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Exploring the potential of geocoding the impact of disasters: The experience of global and national databases

Debarati Guha-Sapir (1), Rhonda Davis (2), Melanie Gall (3), Pascaline Wallemacq (1), and Susan Cutter (3)

(1) Center for Research on the Epidemiology of Disasters (CRED), University of Louvain, Belgium, (2) US Office of Foreign Disaster Assistance, Washington D.C., USA, (3) Hazards & Vulnerability Research Institute, University of South Carolina, USA

As extreme climate events such as precipitation driven flooding, storms and droughts are increasingly devastating, assessing impacts accurately becomes critically important in guiding decisions and investments on disaster risk reduction. Capturing disaster impacts includes not only quantitative information such as the economic and human effects but also the determination of where and when the impacts occurred.

Among the most commonly used impact indicators are the number of deaths and the number of people affected or homeless, and the economic damages. Unfortunately, these figures are typically used in their raw form and conclusions are drawn without due consideration to denominators. For example, key parameters such as the population base or the size of the region affected are often not factored in when judging the severity of the event or calculating increases or decreases in an indicator. To increase the meaningfulness and comparability of disaster impacts across time and space, however, it is important to mathematically standardize indicators and utilize common denominators such as number of population exposed, area affected, GDP, and so forth. Geospatial techniques such as geo-referencing and spatial overlays are coming into greater use to facilitate this process.

In 2013, EM-DAT, one of the main providers of global disaster impact data, launched an effort to enhance its contents through spatial analyses. The challenge was to develop a sustainable methodology and protocol for a large dataset and to systematically collect and enter geocoded profiles for each event that is registered in EM-DAT. Along with specialists in geography from different institutions EM-DAT launched an effort to geocode each disaster event working backwards in time starting from the most recent. For geo-referencing purposes, EM-DAT requires a standardized dataset of sub-national administrative boundaries. Though a number of such initiatives exist, the Food and Agriculture Organization's (FAO) Global Administrative Unit Layers (GAUL) was selected as the most appropriate since the data are updated annually, disputed areas are labelled as such and not assigned to a national entity, and the FAO uses a community-based approach whereby users of the dataset can provide updated administrative boundaries and related shapefiles.

Geocoding the impact areas of disaster events not only allows for more accurate spatial analyses and mapping but it also enhances the interoperability of EM-DAT data with other spatially explicit data (such as population or land use data), or with nationally-developed loss datasets such as SHELDUS. Most importantly, geocoding permits the monitoring of key parameters of disaster impacts such as exposure, vulnerable populations, effectiveness of disaster risk reduction measures, as well as the investigation of linkages and ripple effects between a catastrophic event and other external factors. For example, the intersection between extreme malnutrition and the spatial extent of droughts or floods aids in the identification of hot spots and facilitates strategic delivery of nutrition interventions. With the need for tracking and monitoring progress towards sustainable development and disaster risk reduction gaining in importance, the ability to express disaster impacts in standardized terms such as ratios or percentages per some unit area will increase transparency and comparability of disaster management programmes.