Post-Disaster Damage Assessment using Remotely Sensed Data for Post Disaster Needs Assessments: Pakistan and Nigeria case studies

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Since the launch of high-resolution optical satellites in 1999, remote sensing has increasingly been used in the context of post-disaster damage assessments worldwide. In the immediate aftermath of a natural disaster, particularly when extensive geographical areas are affected, it is often difficult to determine the extent and magnitude of disaster impacts. The Global Facility for Disaster Reduction and Recovery (GFDRR) has been leading efforts to utilise remote sensing techniques during disasters, starting with the 2010 Haiti earthquake. However, remote sensing has mostly been applied to extensive flood events in the context of developing Post-Disaster Needs Assessments (PDNAs). Given that worldwide, floods were the most frequent type of natural disasters between 2000 and 2011, affecting 106 million people in 2011 alone (EM-DAT) , there is clearly significant potential for on-going use of remote sensing techniques.

Two case studies will be introduced here, the 2010 Pakistan flood and the 2012 Nigeria flood. The typical approach is to map the maximum cumulative inundation extent, then overlay this hazard information with available exposure datasets. The PDNA methodology itself is applied to a maximum of 15 sectors, of which remote sensing is most useful for housing, agriculture, transportation. Environment and irrigation could be included but these sectors were not covered in these events.

The maximum cumulative flood extent is determined using remotely sensed data led by in-country agencies together with international organizations. To enhance this process, GFDRR hosted a SPRINT event in 2012 to tailor daily flood maps derived from MODIS imagery by NASA Goddard's Office of Applied Sciences to this purpose. To estimate the (direct) damage, exposure data for each sector is required. Initially global datasets are used, but these may be supplemented by national level datasets to revise damage estimates, depending on availability.

Remote sensed estimates of direct damage are used to confirm field estimates of the magnitude of the damage; thus, the speed of assessment can be balanced not having to achieve high accuracy results. In the future, to increase the speed of remote sensed damage assessments, there is a need for existing exposure information – which can also be used for risk prediction as well as disaster response. However, advances in this area vary significantly by country and sector and therefore efforts to move this agenda forward will significantly improve disaster reduction and recovery.