Special Centre for Disaster Research
(In collaboration with NIDM, MHA Govt of India)
Jawaharlal Nehru University
New Delhi, INDIA

Application of Geospatial to Disaster Risk Mapping and Monitoring

Objective: This course intent to familarise students with ground observations and large-scale mapping by using various GI technologies to map disaster risk areas and locations. Secondly, it will address principal concepts of language of geography by map-making (cartography). Visualization and dissemination of geodata, for goals varying from exploration, analysis, synthesis, and presentation, to communities to strengthen resilience on ground by making use of these datasets in planning and rescue.

Content:

1. Traditional map making and its relevance in digital environment.
2. Generation of geodatabase for disaster risk: spatial and non-spatial datasets, generation of thematic disaster based geodatabase.
3. Role and assessment using geospatial approach: mapping and monitoring using satellite images, integration of datasets in GIS environment
4. Application of geospatial approach to assess disaster risk: Mapping of building vulnerability and damage assessment. Concepts of multi -hazard and multi-risk characterization in urban environment. Agriculture and forest fire mapping and monitoring, vulnerability and damage assessment. Flood extent mapping and implications for land use, and other (geological, hydro-metrological & environmental) disaster based applications
5. Exploration and visualisation: BHUVAN and other geospatial portals offering disaster related mapping services, volunteered geographic information system, cloud sourcing data.
6. Survey and participatory mapping for disaster risk and vulnerability mapping.

Suggested Readings:

1. Robinson, A.H., Morrison, J.L., Muehrcke, P.C., Kimerling, A.J. and Guptill, S.C, (1995), Elements of Cartography, 6th ed., (New York: John Wiley & Sons).
2. DiBiase, D., (1990), Visualization in earth sciences. Earth & Mineral Sciences, Bulletin of the College of Earth and Mineral Sciences, 59 (2), pp. 13-18.
3. Kraak, M.-J. and Ormeling, F. J.,(1996), Cartography, visualization of spatial data, (London: Addison Wesley Longman).
4. MacEachren, A. M., (1994), How maps work: representation, visualization, and design, (New York: The Guilford Press).
5. Casale Ricardo and Margottini Claudio (1999). Floods and Landslides: Integrated Risk Assessment, Springer-Verlag.
7. Sivakumar MVK , Motha RP, and Das HP (2005). Natural Disasters and Extreme Events in Agriculture: Impact and Mitigation, Springer.
8. D.A.Wilhite (2000). Drought as a Natural Hazard: Concepts and Definitions. Drought: A Global Assessment. W. D.A., Routlegde. Vol.1: pp.1-3.
9. Cutter SL, Boruff BJ, Shirley WL (2003) Social Vulnerability to Environmental Hazards. Soc Sci Q 84(2):242–261. doi: 10.1111/1540-6237.8402002

10. Dobhal DP, Gupta AK, Mehta M, Khandelwal DD (2013) Kedarnath disaster: facts and plausible causes. Curr Sci 105(2):171–174.
11. Follmann A (2015) Urban mega-projects for a 'world-class' riverfront - The interplay of informality, flexibility and exceptionality along the Yamuna in Delhi, India. Habitat Int 45:213-222. http://dx.doi.org/10.1016/j.habitatint.2014.02.007
12. Kumar A, Pushplata (2015) Building regulations for hill towns of India. HBRC Journal 11(2):275–284. http://dx.doi.org/10.1016/j.hbrcj.2014.06.006
13. Nisha, Punia M (2014) Socio-economic vulnerability and sustainable development in context of development vs. conservation debate: a study of Bhagirathi basin, Uttarakhand, India. Int Arch Photogram Rem Sens Spatial Inform Sci XL-8:77-84.
14. Rao KHVD, Rao VV, Dadhwal VK, Diwakar PG (2014) Kedarnath flash floods: a hydrological and hydraulic simulation study. Curr Sci 106(4):598–603.

Note: Updated bibliography, particularly periodical references and relevant websites for the covered topics will be given during teaching.