



*Volcanic Unrest in Europe  
and Latin America:  
phenomenology, eruption  
precursors, hazard  
forecast, and risk  
mitigation*

## **TASK 9.2 IDENTIFICATION OF DECISION MAKERS AND THEIR NEEDS**

### **REPORT OF ACTIVITIES AND OUTCOMES**

**WP 9:** Decision-making and  
unrest management

**Task 9.2:** Identification of  
decision makers and their  
needs



**PROTEZIONE CIVILE**  
Presidenza del Consiglio dei Ministri  
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## INTRODUCTION AND PURPOSE

One of the main goals of the VUELCO project was to try to understand what is the best way to manage all phases of a volcanic unrest.

The project consortium offered chance to compare and analyze different habits, rules and levels on decision-making in different Countries.

Within this objectives, work package 9 of the project was related to the decision-making activities during a volcanic unrest.

The task number 2 of this work package aimed both to identify, in the different Countries involved in the project, who decision-makers are and to understand their requirements, especially from the scientific community.

To reach this goal a survey was developed to collect information about decision-makers and their needs in case of volcanic unrest, with specific reference to the six project target volcanoes: Campi Flegrei (Italy), Colima (Mexico), Cotopaxi (Ecuador), Morne aux Diaboles (Dominica), Soufrière Hills (Montserrat), Teide (Canary Island, Spain).

## METHODOLOGY

### Preliminary survey

First step was to identify who decision-makers are in the different Countries. In fact, experience shows that often responsibilities are shared among many levels: from national to regional, to municipal. In addition the responsibility at national level can be assumed by different entities like Ministry of Interior or Ministry of Environment or others.

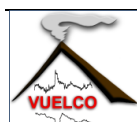
To achieve this goal two ways were followed in sequence:

- A survey was made on official websites of several governmental entities.
- A list of questions was sent to the Vuelco partners, to ask them more details about the situation in their Country; the questions were related to investigate:
  - which is the structure that plays the role of decision-maker,
  - who is the key person as decision-maker representative,
  - who are other possible entities/institutions that people trust most.

### Questionnaire elaboration

On the basis of the preliminary survey it was decided to elaborate a questionnaire to be sent to the identified decision-makers.

The questionnaire was addressed to decision-makers, with the purpose to understand, not only how they are organized and structured, but in particular how they deal with volcanic risk management, what communication strategies they adopt and what they need from the scientific community to better face a possible volcanic unrest.



A first draft version of the questionnaire was elaborated and shared among Vuelco partners to get their comments and suggestions.

The final version of the questionnaire, taking into account the feedbacks received from the project partners, was completed in May 2012. To facilitate the dissemination of the questionnaire, it has been edit in English and Spanish (see Annex).

### **Questionnaire structure**

The questionnaire is organized in 5 sections:

Section 1 - *General information about the decision-makers* - in order to first get general information about the decision-makers.

Section 2 – *Structure organization* - to collect more details on the structure organization in each Country and responsibility assumption.

Section 3 – *Volcanic risk management* - to know how volcanic risk is managed in exposed areas, both on the scientific side and civil protection activities.

Section 4 – *Communication strategy* – to collect information about the communication strategies and population participation.

Section 5 – *Decision makers needs* – to know about scientific-technical information and products that decision-makers consider useful to be provided with, in case of volcanic unrest, to help in making suitable decision, as well as mitigation actions to be adopted. This part was detailed with valuation of each information with his importance.

### **Questionnaire distribution and collection**

To be sure to reach the decision-makers and that the questionnaire was compiled by the right person in charge, it was agreed to convey the questionnaire through those Vuelco partners that have daily contacts with decision-makers in their Country.

This phase started in the early summer of 2012 and first replies began to arrive in July 2012.

Considering the limited number of Countries involved in Vuelco project, in order to have a larger sample of expert needs and points of view, it was decided to extend the survey to other Countries.

In November 2013 the questionnaire was therefore distributed during the VOBP (Volcanic Observatories Best Practices) conference held in Erice (Italy). In addition some other Countries were contacted directly.

Final collecting of all documents occurred during 2014.

Thanks to contributions from Vuelco partners, questionnaires were compiled by representatives of all the Countries involved in the project, sometimes even at different levels of responsibility (National, Regional, Municipal). In addition a couple of questionnaire were received also from other Countries.

The questionnaires received came from: Mexico, Dominica, Italy, Ecuador, Canary Islands (Spain), Monserrat (UK), La Reunion (France), Perù and El Salvador.



## RESULTS

Results emerged from different sections of the questionnaire are illustrated below.

### Section 1 - General information about the decision makers

With reference to the identification of decision-maker and related general information, it was found that usually a large volcanic unrest would be managed at the national level by a dedicated Civil Protection "Agency" organized at Governmental / Ministerial level. Often this is under the umbrella of the Ministry of Interior, that is the final decision-maker. In Dominica is the Ministry of National Security, Labour and Immigration. At La Reunion is the Prefect of the Department, who represents the French Government. In Ecuador is the Ministry of Coordination and Security. In Italy is the Prime Minister.

Local authorities are usually in charge to manage only small events within their area of jurisdiction. Depending on the number of people and the extension of the involved area, higher levels of authorities have power to take decisions.

### Section 2 – Structure organization

The results show that Civil Protection is commonly organized in 3 levels: National / Regional / Local. Depending on the gravity of the situation and the available resources on hands to face the event, one level after another, starting from the lowest one, is typically called up to help the population. In Ecuador there are also authorities at smaller level (villages). In some cases the law defines a further 4<sup>th</sup> level, regarding the call for international assistance.

In most of the cases decision are taken at the State (or federal) level, but operative structures and emergency actions are locally managed.

Small islands have few levels of authorities, and sometimes the mayor is the only decision-maker on site if government is on the mainland.

### Section 3 – Volcanic risk management

The third section of the questionnaire was dedicated to volcanic risk management (hazard maps, scenarios, emergency plan, alert levels, scientific advisory board, prevention actions, mitigation actions, population exposure, former experiences, cost/benefit analysis, false-alarm management).

Results show that hazard maps and emergency plans have been drawn up in a general way (although they are not regularly updated), but exercises and information campaigns have been carried out only in a few Countries and for small amount of people (even in the most exposed populated areas).

Some States involved population in exercise often, even if hazard maps and emergency plans are not developed and updated. In some cases the opposite happens: lot of documents have been prepared, but few exercises and information campaigns involving people have been performed.

Most of questionnaires assert that more activities where people are frequently involved would be needed in each Country.



Often there is a gap between what has been done in the past about volcanic risk management and what present stakeholders involved in the process know about that. This is a major problem where authorities often changes and studies and activities about volcanic risk management are not often updated.

Cost/benefit analysis are usually not applied because of lack of information or for political choices.

False-alarm management often appears to be under-considered by decision-makers and institutions involved in volcanic risk management. Looks like only few Countries are properly conscious about the importance of this issue (although not yet developed).

#### Section 4 – Communication strategies

The fourth section of the questionnaire focused on communication strategies between the scientific community and decision-makers as well as toward the population, on the responsibility of official communication and on risk perception.

Results indicates that different institutions (from Mayor to Ministry) are involved in all levels of communication. Language used is often the national one only. Sometimes local dialects are also used.

Risk perception is generally low, even in highly populated areas close to volcanoes.

The great development of modern technology (websites, mobile phones, etc) in the last years has helped a lot in improving communication between scientists and decision-makers and with the population.

Also in this section, there is a common view that more actions and communication strategies are needed to better inform population on the volcanic risk. This is important also where eruptions are frequent, cause this can even bring to overconfidence with consequent reduction of risk perception.

It is important to develop information material, avoiding the use of too scientific jargon, to be adopted to train local officers and the public.

Anyway more in communication strategies have been developed within work package 8.

#### Section 5 – Decision-makers needs

The fifth section focused on decision-makers' needs with reference to significance of different information during a volcanic unrest. It also aimed to investigate the importance of accuracy in contrast with timeliness of each information (hazard map, early warning, scenario, probability of occurrence and uncertainty, duration of phenomena, false alarms probabilities and costs, possible mitigation actions with their time and costs, etc.).

Unfortunately this part of the questionnaire has not always been filled out, limiting the possibilities to better understand decision-makers' needs. However it appears that, in order of importance, decision-makers mainly want to know:

- 1) kind of expected hazardous phenomena;
- 2) probability of occurrence of different possible hazardous phenomena;
- 3) areas with different hazard levels;



- 4) evolution and duration of the phenomena;
- 5) time needed to adopt each mitigation action.

Low importance seems to be given instead to false alarms and associated collateral risks. Also looks like it is considered less important to evaluate costs of possible mitigation actions.

In many cases the timeliness of the information appears to be preferred to their accuracy.

Regarding possible mitigation measures to be adopted, it is necessary to distinguish them in structural and non-structural actions.

In the first category the construction of temporary shelters or containing walls have been indicated as possible opportune measures to mitigate lahars risk in some zones, while seismic retrofitting of buildings and improvement of roof resistance to overloading seem to be adequate in areas exposed to ash fallout.

On the other side, identified non-structural mitigation measures include: people information and education (with special reference to the diffusion of rules of behavior also by means of exercises), adoption of individual protective devices (masks, glasses), elaboration of emergency plans (considering people evacuation and other response actions).

## CONCLUSION

Despite all efforts produced in order to get as much information as possible about decision-makers and their needs, it was really difficult to obtain replies and to get enough details to have a clear image.

Likely, better results would have been obtained if the questionnaires had been submitted and completed through dedicated interviews on person, as initially planned, rather than sent via email.

In some cases emerged that the questionnaire was not filled in completely and sometimes not by decision-maker but by scientists involved in the matter. Although they may have a wide competence and a complete knowledge of the topic in their Country, the point of view may significantly diverge from a decision-maker's one.

Unfortunately the only Civil Protection agency involved in the project as a full-partner was the Italian one. The contribution from more Civil Protection agencies would have been useful to get a more decisional/operational oriented point of view.

Nevertheless, from the available information collected, it was possible to reconstruct and understand who the decision-makers are in different Countries and how their systems work and are organized.

Useful information regarding strategies adopted for volcanic risk management and people communication were also obtained, as well as indications on what decision-makers need from the scientific community in order to better deal with volcanic unrest.

Some general findings which emerged are reported below:

- Decision-making is a task under the responsibility of different authorities in different Countries. In fact it may compete to various Ministries or entities at national level.



- Civil Protection is commonly organized in 3 levels: National / Regional / Local. Depending on the gravity of the situation and the available resources on hands to face the event, one level after another, starting from the lowest one, is typically called up to help the population. Communication and good practices exchange among Countries could greatly help in improving systems.
- Regarding volcanic risk management, many studies have generally been carried out quite everywhere, in fact hazard maps and emergency plans have been drawn up in many Countries. Unfortunately problems arise where authorities often changes due to political reasons and the knowledge of the matter is not transmitted to the new persons in charge. It is therefore crucial to train technical personnel of local administration that are not subject to these changes.
- Even where hazard maps and emergency plans exist, exercises and information campaigns have been performed only in a few cases and for small samples of people. Therefore generally there is little information and low risk perception even in large towns close to volcanoes. It is very important to involve people in drills and information campaigns, that should be long-term planned and frequently repeated. This will make Civil Protection operations simpler and more efficient in case of necessity.
- The most important information decision-makers need to be provided with are: kind of expected hazardous phenomena and related probability of occurrence, areas with different hazard levels (hazard maps), scenarios (evolution and duration of the phenomena), time needed to adopt each mitigation action. Low importance seems to be given instead to the costs of mitigation actions as well as to false alarms and associated risks. In many cases the timeliness of the information appears to be preferred to its accuracy. Some indications on the most suitable mitigation measures in area exposed to different phenomena also emerged from the questionnaires.

Finally, although some of the difficulties encountered need to be carefully considered in results analysis and the limited number of Countries investigated can hardly permit to extend the outcomes to a global level, it seems to be possible to consider results generally valid for the goals of the task and certainly useful to orient future developments.

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