

Disasters

Preparedness and Mitigation in the Americas



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Combining new and traditional methods for effective learning

For more than 25 years, the Pan American Health Organization has supported disaster preparedness and mitigation training initiatives throughout Latin America and the Caribbean. This support has taken many forms—from complete or partial sponsorship of selected events, to mobilizing trainers or content experts, to providing technical or training material. As countries have become increasingly self-reliant in meeting their own training needs, PAHO is exploring new ways to reach a broader audience with the “just-in-time” information it needs for decision making and performance enhancement.

E-learning, distance learning, self-paced learning—it has many names—is one option on the horizon, and one that is generating a great deal of enthusiasm. However, convincing the disaster community to step into an e-learning environment will require more than spending large sums on technological innovations and fancy graphics. To compete effectively with the vast amount of information that is already available in traditional learning formats, users must learn

to recognize when and how e-learning represents true value added.

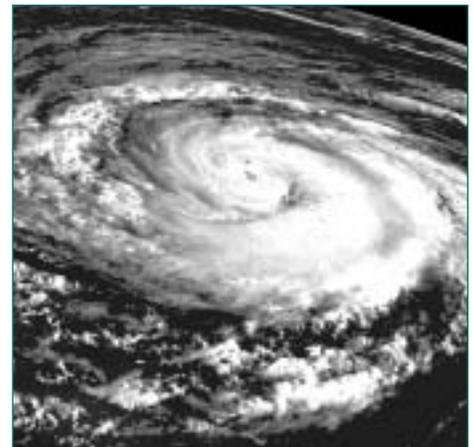
E-Learning: Value added or just a fad?

In the last five years, many disaster management e-learning initiatives have been trumpeted as the alternative to costly international courses directed to an elite. Donors, eager to ride the “dotcom” wave, generously funded these projects. Today, most have quietly faded away. A few e-courses are struggling to find paying students to meet their costs, but residential courses, a breed thought to be marked for extinction with the advent of e-learning, are more numerous than ever!

These difficulties have taught us a few things:

- Converting existing technical content into an electronic format does not automatically ensure that effective learning takes place. Just as with a traditional classroom course, it is important to develop good instructional objectives and

(continued on page 7)



In May 2004, the U.S. National Hurricane Center called for a 50% probability of an above-normal hurricane season. Several of these storms battered the Caribbean and parts of the U.S, leaving a wake of devastation. Hurricanes Charley, Frances, Ivan and Jeanne proved to be most deadly, reminding us that disaster preparedness efforts cannot cease.

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**Pan American
Health
Organization**

Regional Office of the
World Health Organization

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PAHO Directing Council Passes Resolution Urging Safe Hospitals

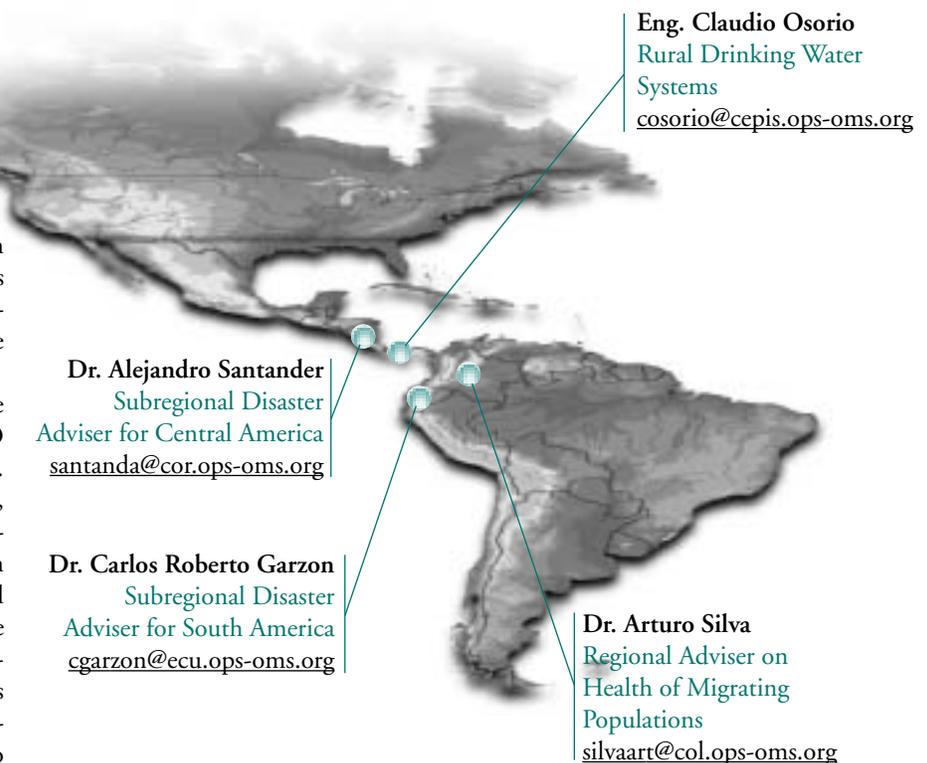


The devastation caused by Hurricanes Frances, Ivan and Jeanne was fresh on the minds of the Ministers of Health of the Americas when they met at PAHO's 45th Directing Council Meeting in late September. The regional health authorities approved a resolution urging Member States to strengthen their own disaster preparedness and mitigation programs by allocating resources and garnering political support to ensure that the health sector remains operational when a disaster-affected population most needs it. The resolution also recommends that countries set the goal of building all new hospitals with a level of protection that guarantees their remaining functional in disaster situations and implementing mitigation measures to reinforce existing health facilities, particularly those providing primary care. The complete text of the resolution is available at www.paho.org/english/gov/cd/CD45.r8-e.pdf.

Disaster Advisers Take up New Posts in Latin America

PAHO has reassigned staff responsible for its country operations in Central and South America to its subregional disaster offices in Ecuador (which covers the Spanish-speaking countries of South America and Brazil) and Costa Rica (covering the six Spanish-speaking countries in Central America). Belize is covered by the Caribbean office in Barbados. The subregional disaster officers are responsible for all aspects of technical cooperation related to preparedness, mitigation and response in these geographic areas.

Thanks to joint agreements with UNICEF and the International Organization for Migration, PAHO has stepped up other specialized areas of support. Through a Memo of Understanding with UNICEF, an engineer based in Panama will look at strengthening the capacity of Latin American and Caribbean countries to reduce vulnerability to disasters in rural drinking water systems. The IOM and PAHO are collaborating on health issues of migrating populations, and a medical officer stationed in Colombia is developing methodologies for quick health evaluations of mobile populations and to monitor access to health services. Contact these disaster advisers in their new duty stations.



Dr. Alejandro Santander
Subregional Disaster
Adviser for Central America
santanda@cor.ops-oms.org

Dr. Carlos Roberto Garzon
Subregional Disaster
Adviser for South America
cgarzon@ecu.ops-oms.org

Eng. Claudio Osorio
Rural Drinking Water
Systems
cosorio@cepis.ops-oms.org

Dr. Arturo Silva
Regional Adviser on
Health of Migrating
Populations
silvaart@col.ops-oms.org

Member Countries

Hurricanes Frances, Ivan, Jeanne caused widespread damage throughout the Caribbean; some islands were hit more than once. Thousands of lives were lost and material losses run in the millions of dollars.

Frances



The Bahamas

Hurricane Frances affected all inhabited islands of the Bahamas chain; the most affected islands were San Salvador, Cat Island, Eleuthera, Abaco, Grand Bahama (the second most populated island) and parts of New Providence. Some of these islands house particularly vulnerable population groups. Two people died as a result of the hurricane, but more than 1,500 were evacuated to shelters; approximately 88,000 persons were at risk for vector and water-borne diseases due to water contamination and disruption of environmental health services.

The Princess Margaret Hospital in Nassau, a 400-bed hospital and the only hospital that provides tertiary care, only temporarily was forced to relocate patients. The Rand Memorial Hospital in Grand Bahama was partially evacuated due to infrastructure damage and flooding. The Bahamas has a network of 115 clinics strategically located throughout the islands to provide primary level health care. Several clinics were affected, significantly compromising the provision of health services.

Jeanne

Haiti

Jeanne had already been downgraded to a tropical storm when it hit Haiti, but nonetheless, heavy rains caused serious flash floods in the Artibonite and North West departments of the country and left more than 1,800 dead. Health structures in the affected areas, already crippled by underdevelopment and years of political unrest, took a heavy blow. An estimated 90% of private and public clinics and the government hospital, serving a population of approximately 220,000 people, were damaged. Departmental health authorities, NGOs and other actors worked to reestablish basic health care. The Red Cross movement set up a field hospital. An epidemiological surveillance system was set up to identify, as early as possible, emerging epidemic health problems, vector control programs have begun again and a very basic cold chain was re-established.

An enormous amount of work however remains to be done. One month after the disaster an estimated 2,500 families were still in need of shelter and the clean-up of Gonaives, the capital of the Artibonite, remains a high priority. Large quantities of mud and debris need to be removed, houses and roads rebuilt, schools and other public buildings cleaned and repaired. Food distribution will have to continue for some time, as crops were destroyed, leaving the population dependent on external assistance. Deforestation, poverty and political instability contributed to the high number of lives lost in the disaster and long-term assistance will be necessary to reduce the vulnerability of the Haitian population.



Dominican Republic

Strong rains brought on by Tropical Storm Jeanne caused heavy flooding in the north and northeast part of the country. Eleven provinces were affected. As rivers overflowed, communication with many areas was cut off, homes were destroyed or damaged and electric power and drinking water was lost.

Some 22,000 sought refuge in shelters and at least 37,000 people were evacuated from their homes. This situation raised concerns about an increase of communicable diseases already present in the area, such as dengue, malaria, leptospirosis, diphtheria and meningococcal disease.

Fortunately, the Dominican Republic has a well coordinated health services network, which was put into action as soon as the storm hit. All the main health facilities were evaluated and made ready with supplies and personnel. To avoid the spread of diphtheria and tetanus, all those in shelters and most children under six in the affected area were vaccinated.



Ivan

Cayman Islands

When it comes to hurricane preparedness, the Cayman Islands ranks high. However, even this was not sufficient to withstand the force of Ivan, which battered the islands with winds up to 165 mph and generated a 20-foot storm surge. Fortunately, only two deaths were reported.

85% of housing in the West Bay area of Grand Cayman suffered damage; the sewage system collapsed and raw sewage contaminated the flood waters. The Bodden Town Civic Centre, a designated shelter collapsed at the height of the hurricane and had to be evacuated. The airport was completely flooded and without power for several days, and the island was left without communications of any kind for two days.

Fortunately, the capital, George Town, was on the sheltered side of the island and it weathered the storm fairly well. The hospital was recently built to hurricane standards and it held up to expectations. It provided shelter for homeless staff, relatives and many others for up to 2-3 weeks after the storm.

Cuba

Cuba evacuated 1.3 million people—more than 10% of its population—from coastal areas of Isla de la Juventud and the provinces of Pinar del Rio and Havana. This opportune decision helped avoid a loss of life. Hospitals readied 5,000 hospital beds and 1,100 medical brigades. The storm downed power and telephone lines and trees in Isla de la Juventud and other areas, and destroyed many crops. There was also widespread damage to houses and other buildings, flooding in Pinar del Rio and blocked highways near Santiago de Cuba.



In Isla de la Juventud houses and other buildings were damaged and electric and telephone services were interrupted. In New Gerona, capital of Pinar del Rio, many streets were flooded. In Santiago de Cuba, at the east of the island the storm destroyed part of the main highway and blocked transit between that city and Pilon, 180 km. to the east.

Grenada

Hurricane Ivan was a category 3 storm when it devastated the island of Grenada, destroying concrete homes, uprooting trees and ripping the roofs from many buildings. More than 30 people lost their lives and damage was estimated at about US\$560 million (150% of the nation's GDP).

The island's only referral hospital, St. George's, was damaged, but the wards remained operational. The Princess Alice Hospital suffered structural damage to more than 75% of the roof and could not function for a time. Although to some extent all health facilities suffered some damage, none was completely destroyed. Damage to individual facilities ranged from 5% to 75% of the structure. The cost to repair damage to health centers and hospitals throughout the island

has been assessed at more than US\$ 5 million. One month after the passage of Hurricane Ivan, more than 8,000 persons still remained in shelters.

St. Vincent and the Grenadines

In St. Vincent and the Grenadines, houses were damaged, but the main hospital in Kingstown did not sustain severe damage. There was no call for international assistance. However, in the islands of the Grenadines, the main hospitals in Union Island and St. Andrews lost their roofs. The island's school also lost its roof. The storm downed trees, caused severe flooding and brought down telephone lines.

Jamaica

The eye of Hurricane Ivan passed 30 miles south of Jamaica, reducing the anticipated impact on the island. Preparedness measures were put into place and thousands of people were evacuated from potential danger zones to ensure safety. Fifteen people lost their lives, and 207 communities in 11 parishes suffered damages.

The National Emergency Operations Centre (NEOC) reported extensive damage to house roofs and roads. There was also widespread damage to infrastructure. Light and water services were cut off for some time after the storm had passed. Fallen utility poles and trees made several roads impassable. Damage to coastal roads in the east was primarily due to storm surges and flooding. There were also several reports of persons trapped in their homes due to cave-ins.

Jamaica suffered extensive damage to the environment and the agricultural sector was also severely affected. Losses were reported in livestock and banana industries. Many health facilities sustained some kind of damage, but were quickly brought back to service.



International Migration, Health and Human Rights



This publication provides an overview of some of the key challenges for policy-makers in addressing the linkages between migration, health and human rights. It attempts to provide a useful platform to stimulate action to address migration and health in a comprehensive and human rights-sensitive way.

The first section explains why the issue of migration and health is addressed and what is meant by doing this through a human rights framework. It then explores some of the terminology

used and what is known about the magnitude of, and reasons for, migration. The second section links the reasons that people migrate with the health and human rights implications of moving for the populations left behind. It focuses attention on the issue of migrating health professionals by highlighting relevant trends, financial implications and ongoing trade negotiations. The third section considers the health implications for those on the move both in the context of public health as well as in relation to the health of the individual. It considers the various ways in which migration is managed, such as detaining and screening at the border. The last section considers the health and human rights issues of migrants once in the host country. It focuses particular attention on the most vulnerable categories of migrants and highlights some of the key challenges to promoting and protecting their health.

Download the publication from www.who.int/hhr/activities/en/intl_migration_hhr.pdf. Printed copies can be purchased (US\$9.00) from the WHO Bookshop by writing to bookorders@who.int

what is meant by doing this through a human rights framework. It then explores some of the terminology

Management of Dead Bodies in Disaster Situations

The new and widely-requested English version of this publication is now available. The proper management of dead bodies is very important to the survivors of emergency and disaster situations. This manual was written to call attention to this aspect of disaster management, especially for authorities and those in charge of disaster preparedness and response, so that it becomes part of disaster plans and a key component of humanitarian assistance.

For print copies of the publication, write to disaster-publications@paho.org. The publication can also be downloaded in PDF format from www.paho.org/disasters (select Publications Catalog).



In the next issue:

Several months ago, PAHO conducted a survey of satisfaction with its print and multimedia disaster publications and training materials. As a preview, respondents told us that they considered our web page and the Disasters newsletter our most useful and best known information sources. The complete survey results in the next issue of this newsletter.

Combining new and traditional methods for effective learning

(from page 1)

figure out how to evaluate the success of e-learning initiatives.

- As opposed to a traditional learning environment, where a classroom instructor has a pretty good sense of when students have grasped a concept, self-paced or independent learning modules often lack the element of human interaction that makes this possible. In the same way that a videotaped lecture is no substitute for a live instructor, e-teaching must include a great deal of human interaction.
- No matter how complete or authoritative a textbook or publication is, some concepts will always require an instructor to effectively transform information into knowledge.

The myth: e-learning is economical and easy

E-learning is not necessarily a cost-saving alternative to traditional face-to-face training workshops. It's expensive to launch this type of initiative and converting content requires special skills. In addition to the costs associated with editing and formatting the content for an electronic medium, materials must be reviewed or redeveloped to provide a structured learning format. In a well designed e-course, the larger the audience, the better the return on investment. E-learning will continue to be costly unless it reaches a large number of students. Is health disaster management a suitable topic for this?

E-learning is not the easiest form of training and learners must adapt to what is still a non-traditional format. E-learning requires a commitment to follow through with a schedule. Participation and interaction are essential, particularly in a group learning environment. Past experience in courses such as LEADERS, which encourages peer interaction, has shown that the knowledge and experience participants bring with them to the course is one of the most valuable resources. Learners must also have a realistic idea of how much time they can and are

willing to allocate to an e-course and how soon they expect to acquire the skills and knowledge.

To embark on or embrace this type of learning environment, learners must perceive a real value added. For example, many disaster managers have told us that certification or continuing education credits lend legitimacy to their profession and enhance their status within their organization. Distance learning can be a cost effective way of delivering tailor-made training, backed by a credible institution, to the greatest number of individuals possible.

What's next?

Just as the radio never replaced books or newspapers and the television did not spell the end of movie houses, e-learning must find its complementary niche among more traditional forms of training. It's easy to become overwhelmed with the time and cost required to set up and launch an e-learning initiative, thus increasing resistance and making it a prospect that never quite reaches fruition. However, by starting small, developing short modules that can be incorporated subsequently into a more comprehensive program, there's no better time than now to begin.

For example, evaluations from the first four LÍDERES courses (a rigorous disaster management training program that encompasses more than 18 modules over a 13-day period) have revealed particular interest in certain topics. Developing these topic areas into e-learning modules would enable PAHO to deliver the most relevant or popular content to a much larger audience. In doing this, a balanced approach would be best for courses such as LÍDERES, whose on-site costs are quite high. In this scenario, self-paced learning, where a student progresses through material at his/her own pace, would be blended with live e-learning, where tools such as audio or videoconferencing and synchronous events allow greater interaction, all of which would eventually lay the foundation for those face-to-



face course modules that do not lend themselves as well to this format.

It's hard to match the social value of face-to-face learning, which may make some even more resistant to adopt distance learning methodologies. This may suggest that it is best to introduce changes slowly or in stages, perhaps within the context of a traditional training workshop, where an e-learning module could be designed as a follow-up instructional exercise to a traditional training program or as a requirement that participants must complete prior to attending a workshop. In this way, e-learning would support existing traditional learning initiatives without replacing them all together.

While technology itself will never be the driver for developing distance learning opportunities for the disaster community, e-learning initiatives, particularly web-based initiatives that incorporate some form of live interaction that simulates face-to-face encounters, can and are becoming an important component of training strategies. PAHO hopes to help enable the disaster "community of practice" to communicate, collaborate and share knowledge regionwide and to learn and use that knowledge to become more effective—all hallmarks of a learning organization.

Selected Bibliography



S e l e c t e d B i b l i o g r a p h y

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Disasters: Preparedness and Mitigation in the Americas is the Newsletter of the Area on Emergency Preparedness and Disaster Relief of the Pan American Health Organization, Regional Office for the Americas of the World Health Organization. The reported events, activities and programs do not imply endorsement by PAHO/WHO, nor do the statements made necessarily represent the policy of the Organization. The publication of this *Newsletter* has been made possible through the financial support of the International Humanitarian Assistance Division of the Canadian International Development Agency (IHA/CIDA), the Office of Foreign Disaster Assistance of the U.S. Agency for International Development (OFDA/AID), and the Department for International Development of the U.K.

Correspondence and inquiries should be addressed to:

The Editor
Disasters: Preparedness and Mitigation
in the Americas
Pan American Health Organization
525 Twenty-third Street, N.W.
Washington, D.C. 20037, U.S.A.
Tel: 202-974-3527 • Fax: 202-775-4578
E-mail: disaster-newsletter@paho.org
www.paho.org/disasters/

Regional Disaster Information Center
Apdo. 3745-1000, San José, Costa Rica
Fax: (506) 231-5973
E-mail: crid@crid.or.cr
www.crid.or.cr

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Water and Disasters

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October 2004



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Progress in risk management in the water and sanitation sector Slowly but Surely

In recent years, a number of Latin American and Caribbean countries have demonstrated significant progress in risk reduction in the water and sanitation sector. These achievements have captured the attention of national and local authorities responsible for risk planning and management and highlighted the importance for health and development of ensuring the sustainability and continuity of water and sanitation services following disasters. These unstinting efforts have resulted in a concrete proposal for the forthcoming World Conference on Disaster Reduction to be held in Kobe, Japan, in January 2005.

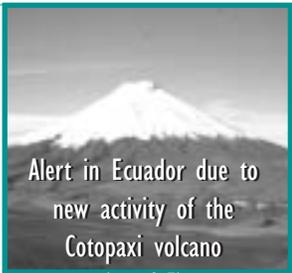
In preparation for the Kobe World Conference, professionals and institutions from the water and sanitation sector of 15 Latin American countries participated in the Latin American Workshop on Vulnerability Reduction in Drinking Water Systems to develop a ten-year plan of action (2005-2015) to permit systematic implementation of effective and low-cost mitigation measures that would make these critical services less vulnerable.

Participants pointed out that, thanks to existing knowledge and technology, it is possible for developing countries to ensure the

availability of safe water in the aftermath of disasters. However, authorities responsible for the sector must know about and use these resources and experiences in order to dispel the notion that protecting these services—vital to health and development—is simply too costly. Some countries have used this knowledge and technology to incorporate vulnerability mitigation elements into initiatives, trends and reforms in the health and sanitation sector, such as regulation and decentralization of services, but much more can be done. The success stories among water and sanitation services are the result of sustained efforts on several fronts: looking at

scale of the problem in the region, these instances are still few and far between. To go one step further and implement the results and recommendations drawn from environmental impact and vulnerability studies, will require even greater collaboration.

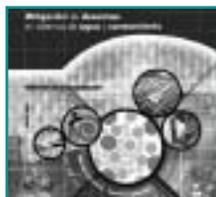
Internationally, more and more organizations acknowledge the importance of the availability of water and sanitation services during disasters and increasingly they are stepping up preparedness initiatives to ensure that water and sanitation services are environmentally sustainable, particularly during disasters. This year's Inter-American Water Day demonstrated clearly the will of the international community to reduce the vulnerability of water and sanitation systems to natural disasters. The theme for 2004, "Water and Disasters: Focusing on Services," drew attention to the importance of the problem and sought to identify concrete measures for ensuring the sustainability and continuity of water and sanitation services during emergencies and disasters, thus contributing to one of the Millennium Development Goals: to "halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation."



Alert in Ecuador due to new activity of the Cotopaxi volcano



vulnerability issues in physical infrastructure and strengthening the capacity of the sector's staff and the community. However, given the



Second edition of the CD: *Disaster Mitigation in Drinking Water and Sewerage Systems*

An updated bilingual version (English/Spanish) of the CD on vulnerability reduction, developed by PAHO, has been designed for technical and training purposes and includes a PowerPoint presentation and script on the topic, documents, a photo gallery and video presentations that describe the impact of natural phenomena on drinking water and sanitation systems. Web version available at www.cepis.org.pe/bvsade/cd/index.html. To request the CD write to desastre@cepis.ops-oms.org.

El Salvador

Soyapango Emergency Puts New Plan to the Test



The ink was barely dry on the Emergency and Disaster Plan of El Salvador's national water and sewerage regulatory body (ANDA), when it was put into practice because of spillage from a drum of diesel fuel which flowed into meter boxes before entering the system, sparking an emergency in heavily populated Soyapango in central El Salvador. The municipality, with a population of more than 260,000, became the first town to benefit

from the new plan to deal with emergencies and disasters.

Just as the board of the new Institutional Emergency and Disaster Plan was being sworn in, ANDA's customer service center received phone calls from Soyapango complaining that the water smelled strongly of diesel fuel and had oily patches. The Soyapango office immediately drained the contaminated network. (More information on these measures can be found in the document *El Salvador se Levanta. Las Obras en Salud después del Mitch* (San Salvador, PAHO, 2004), www2.ops.org.sv/tccendoc/el_salvador_se_levanta/index.pdf). In less than 24 hours, maintenance teams had located the pollutant and its source in the system, and following procedures set forth in the Plan, a situation room was set up to direct and coordinate overall activities.

A decentralized emergency plan

ANDA is the first water agency in Central America to have officially adopted an emergency plan and the mere existence of this tool is a source of pride for Salvadoran authorities. "The plan alone is a benefit and reflects our interest in offering consumers an efficient service focusing on customer care," stated ANDA's general manager, Frineé Castillo de Zaldaña. The Plan is the result of a participatory planning process and has gained buy-in from directors at headquarters and regional offices. For further information contact planificacion@anda.gob.sv.

Comment on this Paper!

Risk reduction during disasters

Drinking water and sewerage services must continue function during emergencies and must recover as quickly as possible after a disaster. These have proved to be decisive factors in reducing the vulnerability of the population and of development processes.

Several organizations are working on a Technical Overview Paper on the many risk factors facing water and sewerage systems. The draft version is available at www.cepis.ops-oms.org/bvsade/e/top/top-web.doc and is open to comments, through 19 November.*

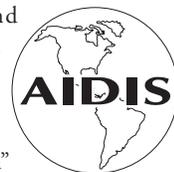
The paper should be ready for the second World Conference on Disaster Reduction in Kobe, Japan in early 2005.

*TOP: Reduction of risks to water and sanitation from natural disasters (preliminary review version).

Facing disasters and emergencies

Improving Damage Assessment Capacity

AIDIS, the Division of Sanitary Engineering and Environmental Health in Emergencies and Disasters, in conjunction with PAHO/WHO, has prepared comprehensive training material for the water and sanitation sector to improve damage assessment in the wake of disasters.



"Damage and Needs Assessment in Water and Sanitation"

has been prepared with financial support from the Regional Office for Latin America and the Caribbean of the Office of U.S. Foreign Disaster Assistance and uses the OFDA needs assessment methodology, which includes a participant's handbook, guidelines to enable trainers to prepare each session, PowerPoint presentations, evaluation forms and a simulation exercise. The availability of this training material and the proposed common form for assessing damage will improve information management and lead to a more efficient use of resources.

By July 2004, 13 courses had been offered in Latin American countries and 273 evaluators were trained. Honduras has formed a team of trainers who have taught two more courses, adapting the material to Honduras and improving the technical skills of 45 evaluators. Additional courses are being planned for other countries in Latin America and the Caribbean.

Contact German Araya Montezuma at garayam@aya.go.cr.

Ecuador

Technical Guidelines Help Reduce Vulnerability

Ecuador is drawing up technical guidelines to help sector specialists to reduce the vulnerability of water systems to the impact of natural and manmade hazards. The document provides guidance on the basics of risk management so that those responsible for water systems can analyze the vulnerability of components to the hazards to which they are exposed. It also describes technical measures for mitigating the impact. These guidelines have been prepared based on a range of international and national experiences. Ecuador will distribute the document nationwide in the water sector.



A plan for risk prevention and mitigation in Ecuador's water and sanitation sector aims to institutionalize risk management and to incorporate policies to make the sector less vulnerable to all kinds of hazards.

The plan identifies priority projects in disaster-prone areas, enhances human capital specialized in risk management, and provides an overall diagnosis of legal and institutional aspects of risk management. The document also identifies possibilities for technical and financial assistance and for horizontal cooperation with Andean Region countries in the field of risk management.

Ecuador must address several important issues: one is the tendency of many towns and water boards to give priority to investment for expanding services, without implementing measures to deal with existing natural hazards.

Another is the low coverage provided by services in Ecuador, 67% in the case of drinking water services, 51% where solid waste collection is concerned and 13% for final waste disposal.

Contact Mario Ballesteros at: mballesteros@sapsb.gov.ec.

Floods in Haiti and the Dominican Republic Emergency Response



Torrential rains in May 2004 in the Dominican Republic and Haiti caused major flooding, tragic loss of life and serious property damage, necessitating an immediate response to the needs of the affected population, most of whom lived in towns and villages on the border between the two countries.

Dominican Republic government figures placed the number of dead at 414 (most in the town of Jimaní); an estimated 270 people had disappeared. Countrywide, the floods affected more than 15,000 people, displaced 1,600 families and destroyed 3,000 homes. The hardest hit area was the province of Independencia, and especially its capital, Jimaní. Official reports from Haiti cited more than 1,000 dead, 6,000 affected families, 1,700 homes destroyed and a similar number damaged.¹ The towns of Mapou and Fonds Verrettes were the most affected.

Because water supply systems had ceased to function, response teams first focused on distributing drinking water and later to providing equipment to purify water and monitor its quality.

Damage to water systems' infrastructure was not overwhelming, but in some cases it was necessary to cut off supplies; even though reservoirs were full, the likelihood of their being

contaminated meant that the only available source of water was rainfall, which the population collected.

The flooding of the water treatment plant in Jimaní, which was knocked out of service, was another factor that contributed to leaving the population without water. The system was out of service for one week, after which water supply was partly restored, although the water was not treated. Even though the population was warned to use the untreated water only for washing, the warning was not fully heeded.²

When, a temporary treatment plant was set up to supply safe water, the amount was insufficient to meet the demand and it was necessary to closely monitor the quality of drinking water.

The flooding in Haiti and the Dominican Republic illustrates that it is important not only to protect water supply systems against damage to infrastructure; it is equally or even more important to be in a position to supply safe water to disaster-stricken populations so they will not have to face additional threats to health.

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Six Years After Mitch Honduras, Water Capital



IDB/D.Mangurian

Six years ago, hurricane Mitch shone the spotlight on the high vulnerability to disasters of countries such as Honduras. The hurricane was responsible for thousands of deaths and huge economic losses, setting this Central American country thirty years back in its development efforts. Water and sanitation services were severely affected. The violent aftermath of the hurricane, in combination with the inability of networks to cope, left more than 1700 of them destroyed or damaged; 75% of the population was left without access to drinking water and more than 53,000 latrines were destroyed countrywide.

However, in recent years Honduras, whose water supply networks are inadequate and vulnerable, has completed an analysis of the water and sanitation sector which acknowledged the need to reduce supply deficits (primarily in rural populations and marginal urban areas) and to build up the capacity of institutions responsible for risk and vulnerability reduction, and preventive maintenance.

At the XIX Congress of the Inter-American Association of Sanitary and Environmental Engineering (AIDIS), Honduras was designated the Water Capital for 2004-2006. As such, Honduras will promote a concerted agenda, securing the commitment of national partners and harnessing every possible effort to improve the precarious state of water and sanitation. Water-borne diseases are the first cause of infant morbidity and the second of infant mortality.

Honduras has shown that it has many strengths. These include the support of the Government and community participation in building and running its own water systems, particularly in rural and marginal urban areas. Against this background, measures have been taken to build up the capacity of national and local actors to monitor and control water quality, to provide information on technical matters and cost evaluation connected with the implementation of the new water quality standard and to validate tools for reducing the vulnerability of services.

Honduras' status as Water Capital during the next two years will make it a focus of attention and offers the country a valuable opportunity to improve the water sector and the quality of life of the country's population.

Recommended readings

Report of the Latin American Workshop on Vulnerability Reduction in Drinking Water Systems, Managua, 21-23 April 2004, PAHO/WHO 2004. Available at: www.cepis.org.pe/bvsade/fulltext/TallerManaguaeng.pdf.

Water and Disasters: Focusing on Services is the central theme of Inter-American Water Day (IAWD). A range of resources and background documents are available on the Internet at www.cepis.org.pe/bvsadiao/diaa/index.html.

Guía Técnica para la Reducción de la Vulnerabilidad en los Sistemas de Abastecimiento de Agua Potable y Alcantarillado Sanitario. (Technical guide for vulnerability reduction in drinking water and sewerage systems). Managua, INAA, 2004. www.cepis.ops-oms.org/bvsade/fulltext/guiatecnica.pdf.

Handbook for Assessing the Socioeconomic and Environmental Impact of Disasters. Mexico City, ECLAC, 2003. Full text available at: www.cepis.org.pe/bvsade/cd/e/publicaciones/CEPAL/index.html.

Agua Yaku. A publication of the water and sanitation sector of Ecuador. Year 2, No. 2. Quito, June 2004.

Los servicios de agua potable y saneamiento en el umbral del siglo XXI (Water and sanitation services at the start of the twenty-first century, Andrei Jouravlev, Series Natural resources and infrastructure 74. Santiago, Chile, ECLAC, 2004. Available at: www.cepis.org.pe/bvsacg/fulltext/servicios.pdf.



Prevention in Quito

Water services ready themselves for a possible eruption of Cotopaxi

In response to renewed activity by the Cotopaxi volcano, the Quito metropolitan sanitation and drinking water company (EMAAP-Q) has drawn up a contingency plan to protect vulnerable points in the water and sanitation networks in preparation for a possible eruption. The Cotopaxi volcano is located 40 kilometers southeast of Quito. Ash from the volcano may contaminate water in springs, canals and treatment plants, while the force of lahars may destroy supply system infrastructure in its path. As a result, a disaster of this type would significantly curtail the availability of drinking water and the population's health and quality of life would deteriorate considerably.

This threat prompted the preparation of the contingency plan, which provides for vulnerability studies and disaster mitigation, prevention and response measures for infrastructure located in risk areas. The Quito National Polytechnic School is undertaking a study, using a scenario based on the 1877 eruption of Cotopaxi; this assumes lahar flows of up to 40,000 cubic meters per second, burying the infrastructure in up to 30 meters of mud. In this scenario, the infrastructure at greatest risk are those located on the Pita, Santa Clara and San Pedro rivers, which are the natural drainage paths for mud flows. The initial study suggested replacing the culverts under the Pita and Santa Clara rivers with elevated passages built out of reach of the lahars.

Preventive measures mainly involve tapping channels that could supplement those of the Pita river system, as these would be severely affected by any disaster. Although it is impossible to determine how long this catchment would be out of service, an estimated half million people in the central and south-central area of Quito would be affected.

EMAAP-Q's emergency response activities would also include the implementation of plans for water rationing, distribution by tanker trucks and an increase in the volume drawn from the Quito aquifer, especially in the city's central and south-central areas.

Consideration is also being given to developing measures to protect the city's sanitation systems and to centralize information on disasters in a single dedicated office.

The contingency plan was drawn up using experience gained through the Pichincha volcanic eruption in 1998-99 and the 2002 eruption of El Reventador. For further information, contact Manuel Cueva at mcueva@emaapq.com.



Currently, Cotopaxi's activity is barely perceptible through tremors and fumaroles in its crater, although there is a threat that any eruption will result not only in bombardment by pyroclastic material, but also mud flows which form when ice melts on contact with pyroclastic material and molten lava.

Lessons from the Pichincha Volcano



The many minor eruptions of the Pichincha volcano in 1998 signaled a large-scale eruption to many experts. Water supply systems were at risk from the impact

of pyroclastic material on Quito's water sources and culverts located along the slopes of the volcano and from ash falling into the city's water-treatment plants.

EMAAP-Q implemented its "operational emergency plan for an eruption of the Pichincha volcano," which in addition to preparedness and response activities also included measures to mitigate the impact on water treatment plants. These measures included covering filters and tanks in urban plants to protect them from ash contamination. In addition, "bypasses" were set up in some plants which had reserves of untreated water, to permit direct use of water from the conduit if the reservoir was contaminated.

Response activities were given priority, and teams were formed to assess damages, evaluate needs and deal with specific emergency situations. Emergency committees were formed, an operation center was set up and levels of alert were clarified, with their corresponding activities.

The plan was put to the test in 1999, when the Pichincha had two major eruptions, spewing ash onto the city and its infrastructure. In spite of the problems caused by the ash, Quito's water company continued providing satisfactory amounts of quality drinking water. Likewise, during the eruption of the Reventador volcano in November 2002, the company did not need to cut off the water supply.

Nicaragua Sectoral Analysis Provides for Risk Management



Nicaragua's most recent analysis of its drinking water and sanitation sector includes a chapter on risk management, reflecting the growing importance of the topic in this Central American country and the recognition of just how vulnerable water and sanitation systems are. Natural disasters are not the only threat these systems face. Manmade risks include contamination of aquifers by hydrocarbons, agricultural chemicals and runoff from refuse dumps, septic tanks and latrines.

The study undertaken to prepare this report revealed a number of conclusions:

- Earthquakes pose a particularly serious threat in Nicaragua and water systems are vulnerable because of the use of rigid material in areas highly earthquake prone and the strong interdependence of water mains and electric supply systems.
- Disaster prevention and mitigation was not taken into account when standards were prepared for design, construction, operation and maintenance of systems, which were deteriorating quickly due to insufficient investment in operation and maintenance.
- In rural water and sanitation systems, these problems were compounded by very low coverage and chlorination and insufficient technical support to cope with a disaster.

So far, the bulk of efforts in Nicaragua have focused on ensuring a rapid response to disasters. The document recommends that in addition to response, new policies should address disaster prevention and mitigation, restoration and rehabilitation of systems. The report also recommends that vulnerability analyses of existing systems be carried out and suggests measures, such as reducing the dependence of services on the electric supply system, preventing contamination of aquifers by hydrocarbons and runoff from refuse dumps and incorporating disaster prevention and mitigation consideration into design, construction, operating and maintenance standards.

For more information, contact Lic. Benita Ramírez at bramirez@inaa.gob.ni.