



## UNISDR Science and Technical Advisory Group Case Studies – 2014

### Integrating community and observatory based monitoring to reduce risk at volcán Tungurahua, Ecuador

#### The problem

Long-lived episodic volcanic eruptions share the risk characteristics of other forms of extensive hazard (such as flood, drought or landslides). They also have the capacity for escalations to high intensity, high impact events. Volcán Tungurahua<sup>1</sup> in the Ecuadorian Andes has been in eruption since 1999 and represents one such challenge for forecasting and managing repetitive long-term risk. The forcible re-occupation of evacuated areas early in the eruption<sup>2</sup> demonstrated communities' desire to remain close to the volcano despite the episodic risks, however there was limited trust in scientific advice, an important factor in risk communication<sup>3</sup>. In these circumstances effective early warning and well-rehearsed and efficient evacuation becomes critical.

#### The science

Volcán Tungurahua is monitored by the Instituto Geofísico, Escuela Politécnica Nacional (IG-EPN) and managed by the local civil protection organisations. Resources were not sufficient to monitor and manage evacuations on all flanks occupied by communities. Thus, a network of volunteers (called 'vigias'), formed from people already living in the communities at risk, was created with two main goals in mind: (i) to facilitate timely evacuations as part of the civil protection communication network, including the management of sirens, and (ii) to communicate observations about the volcano to the scientists<sup>4</sup>.



Photo 1: Tungurahua with Baños in the foreground and communities on the flanks

The current network consists of around 25 *vigias* who use radios with which they maintain daily contact with the observatory. Some now assist with maintenance of the scientific monitoring equipment near their homes or land and make daily observations that add considerably to the sum of knowledge of the range and impact of the volcanic behaviour<sup>5</sup> often assisting with visual confirmation of inferred activity seen on the geophysical monitoring network. They facilitate community-level preparedness activities, such as evacuation drills and resource planning. This case draws on an analysis of these components<sup>4</sup> using mixed qualitative methods, drawing on earlier studies of social response to eruptions at Tungurahua<sup>5</sup>.

#### The application to policy and practice

So far, the communities have responded dynamically to the risk from the volcano, allowing them to live in close proximity and evacuating rapidly when necessary in consultation with the IG-EPN and local civil protection. Community trust in scientific advice and information has reformed since the difficult events of 1999, with *vigias* acting as intermediaries; and the *vigias* have received training from IG-EPN about what to observe, how to describe phenomena and how to communicate with the local observatory. Although initiated by Civil Defence with official civil defence volunteers, unlike a volcano observatory, the network is not incorporated as part of a statutory body. Nevertheless, in practice it fulfils an official role, with risk management authority uniforms, backing and resources.

#### Did it make a difference?

This enables the community to continue their way of life alongside the volcano when it is relatively quiet and to prepare for and rapidly mobilize themselves during acute activity. The network of *vigias* has greatly assisted the monitoring efforts of scientists providing visual observations and by maintaining equipment<sup>6</sup>. Frequent interactions with the scientists have fostered strong trust-based relationships, allowing the *vigias* to act as intermediaries between scientists and the communities during risk communication<sup>4</sup>.



*"The scientists are people who we can talk to and this shows a growth in trust. We now know what they think, what they do, not only talking about the eruptive process but also about our lives and how we live" - vigia of volcán Tungurahua.*

Photo 2: *Vigias* and a scientist, with an exemplary quote about their relationship

Prompt evacuations without loss of life during escalations of activity since 2000 can be attributed to the role of the 'vigias'. Following loss of life in 2006 the network was increased to include communities where mortalities occurred. Volcán Tungurahua is capable of larger-scale activity than has occurred since 1999 and so the network has not been tested for a large escalation in impact, but the trust developed by the network should engender the capacity for action should such an eruption be sufficiently forecasted. The network is a pragmatic response to a real risk problem and is driven by all stakeholders.

Apart from reducing volcanic risk, the network has been able to coordinate the response to fires, road traffic accidents, medical emergencies, thefts, assaults and to plan for future earthquakes and landslides

#### References

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