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AN EARLY APPROACH TO COMMUNITY-BASED DISASTER MANAGEMENT: PREVENTION MITIGATION AND PREPAREDNESS

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Abstract

Overview of the design and implementation of a Local Accident Mitigation and Prevention (LAMP) program from its inception in 1991 to its completion in 1998. Significant elements are that it provided implementation resources for actions prescribed by an existing United Nations awareness program; it made significant strides towards determining how to build sustainability into foreign assistance programs; it took a bottom-up approach that secured local ownership and design; it made real inroads into creating and maintaining local capability to prevent, prepare for and mitigate the consequences of technological accidents and natural disasters; and it was a working example of real partnerships between government, industry and community groups.

Introduction and Summary

In 1991, while the current U.S. Agency for International Development Administrator, Andrew Natsios was Director of the U.S. Office for Foreign Disaster Assistance, he launched a novel program in partnership with the World Environment Center (WEC), an independent, non-profit organization. His goal was to anticipate and reduce the negative social and economic impacts of natural disasters in developing countries. That by itself was innovative enough but he also wanted to include local community groups, i.e. women.

OFDA had allocated funding to a new initiative called PMP - prevention, mitigation and preparedness – and asked the WEC to work with OFDA to design an effective approach. Those discussions, consultations in the field and a pilot project led to a five-year Cooperative Agreement, signed in 1992. The Agreement was for the design completion and implementation of the Local Accident Mitigation and Prevention (LAMP) program that was to incorporate a number of novel steps and work in India, Indonesia, Mexico and Thailand. (A six-minute video of the first simulation exercise in Mexico is available.)

The first innovation was that LAMP capitalized on the existing APELL program run by the United Nations Environment Programme out of the Industry and Environment Office in Paris. APELL, Awareness and Preparedness for Emergencies at the Local Level, with the support of the Canadian, U.S. and European chemical industry manufacturers associations, had a mandate to conduct high-level awareness seminars around the world but had no follow-through implementation mandate or

funding. However, what APELL did do was to create a market for LAMP. This worked so well that a side activity of LAMP became the funding and sometimes the organization of APELL programs.

The second innovation was that the program looked carefully at sustainability. The fact that the USAID funding would only last five years meant that continuity of funding, i.e. sustainability, had to be built in and it was quickly recognized that that meant engaging and serving the needs of the private sector. In addition to providing a recognizably valuable service to the industrial community, a second element of sustainability was the achievement of critical mass. Making sure that the initial programs in each country were attended by officials from other jurisdictions and that, wherever possible, the materials used were all in the local language, raised the likelihood of replication. This tactic worked very well in India where one initial LAMP location in Madras quickly became six cities throughout the country.

Although the long-term goal was to deal with the impacts of natural disasters, the third strategic decision was to focus on PMP with respect to industrial accidents. This was done because it would get private sector attention and the infrastructure created could easily be used in times of natural disasters but would receive full attention, and funding, on a daily and ongoing basis

Thus, the prima facie goal of the LAMP Program was to reduce the incidence and impact of major chemical, hazardous materials transport or other technological accidents and disasters in selected high-risk locations in each selected country but it also included the mitigation of technological side-effects of natural disasters such as earthquakes and floods. Towards this end, WEC organized and implemented results-oriented accident prevention, emergency preparedness and response planning and disaster mitigation training; chemical safety education; and public awareness outreach and accident simulation (mock emergency drills) in each country.

The LAMP program brought about positive and meaningful improvements in emergency response, emergency preparedness, and emergency planning and testing through a sustained, interactive, and client-driven approach. Thus, by definition, methods of intervention varied from country to country, and within countries from site to site, according to the specific social, political, economic, and developmental conditions of each site. For that reason, LAMP had to be flexible and able to respond to the planning and training needs of the groups that engaged the LAMP process of improving industrial accident prevention and mitigation systems. Flexibility and responsiveness to the local clients were the defining characteristics of the LAMP program.

These two traits played an important role in the progression of activities that took place. Since the program was designed to respond to the unique characteristics of each site, LAMP managers relied heavily on the local representatives at each site to help define the plan of action and goals for the project. Those groups and individuals that embraced the Awareness and Preparedness for Emergencies at the Local Level (APELL) process of the Industry and Environment Office of the United Nations Environment Programme (UNEP), and the LAMP program were often key to successful implementation of the program. Thus, one of the most important responsibilities of program management was to identify organizations and individuals who believed in and would champion the APELL and/or LAMP approach. It was crucial to engage those parties, and continually work with them to ensure that objectives were well defined, in line with the conditions at each site, and likely to achieve the expected outcomes.

Under the bottom-up approach of the LAMP Program, prototype examples of improved community-based emergency preparedness were established at selected sites, which then were replicated at other sites while influencing and informing country-wide policies and institutions related to disaster prevention, response and mitigation.

Overall, the foreign exchange cost for implementing the LAMP Program was 200-250 thousand U.S. dollars per country, per year 84% of which was contributed by OFDA and the balance came from in-kind contributions from the private sector, the Canadian government and others. This figure excludes the local currency costs of seminar and training facilities, fees for local experts, expenses for participants, salaries of local APELL/LAMP coordinators and equipment, materials and supplies for emergency exercises. All these costs were borne by local governments, industries and participants. In the spirit of the LAMP Program, these expenses were seen as investments by the communities at each LAMP site to demonstrate their commitment to organizing themselves for improved safety against technological accidents and natural disasters.

Steps for Implementing LAMP Program

Since successful program implementation required flexibility and responsiveness to local conditions, there was no single approach to implementing the LAMP programs in each country. There were, however, several aspects of all LAMP programs that remained constant from one country to the next. The following section outlines aspects of the LAMP program that can be seen as the characteristics that were common to all LAMP programs. These components were the building blocks for LAMP and can be seen as the "steps" to conducting effective LAMP programs.

A particular emphasis has been to create ongoing programs in Awareness and Preparedness for Emergencies at the Local Level (APELL) at selected local sites to:

> Create and/or increase community awareness of possible hazards within the community, and
>
> Based on that awareness, develop an operative plan to respond to any emergencies that these hazards might present.

APELL itself uses as a model the U.S. Local Emergency Planning Committees (LEPC's), as defined and legally constituted under SARA Title 3, and the Community Awareness and Emergency Response (CAER) groups encouraged and supported by the International Association of Chemical Associations, particularly the U.S. and Canadian chemical manufacturers associations and CEFIC in Europe, which are implementing Responsible Care™. Throughout the LAMP Program, WEC and UNEP/IEO cooperated actively to jointly promote improved community-based emergency preparedness in the target countries and selected communities. In fact, in India the Program was known as "APELL/LAMP" both at the local level and the national level.

In each country, local "bonding" agents were found to help ensure that objectives were met on the local level, as well as national "nodal" organizations to help replicate LEPC's to other sites. The local "bonding" agents were typically local industry associations, Responsible Care™ groups, community service organizations, or local worker or public safety committees that had already demonstrated a shared concern about chemical safety. These "bonding" agents became major participants in a tri-partite local emergency preparedness committee comprising representatives of the local government, industry and at-risk community. The national "nodal" organization(s) were selected for a similar demonstrated concern on the national level.

In India, a National Advisory Committee (NAC) was created comprised of representatives of federal ministries (labor, health, environment, interior, etc.), national industry associations (chemical manufacturers, insurance and loss prevention, etc.) and national service and professional organizations (Rotary Clubs, industrial medicine, safety professionals, etc.). The NAC accepted an ongoing role in replicating the LAMP program at other sites in India, as well as in advising national and state governments on issues related to emergency preparedness and response and accident prevention.

Step One - Site Selection

LAMP program site selection was a critical step towards ensuring that meaningful results ensued after two to three years of locally designed interventions. LAMP relied on replication from one site to another to maximize the effectiveness of donor funding and to ensure that program initiatives continued to improve after donor funding ended. The need to replicate LAMP successes, so as to achieve a critical mass of mutually supportive of sites in each country, made the site selection process one of the most important steps in designing each LAMP program. LAMP funding was targeted on industrial areas where the chances for meaningful and lasting impact were most likely to occur and on those communities that would most likely be in a position to share their experience with other industrial sites in need of improved accident prevention, response and mitigation.

The LAMP approach worked best in those countries and/or geographic regions having a multitude of high-risk industrial sites that could benefit from the replication. The criteria for selection of potential LAMP sites were:

1. Flammable, explosive, or acutely toxic substances are produced or utilized on site and transported through the local areas;
2. A significant number of persons reside on or near the industrial site and are at risk;
3. Disaster relief institutions exist near the industrial site or can easily be created;
4. There is an expressed local concern about industrial risk and an interest in organizing more effective prevention, mitigation and preparedness (PMP) programs to counter the current risk; and
5. An established prime mover agrees to take on a leadership role.

Step Two - Recruit and Train Country Manager

Once sites were selected per the above criteria, a Country Manager was put in place to interact with the local representatives of each LAMP site and coordinate on a daily basis with industry, government and community representatives. The Country Managers played pivotal roles and had to embrace a number of diverse responsibilities. The Country Manager needed the aptitude and the skills to both engage local leaders on technical skills of emergency responders as well as display political sensitivity regarding a community's participation and "right to know". For this reason, the Country Managers had to have experience and credibility with local industries and government groups, as well as the dynamism and openness to reach out to other groups, particularly both formal and informal community interest groups, with whom no prior relationship or experience existed. In this way, the Country Managers could effectively direct program activities relevant to many groups and serve as a catalyst for the changes that needed to occur as program goals were first shaped and then realized.

The effectiveness of the Country Managers was ultimately dependent their personal understanding of the nature of the process of change, their vision of what could be accomplished at each site and the patience and skill to allow local leaders to own the process and move towards those changes. Understanding what needs to be done at each site allows the Country Manager to guide others -- plant safety managers, community group leaders, elected officials, hospital managers, and planning committee members -- towards more responsible and more effective means of preventing accidents, preparing for emergencies and mitigating disasters.

To help LAMP Country Managers develop this “vision” of what is possible, the four Managers toured prototype local emergency planning and response groups in the U.S. and Canada, witnessed emergency response exercises and visited first-responder training facilities. This exposure helped them understand community-based chemical emergency preparedness and accident prevention activities, including risk assessment, mapping of chemicals, emergency plan preparation and update and management of emergency exercises. They also visited the Chemical Manufacturing

Association's CHEMTREC that coordinates responses to hazardous materials transport accidents throughout the U.S. In addition, they visited the Federal Emergency Management Agency and the U.S. Environmental Protection Agency, Chemical Emergency Preparedness and Prevention Office (EPA/CEPPO) operations centers in Washington, DC.

Step Three - Determine Baseline Indicators

In planning a LAMP program each country and site within that country, certain baseline indicators related to accident mitigation and prevention must be assessed. Baseline indicators function as a planning tool during program implementation to determine which types of LAMP activities are appropriate. The development of a list of baseline indicators is a useful way of reviewing and documenting the conditions in LAMP countries and at selected sites. Because baseline indicators vary from site to site, planned activities and expected outcomes at each site will also vary.

Baselines are also used as a benchmark against which program outcomes can be evaluated following the completion of program activities. The indicators selected in each location will never be exhaustive but should be easily understood and accepted by all participants as being meaningful reflections of certain elements of safety and readiness. Baseline indicators may also include historical events that have a particular bearing on a site or country where the LAMP program operates. For example, the 1984 Bhopal, India accident resulted in a groundswell of concern for public safety and accident prevention at the grassroots level. Thus, this disaster and the subsequent emergence of grass-roots safety groups throughout India both serve as baseline indicators for India.

There was no single set of baseline conditions to which the LAMP programs had to refer, however, assessment of potential LAMP sites required that baselines be determined in order to help guide LAMP activities and bring focus to long-term strategies of the project as a whole.

Step Four - Develop an Action Plan

Following site selection, choosing a Country Manager, and documenting the baseline conditions, an action plan for each site and the country as a whole was determined. The action plans were an important part of the LAMP process as they helped to set agendas and quantify constraints based on the local conditions.

Each action plan was used to define the site goals and identify the means by which these goals were to be achieved. Since the replication of LAMP activities was one of the primary objectives of the program, highly replicable activities were always central to each action plan. Action plans were also flexible and allowed for changes in conditions at a site. Action plans also defined, as priorities, activities that were most likely to succeed and result in improvements at the local level. The action plan was a guide that helped project management define and achieve realistic goals.

Step Five - Select and train local LAMP Site Coordinators

Consistent with the model promoted by initial APELL seminar/workshops, a local coordinating committee for improved chemical safety was formed and began by assessing chemical risks and formulating emergency response plans to mitigate that risk. Often, a natural leader emerged as a local person motivated and committed to helping the community achieve greater safety for its citizens, through improved cooperation of the tri-partite partners (industry, government and community organizations).

Step Six - Plan and Implement Activities

Site selection, choosing a Country Manager, determining baseline indicators, developing an action plan and selecting and training local LAMP Coordinators were the principle steps to beginning a LAMP program. Once these steps accomplished, program activities were designed and implemented in relation to specific goals and objectives at each site.

The LAMP programs worked with local and visiting experts from the public and private sectors to accomplish priority goals. Local participants, a local advisory board and WEC/LAMP staff determined the goals. Building on the core of a well-established APELL Seminar/Workshop used to initiate the APELL/LAMP process, other programs of particular concern at each location were added as required. These include training of local experts and citizens on hazard and risk assessment, formulating an emergency plan to respond to that risk, plan evaluation and the organizing of mock emergency drills to test the efficacy of emergency preparedness plans.

Simultaneously, local emergency first responders were trained in industrial fire safety, containment and clean-up of hazardous materials incidents and medical response to chemical accidents and disasters, including treatment of the types of medical wounds and injuries that might result in the event of particular accidental releases or spills in that community. Finally, WEC worked with local industry to organize effective accident prevention programs and to reduce the threat to public health and safety from chronic and catastrophic chemical risks.

In addition to working closely with UNEP/IEO to organize and implement APELL Seminar/Workshops as a normal first-step to acquaint a particular community with the concepts and practice of chemical disaster preparedness, other partners provided critical assistance. The USEPA Chemical Emergency Preparedness and Prevention Office (CEPPO) and the Atlanta-based Center for Disease Control's Center for Environmental Health, Division of Environmental Hazards and Health Effects (DEHHE) provided *pro bono* support and personnel. Both of these organizations, as well as private sector companies loaned key personnel to implement various APELL-related seminars and training programs, chemical risk assessments and training in medical response to toxic exposure. In addition, CEPPO, DEHHE and Transport Canada graciously provided various technical references and chemical safety training programs at no cost.

The LAMP approach to environmental disaster mitigation and prevention had several unique aspects, namely:

- A broad-based approach that mobilized private sector resources and equipment to complement the normal public sector responsibilities for fire safety, hazmat handling and medical response;
- Involvement of the medical community in emergency response planning and training for medical personnel in industrial accident response and materials safety data sheet use;
- A proven success in communication of risk and mobilizing community participation in emergency preparedness and response exercises;
- The establishment of prototype programs at the local level that serve as operating examples to guide policy and programs at the national level in each country, and
- Involvement of the insurance industry in risk assessment and the linkage between improved accident mitigation and prevention and reduced catastrophic risk exposure on-site and off-site.

Step Seven - Choose More Sites and Replicate Programs

LAMP relied on replication from one site to another to ensure that donor funding is maximized and that program initiatives continue to improve safety conditions once a program has been completed. This replication typically utilized key persons from the initial LAMP sites to instill new site leaders with enthusiasm and confidence that they could effectively take charge of their own safety, even in a complex technical arena involving toxic or explosive chemicals.

Step Eight - Review, Revise, and Redirect activities

Over the course of a multi-year LAMP program, changes inevitably affected the course of program events. Elected officials changed. Industry leaders came and went also, requiring amendments to the action plans for each LAMP site. All of this was a natural part of the process of implementing LAMP and underlined the need for flexibility from the start. In spite of external changes that may

occurred, LAMP remained effective by continuing to work with motivated groups, focusing on the ultimate goals of the program, and adapting these goals to conditions at the local level.

Observations in the Four Countries

Each LAMP program worked towards its objectives and outcomes through a number of different activities designed to increase industrial and community awareness of chemical risks, to develop prototype industrial emergency response plans, and to improve response capabilities to technological emergencies and natural disasters. By working with the community as a whole, LAMP programs fostered greater involvement of local government, industry, and community leaders in accident mitigation and prevention activities. In this way, the LAMP program achieved a catalytic effect by bringing groups together in support of the goals and objectives of the program, strengthening existing ties between these groups, and developing new ties to improve emergency response and planning capabilities.

LAMP program activities included the following range of initiatives:

- Awareness & Preparedness for Emergencies and Local Level (APELL) workshop/seminar to bring industry/local government/community groups together;
- Chemical emergency preparedness and accident prevention training;
- Risk assessment in process industries training;
- Workshops in communicating risk to the public and preparing the community for chemical emergencies;
- Periodic emergency response exercises involving local government, industry and community;
- Specific skill training for first responders in industrial and chemical fire safety and control of hazardous materials incidents and spills (fire, police and medical response);
- Training on safe transportation of hazardous materials;
- Computer-aided management of emergency operations (CAMEO™) - a computer software program for emergency planning and response developed by U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA); and
- Assistance in the establishing Local Emergency Planning Committees or crisis groups.
- Assistance in establishing national emergency preparedness and response networking organizations to coordinate policy and replicate APELL/LAMP sites around the country.

Altogether, LAMP utilized 54 experts in such diverse fields such as risk assessment, emergency planning, hazmat emergency response (including medical response), CAMEO™, and community outreach and education, to participate in 159 different events and activities. In addition, there were dozens of local experts utilized in the different programs in LAMP Programs in India, Indonesia, Mexico and Thailand.

In general, the lessons learned validated the bottom-up LAMP approach in establishing prototype examples of improved community-based emergency preparedness at selected sites that could be replicated at other sites while influencing and informing country-wide policies and institutions.

Impact

Good progress toward long term, effective collaboration between industry, government and local community to implement appropriate disaster prevention and mitigation measures was indicated at several high-risk sites in the four target countries. In most cases, there was good support from a national nodal agency for replication of LAMP programs at multiple sites throughout each target country.

The sites where that made the most progress were:

Mexico: Vera Cruz State (Coatzacoalcos, Vera Cruz, Orizaba & Poza Rica)

India: Madras, Mumbai, Cochin, Haldia, Kanpur and Vadodara

Thailand: Map Ta Phut and Bangpoo Industrial Estates

Indonesia: West Java State (Cilegon & Tangerang) and Gresik/Surabaya

Although the major focus on the LAMP program was in India, Indonesia, Mexico and Thailand, some LAMP and/or APELL activities were carried out in Egypt, Chile, Colombia, Costa Rica, Jamaica, Poland, Turkey and Venezuela. Between 1992 and 1998, the LAMP program was implemented in whole or in part in over 20 communities.

LAMP Program Benefits

The LAMP program focused on emergency prevention and preparedness at the local level in order to improve capabilities at selected high-risk sites in each target country. Thus, the major benefits and impacts of LAMP programs were defined by changes and improvements to emergency systems at the local level. While the major measurable impacts were at the local level, the long-term replication of activities and experience to other high-risk sites in target countries was also an important national aspect of each program.

Local Level Accomplishments

- Increased industry sensitivity to risk reduction and accident prevention and increased adoption of emergency preparedness and response plans;
- Increased coordinated disaster preparedness and prevention in high-risk communities;
- Increased number of trained technological accident responders using more advanced emergency response equipment as purchased by local industries and some local governments;
- Increased community involvement in disaster prevention and response for defined accident scenarios;
- Periodic and regular testing of local emergency preparedness and response plans; and
- Strengthened local, regional, and national technological disaster response networks.

National Level Impacts

- New legislation supporting the formation of local emergency coordination committees with representatives of the community and industry, as well as government;
- National level disaster planning and coordination committees with representation from industry associations, insurance groups, government ministries and national service organizations; and
- Resources made available for purchase of emergency response equipment and replication of program to more sites.

International Level Impacts

- Other countries have adopted a community-based emergency preparedness approach to empower local communities to take charge of their own safety from the risk of toxic and hazardous chemicals; and
- Recognition of accomplishments from international agencies.

Funding

Foreign Exchange Costs

OFDA contributed U.S. $3.5 million over five years, an average of $219,000 per country per year and an average implementation period of three years in each of the four countries. In-kind Contributions amounted to some U.S.$650,000.

Local Costs

Unfortunately, there was no mechanism set up for tracking local contributions for seminar and training facilities, fees for local experts, expenses for participants, salaries of local APELL/LAMP coordinators and equipment, materials and supplies for emergency exercises. All of these expenses were borne by local governments, industries and participants.

Authors' Biographies

Antony Marcil is the 2001-2002 Planner in Residence, School of Planning, Faculty of Environmental Studies, University of Waterloo. He has an MBA (finance/accounting) from Concordia University and a Bachelor of Mechanical Engineering from Sir George Williams University. He is also the senior policy advisor to Dr. Carolyn Bennett, M.P., Toronto St. Paul's. Previously, he was President and Chief Executive Officer for the last 10 of his 15 years with the World Environment Center. WEC is an independent, non-profit, non-advocacy organization founded with a 1974 United Nations grant. The Center develops and manages industry-government partnerships worldwide and designs professional development programs for corporate environment, health and safety executives. While at WEC, his work ranged from assessing mercury pollution due to small-scale gold mining and the formulation of market-based preventive strategies in The Philippines to establishing a 270-hour environmental consulting engineer's training course that certified 180 engineers in Mexico. He has lectured on pollution prevention and eco-efficiency in academic, government and industry settings around the world. In 1997, he was included in the first, worldwide Top 100 Figures in Environment, Sustainable Development and Social Issues, by The Earth Times of New York and Geneva.

Richard Williams holds a Bachelor of Industrial Engineering from Montana State University and a Masters in the same discipline from Columbia University. He first worked in industrial engineering for Merck Pharmaceuticals, General Electric and then the Franklin Research Institute, where he specialized in the human aspects of operations analysis and training. He then joined the U. S. Peace Corps where he designed training courses and techniques for volunteers in the U.S. and then served in India. He then spent 11 years designing and implementing training programs for the electric power and the telecommunications industries in Iran, leaving just days before the Islamic Revolution in 1979. From there, he joined the U.S, Agency for International Development in Egypt and then in Washington, D.C. before finishing up his government service with the U.S. Trade Development Agency. In 1990, he was named Senior Fellow and he opened the Washington, D.C. office of the World Environment Center from which he retired eight years later. In the interim, he managed the logistics for the establishment of the Regional Environmental Center in Budapest, managed the Local Accident Mitigation and Prevention (LAMP) program from inception to final report and oversaw industrial eco-efficiency programs in Latin America.