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Afghanistan Multi-Risk Assessment to Natural Hazards

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The geographical location of Afghanistan and years of environmental degradation in the country make Afghanistan highly prone to intense and recurring natural hazards such as flooding, earthquakes, snow avalanches, landslides, and droughts. These occur in addition to man-made disasters resulting in the frequent loss of live, livelihoods, and property. Since 1980, disasters caused by natural hazards have affected 9 million people and caused over 20,000 fatalities in Afghanistan.

The creation, understanding and accessibility of hazard, exposure, vulnerability and risk information is key for effective management of disaster risk. This is especially true in Afghanistan, where reconstruction after recent natural disasters and military conflicts is on-going and will continue over the coming years. So far, there has been limited disaster risk information produced in Afghanistan, and information that does exist typically lacks standard methodology and does not have uniform geo-spatial coverage. There are currently no available risk assessment studies that cover all major natural hazards in Afghanistan, which can be used to assess the costs and benefits of different resilient reconstruction and disaster risk reduction strategies. As a result, the Government of Afghanistan has limited information regarding current and future disaster risk and the effectiveness of policy options on which to base their reconstruction and risk reduction decisions.
To better understand natural hazard and disaster risk, the World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR) are supporting the development of new fluvial flood, flash flood, drought, landslide, avalanche and seismic risk information in Afghanistan, as well as a first-order analysis of the costs and benefits of resilient reconstruction and risk reduction strategies undertaken by the authors.

The hazard component is the combination of probability and magnitude of natural hazards. Hazard analyses were carried out separately for each peril. Several models were implemented used to simulate the relevant processes involved. These models were fed by global and local climate data and geological data like elevation, slope, land use, soil characteristics etc.

Exposure is a measure of the assets and population at risk. An extensive data collection and processing effort was carried out to derive nation-wide exposure data.

Vulnerability is a measure of potential exposure losses if a hazardous event occurs. Vulnerability analyses were carried out separately for each peril, because of differences in impact characteristics. Damage functions were derived from asset characteristics and/or experiences from (international) literature.

The main project output consists of tables and (GIS-) maps of hazard, exposure and risk. Tables present results at the nation-wide level (admin0), province level (admin1) and district level (admin2). Hazard maps are provided for various return periods, including 10, 20, 50, 100, 250, 500 and 1000 years.

All maps are stored in a Web-based GIS-platform. This platform contains four separate directories with [1] generic data (catchment boundaries, rivers etc), [2] hazard maps, [3] exposure maps and [4] risk maps for each of the considered perils.