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GIS TECHNIQUES AND DECISION SUPPORT SYSTEM TO REDUCE LANDSLIDE RISK: THE CASE STUDY OF CORVARA IN BADIA, NORTHERN ITALY

ABSTRACT: CAVALLIN A., STERLACCHINI S., FRIGERIO I. & FRIGERIO S., *GIS techniques and Decision Support System to reduce landslide risk: the case of study of Corvara in Badia, northern Italy*. (IT ISSN 0391-9838, 2011).

Landslide hazard assessment aims at profiling the prospective damaging events and identifying the potentially affected areas to reduce risk. This means that procedures for the management of emergency situations can be effectively set up in advance.

Where and when a potentially damaging event will occur is one of the most important topics of discussion in the scientific community. As a matter of fact, landslide area will contribute to identify the vulnerable elements potentially affected by the event of a given magnitude and the degree of physical damage and the economic loss. Knowledge of the area and the time of occurrence, related to the triggering factors, permits to apply in advance an «early warning» system and related procedures to manage the crisis phase, according to Civil Protection Authorities and the laws in force. An example of the proposed methodology is presented; it exploits GIS techniques, Decision Support System, and mobile technologies to reduce landslide risk in the Corvara in Badia test site.

KEY WORDS: GIS, Landslide risk, Decision Support System, Northern Italy.

INTRODUCTION

Landslides caused enormous casualties and severe economic losses in mountainous regions worldwide and in the future landslide risk is bound to increase (USGS, 2006) in relation to human growth and development (Bonachea & *alii*, 2006). Global warming is generally expected to augment both the magnitude and the frequency of extreme precipitation events, which may lead to more intense and frequent land sliding (IPCC, 2007). It is therefore necessary to reduce the landslide risk preventing mass movements, which always involves systematic and rigorous processes of stabilizing or «managing» the slopes (Fell & Hartford, 1997). Since this is seldom sufficiently recognized (Guzzetti, 2000), new and more effective methodologies need to be developed to increase the characterization of landslide risk and to enable rational decisions on the allocation of funds for the management of landslide risk.

The relevance of many losses may depend on the time interval considered: in the short term, casualties, homelessness and damage to buildings, infrastructure and equipment may indeed be the primary concern. In the long term, however, economic loss and social disruption may be of greater importance. Mitigation measures for future landslide events are becoming increasingly common in municipal planning and development activities, especially where disasters occurred in the past. Preparedness and response planning mainly focuses on short-term contingency measures (to be applied during an emergency) whereas mitigation planning involves long-term control of land use, building quality and other impact-reducing measures for dangerous events (Sterlacchini & *alii*, 2007).

A preventive risk analysis is fundamental for setting up proper preparedness and response planning procedures. In achieving this aim, the degree of risk deriving from the expected magnitude of an event and its probable consequences, should be mapped and evaluated in systematic and quantitative way.

RISK ANALYSIS

Landslide risk can be defined in accordance with the definitions developed by the Office of the United Nations'

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