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SafeLand guidelines for landslide monitoring and early warning systems in Europe - Design and required technology

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Landslide monitoring means the comparison of landslide characteristics like areal extent, speed of movement, surface topography and soil humidity from different periods in order to assess landslide activity. An ultimate "universal" methodology for this purpose does not exist; every technology has its own advantages and disadvantages. End-users should carefully consider each one to select the methodologies that represent the best compromise between pros and cons, and are best suited for their needs. Besides monitoring technology, there are many factors governing the choice of an Early Warning System (EWS). A people-centred EWS necessarily comprises five key elements: (1) knowledge of the risks; (2) identification, monitoring, analysis and forecasting of the hazards; (3) operational centre; (4) communication or dissemination of alerts and warnings; and (5) local capabilities to respond to the warnings received. The expression "end-to-end warning system" is also used to emphasize that EWSs need to span all steps from hazard detection through to community response. The aim of the present work is to provide guidelines for establishing the different components for landslide EWSs.

One of the main deliverables of the EC-FP7 SafeLand project addresses the technical and practical issues related to monitoring and early warning for landslides, and identifies the best technologies available in the context of both hazard assessment and design of EWSs. This deliverable targets the end-users and aims to facilitate the decision process by providing guidelines. For the purpose of sharing the globally accumulated expertise, a screening study was done on 14 EWSs from 8 different countries. On these bases, the report presents a synoptic view of existing monitoring methodologies and early-warning strategies and their applicability for different landslide types, scales and risk management steps. Several comprehensive checklists and toolboxes are also included to support informed decisions. The deliverable was compiled with contributions from experts on landslides, monitoring technologies, remote sensing, and social researchers from 16 European institutions. The deliverable addresses one of the main objectives of the SafeLand project, namely to merge experience and expert judgment and create synergies on European level towards guidelines for early warning and to make these results available to end-users and local stakeholders.