

## **Hazard perception and quantitative exposure levels at Turrialba volcano, Costa Rica; Implications for policy and practice**

Saskia M van Manen

The Open University, United Kingdom

E-mail: saskia.vanmanen@open.ac.uk

Continued exposure to the primary volcanic gases can result in a range of chronic ailments, reduced agricultural productivity, and acidification of rain and groundwater that contaminates water supplies. Indirect effects are thought to impede development and poverty reduction efforts. In Central America more than 26,000 people have died and in excess of 1 million people have been affected by volcanic disasters between 1900-2011. To reduce the impact and cost of natural hazards while increasing community resilience in the face of population growth and increasing pressure on ecosystem services, there needs to be effective communication and engagement with incorporation of local and cultural context into disaster risk reduction strategies. As governments and people respond to hazards and risk in ways proportional to their understanding and awareness, the objective of this research is to quantify local communities' exposure to volcanic hazards and to document people's hazard and risk perception.

Fieldwork was conducted January and February 2012. During this period quantitative data regarding exposure levels to SO<sub>2</sub> and acid gases were collected and 43 semi-structured interviews were conducted. A formal town-hall style meeting between the authorities and affected communities at Turrialba was also recorded.

Preliminary results indicate that the concentration of SO<sub>2</sub> up to 15 km downwind of Turrialba exceeds World Health Organisation guideline values, presenting a health hazard to people and livestock. Guideline values for the acid gases were not exceeded during the study period. The main theme to emerge from the qualitative data is concern regarding livelihoods, which is consistent with similar studies in other volcanic areas. In addition, the data strongly suggest significant levels of un- or under-preparedness despite the public education initiatives that have occurred. This is a real concern in the face of the continued gas discharge and potential for larger and life-threatening eruptions. These results imply that adjustments to hazard education and disaster management policies and practice may be required.

Although policy and legislation are essential components of risk reduction strategies, it has been found that the most successful results are achieved through community involvement and work at the local level. Therefore policy change should focus on engagement with the affected populations through collaboration with the scientific community in the design and implementation of integrated disaster risk reduction strategies. This will empower communities and stimulate them to take ownership and action. It will also serve to increase recognition of the wider range of hazards and potential impacts in the region, thereby producing effective but scientifically robust disaster risk reduction strategies that will largely be adhered to and serving to reduce community vulnerability to (volcanic) hazards.