), Pathumthani 12120, Thailand
e-mail: Romanaee.Thongdara@ait.ac.th

L. Samarakoon
Geoinformation Center, AIT, Pathumthani 12120, Thailand

R. P. Shrestha
Natural Resources Management, School of Environment, Resources and Development (SERED), AIT, Pathumthani 12120, Thailand

S. L. Ramakrishanachchi
Agricultural System and Engineering, School of Environment, Resources and Development (SERAED), AIT, Pathumthani 12120, Thailand
How to read critically

Pay attention to how GIS was applied - what analytical tools were used? Were they the appropriate tools? Are there other tools the authors could have used?

Examine the issue of data - is the data source reliable? What format was the data in? Was the resolution of the data (spatial, and temporal, if applicable) adequate to answer the research question?

What are the limitations of the analysis? Are they data-related? Software tools related? Or are better analytical methods needed?

Pay attention to maps, graphs, charts, etc. - are they easy to understand? What about the quality of the maps? How can they be improved?
...find relevant spatial data and evaluate its quality
...work with multiple formats of data
...work with various GIS software programs
... Create new data (field data collection)

Welcome to Field Papers

Make yourself an atlas
Print out anywhere in the world.

Take it into the field
Make your notes and observations.

Capture your notes
Upload pages you've photographed.
...Know what analytical tools to apply
Communicate effectively – make maps that “tell the story”

Lab assignment: Transportation network analysis for humanitarian assistance in Ethiopia
Summary

• This course raised students’ awareness of SDGs
• Designing a course around SDGs exposes students to a wide variety of international data sources
• SDGs provided useful framework for an applied GIS course
Ideas for the future

• SDGs should have a more prominent role in the GIS curriculum in institutions of higher education worldwide

• SDGs could be used to design an entire GIS curriculum, allowing students to learn and apply technical skills in a meaningful context

• Creating an online platform where GIS educators can share their experiences and best practices teaching with SDGs framework
Thank you!

Yelena
Ognea-Himmelberger, Ph.D.
yogneva@clarku.edu