

# **Impact of Large Landslides in the Mountain Environment: Identification and Mitigation of Risk**



**Contract n° EVG1-CT-2000-00035**

**Scientific Report on Activities**

**Annex 5: WP8 detailed scientific Report**

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## WORKPACKAGE N. 8

### Establishment of mitigation strategies in the short and long term and evaluation of residual risk within several legal frameworks

**WP leader:** LCPC

**Participants:** RP, UPC, TUW, EPFL

**Planned start month:** 21

**Actual<sup>1</sup> start month:** 6

**End month:** 30

#### 1 OBJECTIVES

The main objective of the first phase of this workpackage is to review the legal frameworks related to landslide mitigation in the countries involved in the project (Austria, France, Italy, Spain, Switzerland).

#### 2 DESCRIPTION OF WORK

The activities done during the reporting period are:

**Activity 1:** Creation of tables for collection of data relating risk management procedures currently used in the countries involved

**Activity 2:** Filling up of the tables

##### 2.1 ACTIVITY 1

The risk management system in a given country has been divided in two main parts.

The first part, “**risk knowledge**”, is based mainly on technical data: hazard evaluation, elements at risk, their vulnerability. It includes all the surveys, data collections and studies, the aim of which is to get a knowledge as complete as possible of the risk in the concerned areas.

It depends both on the site and on the natural event. It is relevant to existing elements at risk, as well as to possible future developments.

This phase is concluded with the assessment of the acceptable risk.

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<sup>1</sup> The LCPC, leader of the WP8, started the activity in advance. This was decided by the consortium taking into account two elements:

- the period of presence at LCPC of the temporary staff working on WP8,
- it allows to provide to all the partners a more comfortable time schedule for the collection of data and the analysis of their politics in the risk management and for the synthesis to be done by the LCPC.

The second part “**risk control**” uses the results of the preceding one in order to define the recommendations of a management strategy inside the risk area.

The considered elements are:

- The safety (warning/monitoring and preparation of the crisis)
- The protection (buildings, infrastructures)
- The land use (territory management).

In addition, the items taken into account in the risk management system are:

- Actors (decisional component, technico-scientific team)
- Tools (legal framework, technical reference documents)
- Institution in charge financing the actions.

All the analysed arguments have been taken into account in the definition of the table 1 “Risk management system: national framework”. This Table has a matrix organisation that allows an easy understanding of the prevention politics of each country.

As a complement of the national aspect of the risk management, the management of each selected site has been considered. The table 2 “Chronology of the management of the landslide risk of each selected site” includes:

- the relationship between the evolution of the phenomenon, the perception of this evolution at a given time, the supposed scenarios of evolution with their consequences and the proposed management strategies,
- what are the decided actions to control/reduce the risk,
- who is responsible of the definition and implementation of these actions.

Activity 1 has been carried out by the partner LCPC, WP8 leader. All the partners gave their contribution to the definition of the tables in the discussions arose during the project meetings in Torino and Lyon.

Table 1: Risk management system: national framework

	Actors		Tools		Cost Financed by...
	Decision-makers	Technical-scientific team	Legal framework	Technical reference documents	
Hazard Assessment					
Vulnerability Analysis					
Risk Assessment					
Risk Mitigation					
Crisis and post crisis management					
Feedback from experience					

Table 2: Chronology of the management of the landslide risk of each selected site

Natural phenomena	Risk Evolution and Evaluation	Actors Concerned	Actions	
			Kind of action	Cost... financed by...

## 2.2 ACTIVITY 2

Tables 1 and 2 have been filled up for France and for the French test site “Séchilienne” data by the partner LCPC. They have been distributed to all the IMIRILAND partners, with the objective to provide an example.

The Austrian partner (TUW) has already sent back the tables with their data. The Italian partner RP have already completed table 1 with LCPC local support.

## 3 CONCLUSIONS AND FURTHER DEVELOPMENT

The partners started the activity within this workpackage in advance. This allowed to provide a more comfortable time schedule for the collection of data and the analysis of risk management policies in all the countries involved. At the moment this work is in progress. The partners are now working on filling tables 1 and 2 with regard to their countries. These contributions are expected in the next period.

Starting from month 24, when the first phase of the project will reach its conclusion with a risk assessment analysis for each site, the knowledge of the most probable scenarios and the evaluation of the risk related to each of them, will allow to elaborated different strategies consisting of land use regulation, remedial works, monitoring and alarm systems, etc.

The choice of one strategy is a compromise between cost and advantage, to be decided in an uncertain environment and in a given legal framework. We will try to build decision trees in order to make choice of the best-fitted strategies.