



**COMMUNITY PREPARDNESS FOR
VOLCANO HAZARDS
GOMA, DRC**

Final Report

June 1 2002 to May 31, 2004

1. Contacts

Organisation: Concern Worldwide US

Mailing address: 104 East 40th Street, Room 903
New York, NY 10016

Contact Person: Melissa Durda
Telephone: 212 557 8000
Fax: 212 557 8004
Email address: melissa.durda@concern.net

Field Contact Person: Tilaye Nigussie, DRC Country Director
Telephone : + 243 98 24 24 44 (Kinshasa)
Email address: tilaye.nigussie@concern.net

Program Title: Community Preparedness for Volcano Hazards

Grant No.: **HDA-G-00-02-00160-00**

Number of beneficiaries: 450,000, the population of Goma

Disaster: Post Volcano eruption of 17 January 2002

Area of Activity: Goma

Country: Democratic Republic of Congo

I. Summary

Over the course of this program, Concern and its partners, Crongd and the Goma Volcanic Observatory (OVG), sensitized 406,862 people in and around Goma on volcanoes and their associated risks. The Volcano Information Center was set up to ensure continual education of the general public. The capacity of Crongd, OVG and local authorities and communities were strengthened so that future loss and damage will be minimized in the event of another disaster.

II. Program Overview

A. Program Goals and Objectives

Goal

To contribute to the strengthening of local response capabilities to prevent and reduce the risks of damage or losses caused by volcanic activity in and around Goma, eastern DRC.

Objective I: Strengthen community understanding of volcano associated risks

Objective II: Strengthen information networks on volcano-related risks

Objective III: Strengthen response of partners and communities to mitigate risks (including strengthening the capacity of local authorities, key partners and communities to mitigate future loss or damage in the event of similar disasters)

B. Profile of Target Population and Critical Needs

Concern indirectly targets the entire population of Goma and its environs in implementing this program, since all the residents of Goma are considered vulnerable to the hazards of the volcano. The population of Goma is currently estimated at over 450,000 people. People in a wider area in North and South Kivu and into Rwanda have also been reached, mainly through the media broadcasts.

The following local, implementing partners are also direct beneficiaries:

- 40 *Chefs de Quartiers* and their assistants
- 20 traditional chiefs in the area surrounding Goma
- Crongd - *Conseil Régional des ONG's pour le Développement*
- The Goma Volcanic Observatory (OVG)
- Community members of the 18 local committees
- Radio and television journalists.
- The Concern, Crongd and OVG animators

In turn these partners have sensitised the following specific target groups as defined during the initial research phase of the program:

- Local community based organizations
- Women's associations
- Medical bodies
- Other members of local authorities

- Representatives of local and international NGO's
- The remainder of the population in Goma

C. Geographical Location

The animators have worked in all 18 neighbourhoods of the town of Goma and in nearby rural communities in the territories of Nyiragongo and Masisi.

III. Program Performance by Objective

Objective 1: Strengthen community understanding of volcano associated risks

Activity 1.1:

Over the course of the program, five relevant and comprehensive messages were utilized by Concern and its partners, Crongd and OVG, for the sensitisation of the communities. OVG's scientific knowledge ensured that the messages were accurate and up to date and the animators ensured that this information was relayed in a comprehensible manner. The OVG has held regular workshops for the animators to give them the latest information on their findings on the activity of the volcano and to answer questions that the team brought back from the field. Some of the messages were slightly modified but the general theme remained the same - how to live with the volcano. The messages were as follows:

1. Volcanoes: explanation of what they are and their features.
2. Advantages and disadvantages of the volcano.
3. Negative effects of the volcano, including those related to health. A particular emphasis is put on the "mazuku", which are fissures or openings in the lava where high densities of gas, such as carbon monoxide and sulphur dioxide, are emitted and can be dangerous to those living nearby or walking near them. Himbi, Keshero, Lac Vert and Mugunga are areas especially affected by this.
4. Alert systems (some messages modified by the OVG) with the 4 colors indicating the 4 important phases:

GREEN	Activity normal
YELLOW	The volcano is active, but no immediate danger to the population.
ORANGE	Intense activity, eruption possible, prepare for possible evacuation.
RED	Eruption imminent, follow the messages on the radio, wait for the order from the authorities to evacuate, or listen for the siren.
5. Evacuation plans and precautions to consider before and after eruption.

Additional messages were developed over the course of the project, including:

Risks of volcanic gas

- What it is and its features
- How to recognize gas emissions
- Types of volcanic gas
- Geographical location of gas leaks in Goma
- Harmful effects on people, animals, plants

Seismology

- Analysis of concepts: hypocenter, epicenter, seismograph
- Causes of earth tremors and earthquakes
- Tectonics and movements of tectonic plates
- Characteristics and origins of earth tremors
- What to do in case of an earth tremor or earthquake.

Examples of items covered in training:

- Seismic aspects of eastern DRC including Nyiragongo and Nyamulagira
- OVG's new surveillance equipment
- Phenomenology of Nyiragongo: the current state of the lava lake and related aspects
- Geothermal and electronic measurement
- The management of the information center
- Animation techniques
- Team management
- Planning field work

This training benefited from the expertise of the OVG staff, including international volcanologists.

Objective 2: Strengthen information networks on volcano-related risks.

Concern and Congd team, in collaboration with local authorities, successfully set up “emergency follow-up committees” in each of the 18 neighbourhoods. Their role is to:

- ensure that the work of the volcano project continues e.g. maintenance of alert panels and flags, monitoring of gas emissions etc.
- continue to organise awareness raising meetings, film shows and other activities.
- enable information from the OVG to continue to reach the population at all times.

A series of training sessions has been organised for these committees.

To strengthen this information network, Concern provided the following:

- Leaflets (140,000 in French, 110,000 in Swahili). The leaflets were designed by the teams and have been distributed after sensitisation sessions.
- 55 color-coded, bi-lingual alert panels have been fixed at strategic points in the town and in schools.
- 20 new panels indicating locations with a high risk of gas emissions.
- Construction, equipment and running of a Volcano Information Center situated next to the OVG with a view of Nyiragongo and of two extinct volcanoes over the border in Rwanda (when the air is clear).
- Production of teaching materials for 135 schools.

The animators provided through the OVG have been responsible for technical aspects and in helping to produce the didactic materials and artistic visual aids for the animators to use in the field and for schools. These visual materials include: the structure of a volcano, the structure of the earth, different types of eruption, classification of volcano types in the world, levels of alert. A number of clubs and associations have also requested and received didactic materials, including the Training

Center for Street Children, Juhudi School Complex, Club of Young Friends Protectors of Nature, Organisation for Protection of the Environment, Congolese Red Cross. These groups have organised their own awareness raising activities in their neighbourhoods as well as helped to identify high risk locations.

Activities 2.1

Concern’s leaflet on the volcano contained 5 basic lessons which can be used by teachers in school and was well received by the pupils during the animators’ visits. The messages were particularly relevant as many of the animators were former teachers.

The Volcano Information Center was and continues to be a constant source of information for individuals and groups. It is open 6 days per week and since its opening there have always been two animators on duty. OVG experts are on call if additional information is required quickly.

The weekly report which updates the state of volcanic activity was distributed to each local committee and to schools and other organisations upon request.

Activities 2.2

Thorough training has ensured that the animators have an excellent mastery of communication techniques. Following their awareness raising efforts, they have enabled local committees to be installed by their communities in all 18 quartiers. In the last months of the project 6 training workshops were held for the committees.

Activities 2.3

Concern, Crongd and the OVG developed radio messages that were broadcast on Radio Okapi in both French and Swahili (15 minutes on Monday, Wednesday and Thursday); RTNC radio (Monday, Thursday, Friday, Sunday) and Great Lakes Full Gospel Radio (daily). They were also broadcast 20 times on RTNC television.

Activities 2.4

Concern and its partners became involved with the issue of the gas emissions (“mazukus”) in the area and recent visits have been made to some of the most affected areas- Keshero, Himbi, Lac Vert and Mugunga. The staff from the OVG used a landfill multi-gas analyser for recording types of gases and quantities (CO₂, H₂S, O₂, CH₄ and CO) and surveyed these areas, recording gas emissions. It was found that in several areas the emissions of carbon dioxide are dangerously high. These are places where an abundant concentration of carbon dioxide is released from the ground. In some shelters at lake level, concentrations of CO₂ were as high as 47% and O₂ as low as 10% (the latter normally being 17% in normal air). Residents of these shelters complained of severe headaches and respiratory problems particularly at night when sleeping at ground level. Children and older people are particularly at risk. There are other areas where fissures are present in Goma, often in densely populated areas (see table showing neighbourhoods where a concentration of CO₂ has been found below).

Quartier	Site	CH ₄ %	CO ₂ %	O ₂ %	CO %
Keshero	Lake shore	-	37,1	11	2
	Lake shore		22,4	13,6	3

Lac vert	Mawe Hai A		49,7	9	9
	Mawe Hai B		45	10	11
	Buhimba	0,1	21,4	14	11
	Buhimba		35,5	11,6	3
	Av.Xaveriens		46,1	9,9	2
	Av.Kimbanguiste1		38,5	11,4	2
	Av.Kimbanguiste2		38,8	11,4	2
	Kabutembo B	0,1	49,3	9,4	11
	EP Bulengo	0,1	38,5	10,7	5
	Katambi	0,1	49,8	9,2	4
	Kirunga	0,1	40,2	10,6	4
	Av.Kabande	0,1	38,6	10,9	2
	Nyabyunyu		60,8	7,5	11
	Kanyabishoho	0,2	56,3	8	13
Sake	Institut Kiluku	0,1	43,1	3,3	14

The places in Goma where pressure is low, concentrations of CO₂ are found in a band 2 kms wide and 27 kms long that stretches along the north shore of Lake Kivu. In some of these places the concentration is up to 70% whereas 15% can be fatal. Unfortunately, most of these locations are highly populated and crowded. There have been a few deaths at these sites as well as a loss of livestock, including goats and chickens, especially before the warning panels were erected.

Activities 2.5

As part of this project, Concern supported the production of the video on the dangers of the volcano. Animators played roles in demonstrating on film the different activities to be followed according to the colour alert. Examples include orderly evacuation, listening to the radio messages and the dangers of the gas to people and animals. The commentary for the film was in both French and Swahili.

In the past year this film has been shown extensively as part of the sensitization process. The film is followed by a question and answer session. The methodology is: experience (doing and seeing), reflection and analysis, generalization (lessons learned) and finally application (putting into practice). Versions of the film in English and Kinyarwanda were proposed but have not been made. For screenings, Concern has provided a mobile generator to enable the film to be used anywhere.

Objective 3: Strengthen response of partners and communities to mitigate risks.

The follow up committees, referred to above, strengthen local response. Their members have been trained in communication techniques as well as the basic information to be communicated. Concern tried to prepare them to be self-sufficient through PRA training. These committees are responsible for coordination, changing the flags on the alert panels, disseminating the information given in the weekly and monthly reports provided by the OVG to the community at large. The Education, Sensitisation and Communication Commission has contributed greatly, meeting on a weekly basis to discuss the progress of the program and its members are helpful in acting as a liaison with the authorities. Members of the commission have been present at animation sessions and each member helps in the process of awareness-raising in his or her sector (school, church, association, community). The commission has been dormant since the unified national government came into

power early in 2004. The National Education Authorities gave written permission for the animators to work in their facilities, as there were some initial difficulties in individual schools when school directors refused access without this document.

The radio and television broadcasts enable the message to be heard beyond Goma e.g. in Sake, Masisi and Bukavu; and also in nearby areas of Rwanda. Feedback from these broadcasts comes in the form of telephone calls and e-mails from people who want to learn more about the volcano. For example, a youth group in Kalemie (N.Katanga) wrote to ask for leaflets and videotapes; a school in Kindu (Maniema) wanted teaching aids and churches in Goma wanted to know about the health risks.

Another role of the animators has been to highlight and reinforce the work of the Observatory and the importance of safeguarding the equipment sited at various strategic positions in the field. This information is important for the experts following the activity of the volcano, so that they may give early warnings.

Activities 3.1

Concern has been able to reinforce coping mechanisms and capacity of the local authorities, key partners and communities to minimise future losses or damage in the event of another eruption. When starting work in each new quartier, the animators met with the Chef de Quartier and his assistants to explain the benefits and plans. Early on, the Mayor of Goma was present at a sensitisation session with his staff plus a large number of Chefs de Quartiers. At a more general level, the fact that the awareness raising activities have reached all levels of society means that in case of a future eruption, everyone will be attentive to the instructions given. (See Activity 1.1 for further information on the alert panels.)

Activities 3.2

All of Concern's activities in the Volcano project have been regularly reported to the "Commission de Gestion de Catastrophes", of which the Governor is chairman, and to the Sub-commission for Education, Sensitisation and Communication. Issues are discussed and any problems encountered are put to the committee for assistance and ideas. The Governor regularly makes recommendations and has intervened in a positive way since the beginning of the program. This has allowed the project to be operational in the rural areas outside Goma where the villagers are affected by gas emission, deposits of ashes, scoria and "cheveux de péle". In recent months members of the sub-commission have visited key sites on many occasions including two visits up the volcano. All the relevant authorities are provided with Concern's monthly project report.

Activities 3.3

The neighbourhood-specific risk maps and evacuation plans are not yet finalised and therefore Concern has not yet been able to incorporate them in the program. The leaflets containing summarised messages, photos and colour coding have been immensely popular and widely distributed. As they are in both Swahili and French most of the population are able to understand them. These often leads to people to seek further information and then pass it on to others.

Activities 3.4

11 special sessions have been held in recent months in Lingala for the military, police and church congregations. 17 sessions have been held in Kinyarwanda which is spoken widely among the rural population and part of the army.

Activities 3.5

Messages to create awareness of the volcano have been adapted for use in each different context and are always based on up to date information from the OVG experts as well as on feedback from the beneficiaries. They include advice on what to do in the event of an eruption. These messages are also recorded and broadcast in French and Swahili regularly on the UN radio station OKAPI three times per week, by the national radio station RTNC four times per week and by Great Lakes Full Gospel Radio. Broadcasts on RTNC television have also been transmitted regularly from March 2004.

IV. Overall impact of the Volcano Program.

a) General.

As a result of this program, the nature of the volcano is now understood by a majority of the population. This project has been of vital importance to the people of Goma, practically and psychologically. They know now that they will receive ample warning of an eruption and that loss of life and property will be minimised.

b) Impact on the population at large.

- A total of 406,862 people were directly reached in the course of this project. This represents almost 90% of the population of Goma. It can be assumed that others have been indirectly informed through the media or by those directly contacted.
- The nature of Nyiragongo is now understood by the majority of the population. People no longer have irrational fears as to how the volcano behaves. Rumours can be corrected on the basis of sound advice from OVG experts. The volcano, which had been seen as something both divine and malevolent, is now understood as a natural phenomenon.
- The Volcano Information Center is a permanent asset for the use of the people of Goma and is already attracting a steady number of individual visitors as well as groups from schools and associations. The center is one means by which the effect of the project can be made permanent.
- The system of alert indicated by the panels (and by the sirens now also installed by Swiss aid) is now understood by most people.
- Students are advocating a positive use of the location of Goma next to a volcano – to set up an institute of volcanology.
- As a result of the efforts made by the team to raise awareness among school pupils and university students, their parents and friends are also sensitized.
- Beneficiaries have been involved in the search for fissures and other high risk locations where special panels have now been erected.
- There have been no more movements of population from fear of a new eruption.
- The local committees in each neighbourhood are involving the whole community in continued awareness raising. These committees are fairly new and still need further training but they have made a promising start. They are also taking over responsibility for maintaining the alert panels, changing the flags as necessary.
- “Plus jamais l'impréparation” (Never again unprepared) is the phrase taken to heart by the population. A future eruption will not be a surprise and this project has ensured that risks will be minimised.

c) Impact on the implementing partners (Concern, Crongd, OVG)

- The capacity of the partners was built, particularly through running the project and the development of the information center.
- A committee to advise on the center's activities is being created. OVG and Crongd will be represented on this committee which will ensure collaboration into the future.

d) Impact on youth.

- Study of the volcano has proven to be of great interest to schoolchildren and students. Schools have indicated that they would like to continue such inputs and to incorporate them into the syllabus.
- Youth clubs and associations have made use of Concern leaflets and have taken part in vacation activities related to the project.
- Schools have appreciated the didactic materials showing the structure of the globe, the structure of volcanoes and the alert system.

e) Impact on the animators.

- The training given to the animators coupled with the experience gained over two years has made the animators expert in communication techniques and in knowledge about volcanoes. Their good relation with the OVG has enriched their understanding.
- They have also learned to work well in a team.
- They have learned how to plan their program, how to involve local partners and how to obtain feedback from the population.
- Their knowledge of every corner of Goma and of some of the people's problems has been a spur to Concern to set up a study of some of the poorer areas with a view to mounting another project which will answer some of the poorer people's basic needs.

f) Activities planned but not carried out.

- It did not prove possible to organise awareness-raising in the area west of Goma where the other active volcano, Nyamulagira, was erupting over a number of weeks. It mainly affects the national park but there are villages which are susceptible.
- The development of an evacuation plan by the authorities is still ongoing.
- Although the information center has been provided with excellent equipment, there are still some items to be obtained e.g. books and videotapes. Security at the center also needs to be improved with the construction of a boundary wall or fence.

g) Problems encountered.

- Members of the local committees would like to receive payment. The project manager has explained to them that this is not possible.
- Access problems to some of the remoter communities in the area around Goma.
- Demands that warning panels be erected in Gisenyi (Rwanda) which we have not been able to do.
- More fissures identified in Goma where we have not been able to erect panels.
- The problems with Crongd prevented the institutional capacity building of Crongd, as planned. The unqualified animators and co-manager nominated by Crongd were ongoing problems in the relationship. Also, although the idea for the information center came originally from Crongd, they were disappointed when its location next to the OVG was

selected instead of on Crongd's own premises, where they might have gained income from it.

V. Unforeseen Circumstances

There was a 65% overspend in direct costs, covered by Concern, for the following reasons. It was discovered that 9 animators would not be enough to cover the 18 targeted neighbourhoods. The additional 16 animators recruited were supplied through the partners, Crongd and OVG. It also became evident during the project period that Crongd was incapable of carrying out certain tasks, so Concern ended up doing more than originally planned. The original idea of building the information center came from Crongd and it was anticipated that it would be located at Crongd's office. Since the actual space proved to be too small it was decided that it should be at its present, newly constructed site. Lastly, alert panels and panels showing high-risk areas and TV programs were added at a modest extra cost.

VI. Future

Mount Nyiragongo remains a very active volcano and continues to exhibit new characteristics and features. There are active lava lakes, which are visible from the crater rim and from the air. They are at a depth of about 700 metres from the top but do not pose a threat to the community. Large plumes of smoke continue to be emitted and can be seen from a distance. This smoke contains large quantities of sulphur dioxide and has affected some farming communities in the west when it falls in the form of acid rain, affecting crops and soil. There are evenings where the top glows red due to gases burning in the crater. There was a time when this used to cause panic amongst the population. Earth tremors have recently been experienced further south on Lake Kivu.

These circumstances underline the importance of continuing public education about the volcano.

Future activities should include:

- further training and capacity building of the 18 local committees including perhaps the creation of an association linking all the committees.
- creation of a permanent committee for the information center, consolidation of its management and further development of its contents (geological specimens, books, videos etc) and its regular program
- finalisation of the evacuation plan by the authorities with a mechanism to continually update it
- a continuing program of screenings of the video (and perhaps the creation of new videos)
- more activities with youth groups
- identification of more high risk locations and erection of more warning panels
- more work with out of school youth groups
- development of a section of the school syllabus on volcanoes