Chapter 7

COMMUNICATION BETWEEN SCIENTISTS, CIVIL AUTHORITIES, NEWS MEDIA AND THE PUBLIC

7.1 Introduction

Communication between the various professional groups involved in managing a volcanic emergency must be rapid and effective, if appropriate protective action is to be taken in good time. Significant information on the state of the volcano and its probable future behaviour will come from the scientists, and this, together with information on the action taken or envisaged by the civil authorities, must be passed on to the public via the news media. If the scientific forecasts are precise and reliable, if the civil authorities are prepared and have the means to take appropriate protective action, and if the public is fully and accurately informed of the findings of the scientists and the measures taken by the civil authorities, casualties can usually be prevented and losses reduced.

In practice, problems arise:

(*a*) When there is disagreement among scientists on the interpretation of the observed phenomena and on the probable future course of an eruption;

(*b*) When the scientific data and inferences drawn from them are couched in terms which are not sufficiently precise or not easily understood by the civil authorities;

(*c*) When the news media transmit to the public incomplete or distorted information on the nature of the volcanic hazard or on the measures being taken to protect people against it.

7.2 Example of a communication problem

The 1976 eruption of La Soufrière volcano in Guadeloupe (French West Indies) was a small one (see chapter 2 above), but it caused great alarm partly because of the high level of perception of volcanic risk in the West Indies and partly because of the high density of the population on the

flanks of the volcano. The eruption was most noteworthy, however, and is cited as an example here, because of the acute problems which arose in communication both among scientists and between the scientists and the other parties concerned.

The starting point of the polemic was the failure of the scientists to agree among themselves or in public on the probable course of future events on the volcano. Opinions ranged from one extreme, that destructive activity was unlikely and in any case would not occur suddenly without warning, to the other extreme that a violent climax was inevitable and might occur within 24 hours. The ensuing publicity heightened these differences and led to a polarization of scientific opinion and a refusal to compromise. Meanwhile, most of the 72,000 inhabitants of the lower flanks of the volcano were evacuated and did not return to their homes for nearly three months. The evacuation was terminated only after a multinational scientific commission had concluded that the volcano presented no immediate danger. The affair continued to be debated for several years in the volcanological literature.

The main reasons for the polemic between scientists were inadequate analysis of the significance of the observed phenomena for the purpose of prediction, and the absence of any quantitative assessment of hazard based on all relevant and available data. Scientists communicated their views independently to the civil authorities and to the media, in some cases expressing opinions not only on the probability of a destructive event but on the desirability of evacuation. The failure of the scientists to agree among themselves resulted from:

(*a*) Uncertainties as to the reliability of the observational data,

(*b*) Differences of opinion regarding the significance of the various possible precursory phenomena;

(*c*) Incomplete knowledge of the previous eruptive history of the volcano, and

(*d*) Rivalry between scientists and scientific teams as to who or which had the prime responsibility for monitoring and interpreting the volcanic phenomena.

7.3 Communication among scientists

In the present state of volcanological science, and probably for some time to come, differences of opinion will inevitably arise among scientists regarding the prediction of volcanic activity. The civil authorities respon-

sible for public safety cannot be expected to judge between different scientific opinions; they need an objective, impersonal statement representing the consensus of scientific knowledge and opinion. At a regional seminar held by UNESCO in 1976 soon after the Soufrière eruption, civil defence specialists urged that "on every important scientific issue as it arises, a single, impersonal decision should be given which represents the collective opinion of all the scientists involved" (UNESCO, 1976).

In many countries there is no single institution having sole responsibility for volcanic monitoring, and rivalry can easily develop between different scientific teams working on a volcano during an emergency. On the other hand, in the critical circumstances of a volcanic emergency, the assessment of hazard should be a collective rather than an individual responsibility. It is desirable that in each such case an *ad hoc* scientific committee or task group be established, with authority to co-ordinate observations and to review the inferences drawn from them.

Most civil authorities and most scientists would probably agree with this suggestion, though there may be differences of opinion regarding the composition and terms of reference of such committees. It is possible that in some cases the civil authorities would prefer to select the experts to serve as members of the committee whereas, in general, scientists may prefer to decide among themselves who should represent them. The procedure adopted will certainly vary from country to country.

During the 1977 eruption of Usu volcano in Japan, the co-operation of many government and university institutions was successfully organized by the National Co-ordinating Committee for the Prediction of Volcanic Eruptions. Field observations were made by eight different institutions, and each morning one representative of each institution attended a meeting at the field headquarters to discuss the latest data, following which a press communiqué was issued. Similar procedures are followed regularly in Iceland, where there is daily contact between the Civil Defence Organization and the Volcanological Institute even when there is no eruption in progress.

7.4 Communications between scientists and the civil authorities

The accuracy with which natural phenomena can be predicted depends on their complexity. Astronomical predictions of the movements of the sun, moon and planets can be made with extreme accuracy, using only the Newtonian laws of motion and gravitation. Meteorological predictions are less accurate because of the complexity of the processes governing the transfer of thermal and mechanical energy within the atmosphere and be-

tween the atmosphere and the earth's surface. Volcanic processes are perhaps less complex than those in the atmosphere, but they take place at depths within the earth which render them very difficult or impossible to observe directly.

Scientific predictions of volcanic activity will always contain an element of uncertainty, and will usually be expressed as probabilities of various phenomena occurring during various periods of time at a given volcano. Categorical statements (e.g. that a particular phenomenon *will* or *will not* occur) will nearly always be subject to doubt.

Public authorities, on the other hand, have often to make decisions on a "yes" or "no" basis, and in the case of volcanic eruptions, where human lives may be in danger and where evacuation of the population is often the only effective measure of protection, such decisions are of great consequence for the economic and social life of the community and the country concerned.

It is therefore of crucial importance to develop an effective dialogue, so that the civil authorities can make the best use of the available scientific information and advice, and to do this before an emergency arises. The civil authorities need to acquire, through discussions with the scientists, insight into the reasoning which leads to the formulation of predictions in a particular form (e.g. statements of the probabilities of occurrence of various phenomena); on the other hand, scientists need to familiarize themselves with the problems faced by the civil authorities, so that they understand the latter's responses to predictions and the reasons behind these responses.

The advantage of such prior consultation between scientists and civil authorities is that it not only makes each side more aware of the kind of information required and available, but provides an insight into the personalities of the individuals concerned, their ability to make sound judgements under stress, and their readiness to work as members of a team.

7.5 Communications with the public

Both long-term measures to limit volcanic risks, and emergency measures to reduce losses when eruptions do occur, have necessarily to be planned by the civil authorities but, to be effective, they depend on the understanding and co-operation of the community as a whole. Prompt and effective action in emergencies can be achieved only if the public is made fully aware beforehand of the nature and degree of the hazards and the consequent

risks, and of what can be done collectively and individually to reduce these risks.

Information about the hazards comes from scientific studies of each volcano and can be disseminated to the public through the various information and news media, either by the scientific teams directly or by the civil authorities on the basis of information received from the scientists. It will normally be the prerogative of the civil authorities to decide on the procedure to be adopted for the diffusion of this information.

The simplest procedure from the administrative point of view, and the most "democratic", is to allow the news media free access to the scientists, and to encourage the scientists to respond to reporters. The advantages of this are:

News of the latest volcanic developments and predictions will be spread widely and rapidly to the general public;

It will be evident that no information is being withheld from release to the public for political or other reasons;

The public will be made fully aware of the efforts that are being made to monitor the volcanic activity and to foresee the course that it will take;

Reporters will not be tempted, through lack of first-hand information, to quote second-hand reports or rumours of dubious accuracy.

The disadvantages are:

Reporters, in their search for newsworthy material, may tend to present or interpret scientists' declarations in an unduly spectacular manner, exaggerating the more fearsome possibilities;

Frequent interruptions by reporters seeking the latest information may distract scientists from their primary duty of making and assessing scientific observations.

Further problems may arise if reporters are free to interview scientists individually:

When different scientists are interviewed in this way, they may make statements which are, or appear to be, mutually contradictory; real or apparent differences of opinion may be highlighted, leading to embarrassment and possible confrontation between the scientists concerned;

Reporters are not always in a position to judge the scientific competence and reliability of the persons they interview, and may be misled into giving credence to statements made by persons whose principal motive is to gain publicity for themselves or for their opinions.

There was free communication between the scientists and the news

media during the early stages of the 1976 eruption in Guadeloupe. When public disagreement between scientists became an embarrassment, meetings of scientists were held in the hope of reaching agreement on the nature and degree of the hazard. These meetings were only partly successful because some of the scientists involved continued to speak independently to the news media.

An alternative policy, virtually the opposite of the "open house" described above, is for the government to forbid direct access of the media to the scientists, and for the civil authorities to act as the sole clearing house for all news about the volcano. This simplifies the work of the scientists, who are thus freed of any responsibility for public relations and of the distractions caused by visiting reporters. It also goes far towards ensuring that differences of opinion among scientists will not reach the public domain. On the negative side, it may give rise to suspicions among the public that the scientists are actively or passively colluding with the authorities to suppress or distort information. In one recent mild eruption, for example, the scientists in charge were accused by a leader of the political opposition party of conniving to stimulate the volcano into destructive eruption in order to wipe out the population (mostly opposition supporters) living on the flanks of the volcano.

Whatever the official policy, the disadvantages of random communication between individual scientists and the news media are generally recognized. During an episode of steam venting on Mt. Baker in northwestern USA, many geologists visited or flew over the area and subsequently made statements which were presented by the news media as predictions. A subsequent study (Marts *et al.*, 1978) concluded that "the Task Force Information Committee which was set up appears to be the best available approach to the information problem, even though it may be suspect as an attempt to manage information". During the eruption of Mt. St. Helens in 1980, an Emergency Co-ordination Centre was set up by the US Forest Service and the US Geological Survey, and it was agreed that all communication with the news media would be handled by this Centre. During the 1977 eruption of Mt. Usu in Japan, the National Co-ordinating Committee for the Prediction of Volcanic Eruptions held a daily meeting after which a communiqué was issued to the press.

7.6 Public response

Even when the public is kept fully informed of the evolution and probable course of a volcanic eruption, and of the measures taken to reduce

possible losses, public response may in some cases be insufficient or inappropriate to the situation. The causes of this may lie in the history, culture, level of education, state of economic development and social structure of the population, and thus vary from country to country. The degree of constraint that the civil authorities can exercise over individuals also varies greatly. In any case, emergency measures recommended or imposed by the civil authorities will receive the active participation of the population as a whole, only if the public has been prepared for them by a long-term effort of information and education to overcome natural resistance to inconvenience and change.

In any event, the information should be communicated to the public:

In language which is non-technical, clear and precise;

With the minimum of distortion of fact or opinion;

With the minimum of delay; and

In such a way as to make it evident that the information is accurate and complete (i.e. that no significant facts have been withheld).

People may often resist advice or orders to leave their homes or places of work if the signs of an impending eruption are not immediately visible. They resent the inconvenience and fear for the safety of property left behind. They may feel that if past generations lived through the hazards and endured occasional catastrophes, the present generation should be willing to do the same. This latter attitude is strong where volcanoes have assumed religious significance. Apathy or fatalism may also be widespread.

Some individuals and groups may seek to exploit the situation for their private gain (e.g. by trafficking in real estate). On the other hand, the civil authorities may come under pressure from groups of people whose livelihood would be affected adversely by evacuation or even by the public designation of a hazard zone. For instance, the local tourist industry may be severely affected by statements regarding volcanic risk and may oppose the publication of hazard maps or the restriction of access to certain areas.

To overcome such difficulties and to create the social and psychological climate for full public co-operation in emergency measures, one needs a long-term effort of public education, in which scientists, the civil authorities and the news media all have a part to play.

In several countries, museums have been set up near volcanoes, containing photographs and other material on past eruptions, as well as illustrations of what can be done to reduce the risks to life and property. In Iceland, such information is printed in each telephone directory.

Despite widespread public interest in volcanoes, there is still a need in many countries for educational material on volcanic hazards, to be used in schools, and colleges, and in periodic radio and television programmes for the general public.

Bibliography
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