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People-centred landslide early warning systems in the context of risk management

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In the current hazard research people-centred warning becomes more and more important, because different types of organizations and groups have to be involved in the warning process. This fact has to be taken into account when developing early warning systems.
The effectiveness of early warning depends not only on technical capabilities but also on the preparedness of decision makers and their immediate response on how to act in case of emergency. Hence early warning systems have to be regarded in the context of an integrated and holistic risk management. Disaster Risk Reduction (DRR) measures include people-centred, timely and understandable warning. Further responsible authorities have to be identified in advance and standards for risk communication have to be established. Up to now, hazard and risk assessment for geohazards focuses on the development of inventory, susceptibility, hazard and risk maps. But often, especially in Europe, there are no institutional structures for managing geohazards and in addition there is a lack of an authority that is legally obliged to alarm on landslides at national or regional level.

One of the main characteristics within the warning process for natural hazards e.g. in Germany is the split of responsibility between scientific authorities (wissenschaftliche Fachbehörde) and enforcement authorities (Vollzugsbehörde). The scientific authority provides the experts who define the methods and measures for monitoring and evaluate the hazard level. The main focus is the acquisition and evaluation of data and subsequently the distribution of information. The enforcement authority issues official warnings about dangerous natural phenomena. Hence the information chain in the context of early warning ranges over two different institutions, the forecast service and the warning service. But there doesn't exist a framework for warning processes in terms of landslides as yet.

The concept for managing natural disasters is often reduced to hazard assessment and emergency response. Great importance is attached to the scientific understanding of hazards and protective structures, while analysis of socio-economic impacts and risk assessment are not considered enough. The reduction of vulnerability has to be taken into greater account. Also the information needs of different stakeholders have to be identified at an early stage and should be integrated in the development of early warning systems. The content of the warning message must be simple, understandable and should cover instructions on how to react. Further the timeliness of the messages has to be guarented.

In this context the aim of the landslide monitoring and early warning system SLEWS (Sensor Based Landslide Early Warning System) is to integrate the above mentioned aspects of a holistic disaster and risk management. The technology of spatial data infrastructures and web services provides the use of multiple communication channels within an early warning system. Thus people-centred early warning messages and information about slope stability can be sent in nearly real-time. It has to be underlined that the technological information process is just one element of an effective warning system. Moreover the warning system has also to be considered as a social system and has to make allowance to socio-economic and gender aspects :

«[...] Develop early warning systems that are people centered, in particular systems
whose warnings are timely and understandable to those at risk, which take into account the
demographic, gender, cultural and livelihood characteristics of the target audiences,

including guidance on how to act upon warnings, and that support effective operations by disaster managers and other decision makers »

(Hyogo Framework, 2005)

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