



Risk, Vulnerability and Resilience: Concepts and Understanding

Rationale of the course:

This course focuses on the entire vulnerability and risk assessment processes and different methods. This course is about procedures to collect, analyze and evaluate geospatial data for risk assessment from natural and man-made hazards.

Objectives of the course:

1. To help students understand the concepts of vulnerability and vulnerability assessment methods, critically analyze them.
2. To understand the basics to develop framework and recommendation for vulnerability assessment techniques.
3. To help students guide through entire process of risk assessment using geospatial domain.
4. To understand and formulate requirements of hazard data and methods.

Course Description

The course will focus on basics of vulnerability and risk assessment including definitions, methods for analysis, decision analysis, management of uncertainty, and analysis of inherent and chronic vulnerabilities as well as those related to extreme events and hazards. It will follow the framework of IPCC while defining and development framework for vulnerability assessment, which would include concept of exposure, sensitivity, and adaptive capacity. It will deal with integration of social and natural science perspective and approaches to identify the purpose and focus of the vulnerability assessment with the examples from different sectors (e.g. forestry, agriculture, coastal area and others).

In the second module the course will deal with introduction to disaster risk assessment and management, and rebuilding on importance of geospatial data. It will deal with the different sources and methods of obtaining spatial data for risk assessment and presentation for various types of hazards. The collection and generation need to be targeted to hazard profiling and maximum usage of Internet search and acquiring open and free (low cost) data. It will deal with hazard assessment, concepts, frequency, and magnitude with selected examples of hazard assessment. This will also include elements at risk, classification, infrastructure, critical facilities demography and collection of related information. It will also include component of vulnerability assessment (social, physical, ecological and other), participatory GIS, spatial multi-criteria evaluation and decision-making.

The third and the final module will deal the risk assessment and loss estimation model. It will also deal with qualitative and quantitative risk assessment including flood, seismic, landslide and technical risk assessment. The course will conclude with risk evaluation, cost benefit analysis and necessities for emergency planning and environmental impact assessment.

Reading List

1. Bankoff, G, Frerks G, and Hilhorst D, (2004). Mapping Vulnerability: Disasters, Development and People. eds. Pp. 115-127. London: Earthscan.

2. Blaikie, P., Cannon, T., Davis, I. & Wisner, B. (1994). *At risk: natural hazards, people's vulnerability, and disasters*. New York: Routledge.
3. Brooks, N. (2003). *Vulnerability, risk and adaptation: A conceptual framework*. Tyndall Centre for Climate Change Research Working Paper, 38, 1-16.
4. Cannon, T., Twigg, J., & Rowell, J. (2003). *Social vulnerability, sustainable livelihoods and disasters*. London: DFID.
5. *Caribbean Handbook on Risk Management, ACP-EU Natural Disaster Risk Reduction Program* (accessed from <http://www.charim.net/>)
6. Daniel, M. B. III., & Cothorn, R. C. (2001). *Introduction to risk analysis: a systematic approach to science-based decision making*. Rockville: Government Institutes.
7. Fang, W.H., et al. (2011). *Integrated Risk Governance: data base, risk map and network platform*. Beijing: Science Press.
8. *International Strategy for Disaster Reduction. (2007). Building Disaster Resilient Communities: Good Practices and Lessons Learned – A Publication of the “Global Network of NGOs” for Disaster Risk Reduction*. http://www.unisdr.org/files/596_10307.pdf
9. Marzocchi, W., et al. (2009). *Principles of multi-risk assessment. Interaction amongst natural and man-induced risks*. Brussels: European Communities.
10. Southwick, S. M. (2012). *Resilience: The Science of Mastering Life's Greatest Challenges*. New York: Cambridge University Press.
11. van Westen CJ, Alkema D, Damen MCJ, Kerle N, and Kingma NA (2011). *Multi-hazard risk assessment*. United Nations University – ITC School on Disaster Geoinformation Management (UNU-ITC DGIM)