



Estimation of losses from landslides – a review of current approaches

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Despite novel scientific approaches and efforts of administration, losses from natural hazards (landslides in particular) are increasing every year. Since the beginning of the 21st century (2000-2008), landslides have affected about 1.5 million people worldwide and have cost approximately more than 875 million US dollars. These losses are currently increasing as the pressure of population growth causes urban areas to expand into more unstable hillside areas. Landslide losses are usually underestimated in official statistical records, because they are often attributed to the primary triggering phenomena like storms or earthquakes or are sometimes not considered in the statistical records due to its restricted impact area.

Unlike other hazards (e.g. earthquakes, floods, windstorms) loss estimation models and approaches almost do not exist for landslide hazards. Nevertheless, some studies deal with this issue. This situation is partly caused by the limited extent of landslides compared to other natural hazards and by the scarcity of historical data. For the purposes of land use planning and mitigation measures, information about possible landslide losses is of high relevance, especially when the cost-benefit analysis is performed.

In the landslide risk assessment framework, losses can be divided into broad variety of categories: 1. Human losses; 2. Value of private and public properties and infrastructure; 3. Losses of economic activity; 4. Environmental losses; 5. Cultural losses. Each type of the losses has to be addressed with different methods, using usually the "ex ante" approach studying former events in order to predict possible future losses. Some of the losses are interrelated and dynamically evolving during time. For that reason, an interdisciplinary approach coupling information and methods from earth and engineering sciences, but also economics has to be performed.

In our study, a review of current techniques and methodologies in landslide hazard loss estimation was performed and feasible approaches for landslide loss estimations were investigated with a special attention to indirect and intangible loss estimation methods.