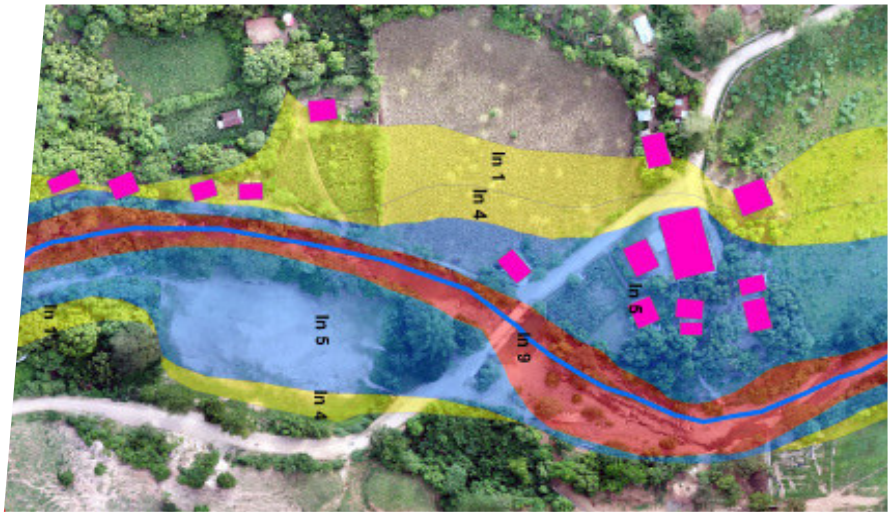
SRC International Cooperation – March 2024

Methodological Guide Analysis of Natural Hazards

Landslide
Debris flow
Flood



Swiss Red Cross

Why this guide is necessary

Statistics of damage caused by weather-related disasters show significantly growing worldwide trends. In recent decades, damage has been on the rise as a result of more frequent and more intense events. However, a more critical factor is the increasing number of settlements in vulnerable areas.

The Swiss Red Cross (SRC) supports its partner organizations in Disaster Risk Management (DRM) around the world, including emergency relief and post-disaster reconstruction. In addition, it is increasingly supporting disaster prevention and preparedness. These approaches are outlined in core documents of the SRC, such as the Disaster Management Policy and the Conceptual Framework for Disaster Risk Reduction. Through preparedness and prevention/mitigation actions, we seek to strengthen the resilience of vulnerable individuals and communities (see Illustration 1).

Illustration 1: Building blocks to strengthen resilience against natural hazards. Hazard and risk mapping is a prerequisite for planning preparedness and prevention/mitigation activities. Source: SRC

Sound knowledge of existing natural hazards is an important prerequisite for building resilience. Red Cross and Red Crescent (RC/RC) partners often carry out hazard analyses based on local knowledge, using the vulnerability and capacity analysis (VCA) method[1]. This method is essential. However, the importance of a VCA is often limited by a subjective assessment and insufficient consideration of the effects of rare extreme events which are beyond memories of local population.

[1] For more information on the method, see www.ifrcvca.org,.

This methodological guide is intended to complement the IFRC VCA methodology, with simple geomorphologic and quantitative methods to improve the quality of analyses. This document provides a practical manual for analyzing water, landslide and rockfall hazards. The maps that result from this exercise provide a basis for landuse planning, the planning of mitigation measures and organizational activities to deal with emergencies (early warning and evacuation system).

Illustration 2: Flooding in downtown Copiapo, Chile, in 2015. Source: Datos.bo

Who is this guide for

The target audience is the DRM practitioners in RC/RC organizations who conduct the analyses together with their grassroots organizations and external consultants mandated by the RC/RC.

The guide is aimed at both people who do not have a thorough knowledge of natural hazards and experienced users as well. It contains concrete step-by-step instructions for both user groups.

How this guide is structured

The guide includes definitions of hazardous processes, such as flooding, debrisflows landslides and rockfalls. For each of the processes, the guide provides hazard analysis manuals for analysis and corresponding tools.

If possible, the advanced standard should be applied, particularly for hazard analyses in residential areas, which require accurate information. The advanced standard requires basic knowledge in Geographic Information Systems (GIS). The minimum standard does not require expert knowledge in natural hazards, but it is advisable to participate in a practice-oriented training course to become familiar with analysis methods. The SRC offers such training courses.

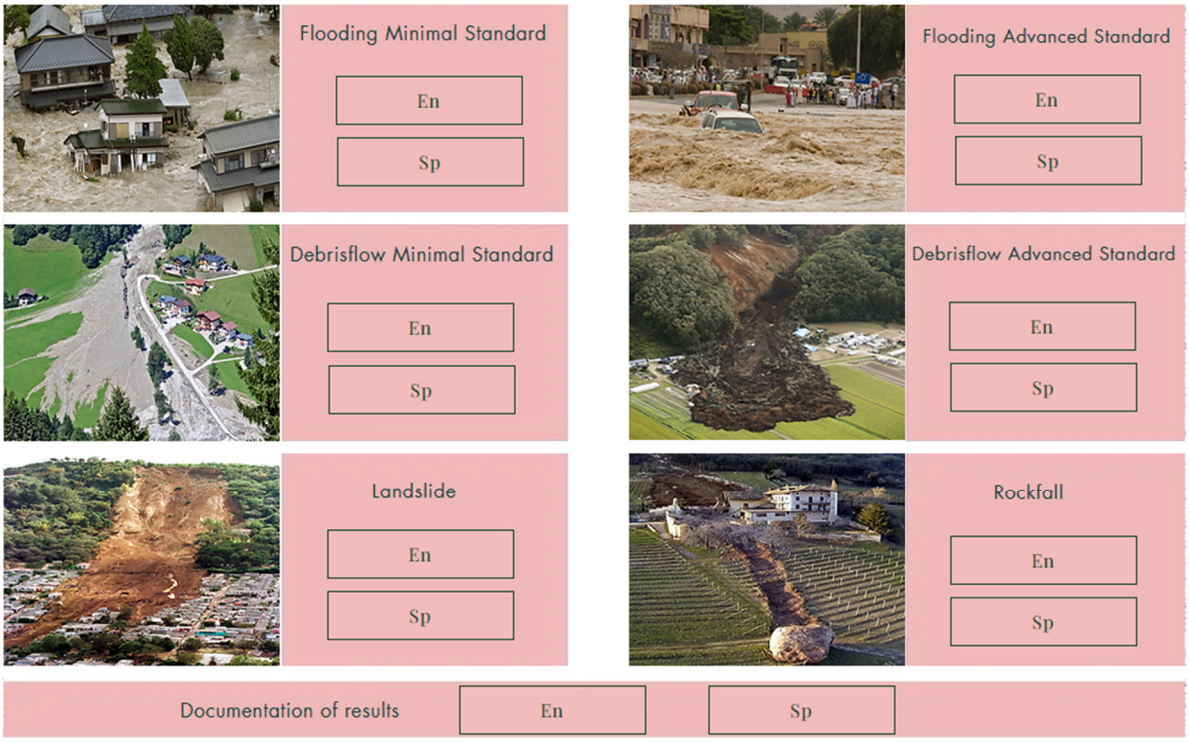


Illustration 3: Interactive presentation of a hazard analysis. The corresponding thematic section is displayed by clicking on a colored field. Source: SRC

Scope of the guide

This guide describes the work steps of a hazard analysis in order to map the spatial extent, frequency and intensity of floods, landslides and rockfalls. This guide examines three hazard scenarios:

- Very frequent event with a return period of less than 10 years
- Generational event with a return period between 10 and 30 years
- Extreme event with a return period between 30 and 100 years

Other processes such as drought and anthropogenic hazards are not addressed. The methodology for quantifying potential damage to people and livelihoods is covered in a separate guide entitled "Disaster Risk and Cost-Benefit Analysis".

In the analysis of flood hazards, the applicability limit is set for river basins smaller than 300 km^2 with a riverbed gradient greater than 1 %.

The hazard from deep spontaneous landslides with volumes greater than 10,000 m^3 cannot be analyzed using this guide, as it requires studies that normally exceed the financial and technical possibilities of the RC/RC.