

Targeting High-Risk Behaviors in Diarrheal Disease Prevention

*Why are childhood diarrhea rates sometimes high even in areas where most people have water and sanitation?
This question was the starting point for a diarrheal disease prevention program in Bolivia.*

To help achieve the strategic objectives of the Office of Health and Nutrition, the Environmental Health Project (EHP) has developed a community-based approach to disease prevention. The overall goal of EHP's approach is to reduce morbidity and mortality from the three major childhood diseases: diarrhea, malaria, and acute respiratory infections (ARI). EHP is applying the approach specifically for diarrheal disease control in Bolivia in collaboration with the USAID-funded Community and Child Health Project (CCH).

The Bolivia program is built on a foundation of EHP experience:

- a prevention paradigm based on the concept of breaking environmental links to disease,
- application in Tunisia and Ecuador of a method for encouraging behavioral change at the household and community level,
- assessment tools to identify environmental and behavioral risk factors, and
- creating links between communities and local- and national-level government officials to support community-based activities which achieve health outcomes. The text box on page 6



Residents draw a perceptual map of their community. Photo: Dolly Montañó

lists related reports and resource materials.

Data Reveals Risk Factors

Epidemiological/ KAP (knowledge, attitudes, and practices) data were collected in the project communities to guide planning of the program. The survey covered approximately 350 households with over 400 children under 5 years old. The data, in combination with diarrheal disease data from health clinics, are being used to assist regional and community teams with “autodiagnoses” of the environmental and behavioral risks that should be addressed. The data will also allow objective monitoring of health outcomes.

The project area, Valles Crucenós, in the Department of Santa Cruz, is one

of 11 health districts in which CCH works with the Ministry of Health to improve local services. Water supply and sanitation coverage, as reported by CCH, is in the 75% range. Yet data collected by the primary health system show high childhood diarrhea rates. And the reported figures should be viewed in light of the Epi/KAP survey. This survey, carried out during the dry or “low” diarrheal disease season, showed that 30% of children under 5 in the surveyed communities had an episode of diarrhea in the two weeks prior to the survey, a rate several times higher than that reported at the health facilities.

Data summarized in the figure on page 7 point to the need for behavior change. In the initial Epi/KAP survey,

Continued on page 6

INSIDE...

Update: Current Activities	2
Reducing Diarrheal Disease Mortality ..	4
Information Resources	5
Successes in Jamaica	8

UPDATE: Current Activities of Note

Malaria Emerges as Major Health Problem in the Peruvian Amazon

During the 1960s and 1970s, malaria was well controlled in Peru: only 2,010 cases were reported in 1968. But in 1996, the disease became a major health problem, with over 200,000 cases reported. The Amazon region is the hardest hit. In Loreto, the largest administrative entity in the Amazon region, the incidence rate was 11,905 cases per 100,000 population. Other countries in the Amazon basin are experiencing similar increases, but Peru's case is especially severe.

Several environmental factors narrow the options for control. Heavy rains in the highlands and deforestation for agricultural expansion and exploitation of natural resources can increase vector breeding sites. Perhaps most disturbing, the parasite shows resistance to chloroquine and possibly other anti-malarial drugs. There are numerous species of anopheline vectors in the area, but their biting habits, efficiency as vectors, susceptibility to insecticides, etc. are not well understood.

EHP has been asked to collaborate with the Centers for Disease Control and Prevention (CDC) in an effort to

achieve a better understanding of the mechanics of malaria transmission in the tropical Amazon. EHP and CDC will review the procedures for diagnosis and treatment and the effectiveness of anti-malarial drugs and obtain better information on the ecology of vector mosquitoes and the status of insecticide resistance. Peruvian officials will work side by side with EHP and CDC consultants, thus increasing their capacity to develop more effective plans for malaria treatment and prevention.

Soap Companies in Central America Launch Handwashing Campaign

EHP and BASICS are collaborating with soap companies in Central America to launch an advertising campaign promoting handwashing with soap to prevent childhood diarrhea.

The multinationals Colgate-Palmolive and Unisola and three local producers have agreed on a social marketing strategy to lead the target audience (mothers and children under age ten, especially in low-income and rural areas) to use soap, not just for laundry, bathing, and housecleaning, but also for handwashing.

Market research, which included

1,000 or more interviews in each country, revealed that only 9% of the mothers reported washing their hands at critical occasions and demonstrated proper handwashing technique.

A local advertising agency, Servicios Estrategicos, has developed an advertising campaign and tested it for relevance, understandability, appeal, and memorability among the target group. The soap producers will adapt the campaign to their brand of soap and simultaneously launch the campaign.

The household survey confirmed the direct relationship between diarrheal incidence and handwashing. Households where no correct handwashing was practiced had a diarrhea prevalence rate of 23% for children under five. Those with an average of eight handwashings a day had a prevalence rate of 10%.

This activity is an example of how donors can partner with business to achieve development and commercial goals. The success of the project will depend on its ability to tap previously untapped potential—for disease prevention and increased sales of soap.

CIMEP Benin Kicks Off

EHP has completed two successful CIMEP programs: one in Tunisia and the other in Ecuador. A third CIMEP activity is now underway in Benin—with an eye to replication in other countries in West Africa. The new program is funded through the Population, Health and Nutrition (PHN) Center and the Women in Development (WID) Office of USAID's Global Bureau and USAID/Benin.

CIMEP—Community Involvement in the Management of Environmental Pollution—is a community-based approach for addressing environmental health issues, especially in unserved peri-urban areas. CIMEP improves the capacity of municipal staff and local NGOs to work in partnership with



Environment, Health & People is published three times a year by the Environmental Health Project (EHP), a consortium of firms and research institutions headed by Camp Dresser & McKee International Inc. For information, contact EHP headquarters, 1611 N. Kent St., Suite 300, Arlington, VA 22209-2111. Tel: (703) 247-8730; Fax: (703) 243-9004; Internet: EHP@ACCESSDIGEX.COM.

Visit the EHP Homepage: <http://www.access.digex.net/~ehp>

Contributors

Andrew A. Arata, *EHP Senior Tropical Disease Specialist*; Diane B. Bendahmane, *EHP Technical Director for Marketing and Information Services*; Patricia Billig, *Senior Technical Director*; Dan Campbell, *EHP Librarian*; Eduardo A. Perez, *EHP Technical Director for Engineering and Technology*.

Editor Diane B. Bendahmane
Copyeditor Betsy Reddaway



Production and layout Darlene Summers
Design Leslie Shapiro, ArtConcepts

Contract No. HRN-C-00-00036-11; Project No. 936-5994 is sponsored by the Environmental Health Division; Office of Health and Nutrition; Center for Population, Health and Nutrition; Bureau for Global Programs, Field Support and Research; U.S. Agency for International Development, Washington, DC 20523.

Continued on page 3

Update (from page 2)

residents to improve environmental conditions and health-related behaviors.

Three secondary towns in Benin have been selected for the pilot phase based on the prevalence of environmental risk factors and environmentally related diseases and the capacity of the communities for social and financial mobilization.

Seven representatives from each town will participate in CIMEP training over the next year. These public health sector technicians, neighborhood leaders, and NGO representatives will complete four training cycles:

- Introduction to a Facilitative Community Management Approach,
- Changing High-Risk Behaviors,
- Helping Communities Develop Environmental Health Plans, and
- Creating Financing Options for Community Projects.

The training cycles will alternate with practical work in the communities. In each community, the program culminates in completion of low-cost projects to address priority environmental health issues.

CIMEP Benin's overall objective is to improve maternal and child health, with special attention to reduction in cholera and other sanitation-related diseases. (According to the World Health Organization, in 1996, there were 6,190 reported cases of cholera in Benin with a case-fatality rate of 3.3%.)

CIMEP will also play an important role in Benin's decentralization. The program will be implemented through the Department of Borgon, where the pilot communities are located, not through national-level ministries. As the country prepares for its first municipal elections, CIMEP will strengthen the synergy between the state and society.

CIMEP Benin will help achieve results for several of the mission's cross-cutting strategic objectives in the areas of health, environment, education, and good governance.

The program in Benin will be used as a model and training center to disseminate the CIMEP approach throughout West Africa. Teams from other countries—Côte d'Ivoire, Togo, and Mali—will attend a regional workshop in Benin in early 1998 to develop a regional strategy.

"Building Community Partnerships for Change," a 28-page booklet on CIMEP, is available from EHP.

Key Environmental Health Indicators Identified

A technical advisory group (TAG) of six experts in child health programs met with EHP personnel in July to develop a set of environmental health indicators. At the conclusion of the 2-day meeting, approximately 50 interested persons from USAID and USAID health and environment contractors reviewed and discussed the TAG's findings and recommendations.

The advisory group included experts in the prevention of three major childhood illnesses—diarrhea, malaria, and acute respiratory infections (ARI)—as well as community participation and evaluation. EHP will use the experts' input to refine indicators that can be used by missions seeking to integrate environmental health with their maternal and child health programs. A report on the TAG meeting is in preparation.

Child Health Is Focus of Lead Exposure Abatement Activities

EHP is involved in lead exposure abatement activities to improve child health in three locations.

In Romania, EHP has assisted community and health

leaders in Zlatna to reduce the exposure of children to environmental lead from a copper smelter that is the main source of employment in the city. The key accomplishments have been to demonstrate the gravity of the situation through blood-lead-level testing and to convince the community members that there are actions they can take to protect themselves.

As a result of community action, kindergartens have been made safer for children through improving bathrooms and installing hot water so that children can wash after playing outdoors, introduction of educational programs, and creation of safe outdoor play areas. Numerous community groups made contributions. EHP provided educational materials, including very popular hand puppets.

In Egypt, EHP is assisting the government to develop a lead exposure abatement plan. The work includes identifying sources of lead contamination in air, soil, and water and suggesting remediation activities.

Continued on page 4



Principal of kindergarten in Zlatna shows off puppets used to teach children how to avoid exposure to environmental lead. Photo: Patricia Billig

Opportunities for Further Reductions in Diarrheal Disease Mortality

Oral rehydration therapy (ORT) has been the mainstay of diarrheal disease control for the past decade and a half, and there is general agreement that ORT has contributed substantially to reducing mortality from diarrheal disease among children under five. However, this success has tended to divert attention from the types of diarrhea that cannot be effectively treated with ORT and from interventions that can *prevent*, as opposed to treat, diarrheal diseases.

ORT is primarily effective in reducing mortality from acute watery diarrheas, where the cause of death is associated with dehydration and electrolyte imbalance. For dysentery, persistent diarrhea (that lasting 14 days or more) and complicated diarrheas (those accompanied by measles, acute respiratory infections or malaria), the causes of death are not typically dehydration and electrolyte imbalance and, therefore, the impact of ORT in reducing mortality from these types of diarrheal disease is limited. (See *the World Bank's Disease Control Priorities, 1993, p. 95 and 110.*) In these cases, control and prevention strategies other than ORT must be sought.

Recommended preventive strategies include provision and/or improved use of adequate water and sanitation, improved hygiene behavior, improved weaning practices, promotion of breastfeeding, and measles vaccination. (*Disease Control Priorities*, pp. 96-101).

Estimating the effectiveness of a continued emphasis on ORT to further reduce childhood diarrheal disease mortality rates requires an estimate of the relative magnitude of acute watery diarrhea mortality versus mortality from other types of diarrhea. Recent studies document that persistent diarrhea and dysentery are responsible for a substantial proportion of diarrheal mortality:

- Population-based studies summarized in Victora (1993) found that persistent diarrhea accounted for 60% of the <5 diarrheal deaths in Brazil, 47% in India, 36% in Senegal, and 26% in Bangladesh.
- Bhan (1996) reported revised estimates of diarrheal incidence in developing countries: dysentery and non-dysenteric persistent diarrhea combined account for 65% of total diarrhea deaths.
- A study by Fauveau (1991) of a large rural Bangladeshi community during 1986-87 found that persistent diarrhea accounted for 63% of diarrheal deaths of children 1-4, dysentery accounted for 16%, and acute watery diarrhea 5%.

These data suggest that exclusive emphasis on ORT will have limited impact on further reducing overall diarrheal disease mortality among children. Further reductions in child mortality from diarrhea will require much more emphasis on prevention and on more comprehensive case management that encompasses all life-threatening diarrheal disease episodes, including persistent, dysenteric and complicated diarrheas.

— Patricia Billig

(Works cited: CG Victora *et al.* International differences in clinical patterns of diarrhoeal deaths: a comparison of children from Brazil, Senegal, Bangladesh, and India. *J Diarrhoeal Dis Res*, 1993, 11(1):25-29; MK Bhan *et al.* Epidemiology and management of persistent diarrhoea in children of developing countries. *Indian J Med Res*, 1996, 104: 103-114; V Fauveau *et al.* Diarrhoea mortality in rural Bangladeshi children. *J Trop Pediatr*, 1991, 37(1):31-36.)

Update (from page 3)

An extensive environmental sampling survey was conducted in Cairo earlier this year to estimate the magnitude and extent of children's exposure to lead in Greater Cairo. Over 1,000 samples of soil, dust, drinking water, paint, various foods, cosmetics, traditional medicines, newspaper, and ceramics were collected and analyzed for their lead content. The survey identified ingestion of some food items (produce and milk) and use of *kohl* (a traditional cosmetic) and lead-glazed ceramics for cooking and storing food as significant sources of potential lead exposure for children. The Egyptian government is currently conducting a study to determine the distribution of blood lead levels of children in Cairo and to

identify potential risk factors for high blood lead levels.

EHP's recommendations are under consideration by the Egyptian Environmental Affairs Agency, the Ministry of Health and Population, and other involved agencies.

In Latin America and the Caribbean USAID and PAHO are engaged in a joint effort to monitor the environmental and health impacts of the phase-out of leaded gasoline. EHP provided assistance in developing several monitoring options among which countries in the region could choose, depending on their needs and resources. A report laying out the options is forthcoming and will be available from EHP. This activity is part of USAID's Environmental Initiative

for the Americas.

Lead is one of the most toxic and ubiquitous heavy metals, contaminating many urban environments and adversely affecting the health and development of children and certain groups of workers.

Risk Assessment Provides Input for Environmental Management Plan in West Bengal

The Spring 1996 issue of *EHP* described a USAID-assisted risk assessment in Ahmedabad, India, that served as a lightning rod to direct attention to major health-related environmental problems. Since then, EHP has assisted with a second risk assessment—of the

Continued on page 5

Update (from page 4)

Asansol/Durgapur area in West Bengal—and with the follow-on environmental management plan.

The Asansol/Durgapur risk assessment singled out four problems posing the greatest risks to the health of residents: inadequate supplies of potable water, inadequate sanitation, poor air quality, and land subsidence in the mining areas.

Preparation of the environmental management plan began with a training course for persons responsible for the technical work leading to the plan. The course covered the purpose, content, and scope of an environmental management plan; data needs; identifying and working with stakeholders; and development of a workplan. Trainees were drawn from the Asansol/Durgapur Development Authority, the local office of the West Bengal Pollution Control Board, and municipal corporations and local NGOs.

EHP's role is to build local capacity for conducting risk assessments and incorporating them into the planning process. EHP will continue to play this role in a new activity under the Global Bureau Joint Action Incentive Fund (JAIF) with collaboration between the

Environmental Health Division of the Center for Population, Health and Nutrition, the Urban Programs Division of the Environment Center, and the Regional Urban Development Office of USAID/New Dehli. An environmental health risk assessment will be conducted in three additional cities (Chennai—formerly Madras—and Pune in India and Khulna in Bangladesh), coupled with follow-on community interventions based on the CIMEP model (see article page 2) in several neighborhoods in each city. The project falls under strategic objectives of both centers. G/PHN will look for improvements in child and maternal health; G/ENV will look for reduced urban pollution and improved urban management.

Sanitation Guidelines Published

A new manual from UNICEF takes planners and programmers step by step through the process of designing a sanitation program. The highly participative process described strikes a balance between sanitation “hardware” (technologies, such as latrines) and “software” (improved behaviors, such as hand-

washing after defecation).

Authors of the manual reviewed evaluations of 54 sanitation programs to isolate the common characteristics of the successful ones and to develop principles of successful sanitation programs based on field experience. EHP assisted UNICEF with the preliminary review and preparation of the manual.

“Better Sanitation Programming,” which UNICEF will likely apply in Zambia and Peru, is available from EHP.

Monitoring System for USAID Cairo Based on User Needs

To fulfill USAID reporting and programmatic requirements, the Cairo mission, with assistance from EHP, is developing an environmental sector monitoring system. The system will make possible sectorwide monitoring of key environmental indicators as well as the performance of mission results packages and the Egyptian Environmental Policy Program. Preparation of the system began with an analysis of what the system's potential “customers,” or users, expect to get out of it. □

Information Resources on Community Involvement in Disease Prevention

Over 400 records in the EHP Library database pertain to community-involvement, disease-prevention projects. Community approaches can be applied to all environmentally related diseases: diarrhea, malaria and other vector-borne diseases, lead poisoning, and others. A sampling from the database appears below; detailed abstracts are available from EHP upon request.

Improving Environmental Health Conditions in Low-Income Settlements: A Community-Based Approach to Identifying Need and Priorities. Geneva: World Health Organization, 1987.

Community-Based Integrated Control of *Aedes Aegypti*: A Brief Overview of Current Programs by Duane J. Gubler and Gary G. Clark. *American Journal of Tropical Medicine and Hygiene* (1994) 50(6):50-60.

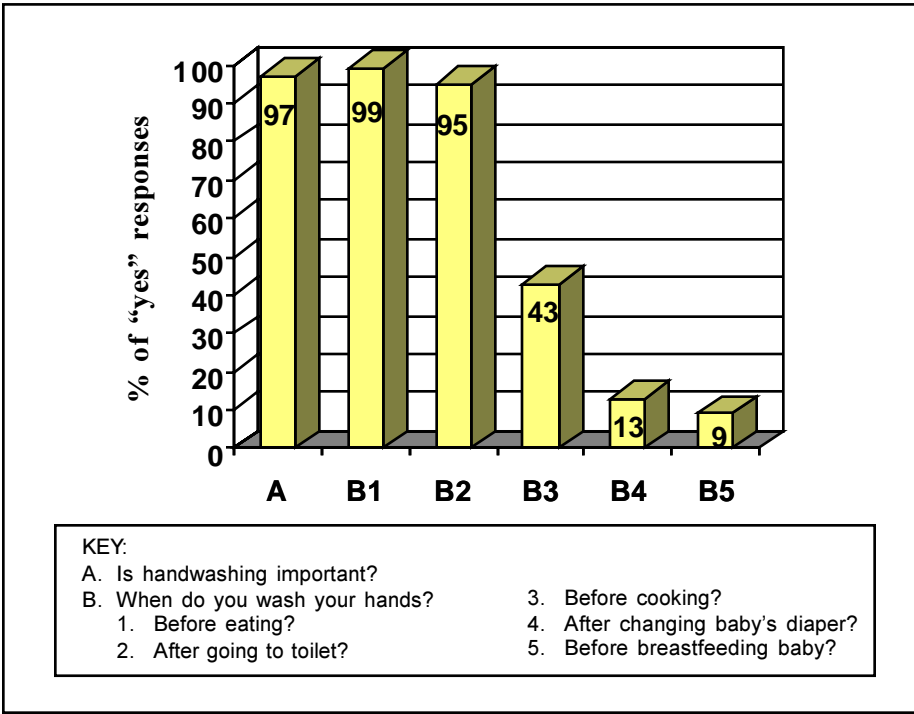
Chagas Disease Control through Community Action in Bolivia by Fanor Balderrama *et al.* In *Down to Earth: Community Perspectives on Health, Development, and the Environment*. West Hartford, Connecticut: Kumarian Press, 1995.

Community Participation for Disease Vector Control. Proceedings of the ICMR/WHO Workshop to Review Research Results, Malaria Research Centre, New Delhi, India, 1986.

Implementing and Sustaining Community-Based Mosquito Net Interventions in Africa by S. Mutambu and C. Shiff. *Parasitology Today* (1997) 13(6):204-206.

Community Partnerships in Preventing Childhood Lead Poisoning by K. Dugbatey *et al.* *Journal of Environmental Health* (1995) 58 (4): 6-10.

— Dan Campbell



High Risk Behaviors (from page 6)

Visit to Ecuador

In April 1997, to learn more about the EHP approach, 12 Bolivian community leaders, health officials, and CCH counterparts visited two communities in Ecuador where an earlier EHP-supported project using the community-based approach demonstrated dramatic reductions in endemic cholera. The Bolivians noted that the project

communities in Ecuador had continued their hygienic practices several years after the formal project and EHP involvement had ceased. The visit helped convince the Bolivians that the community-based approach could be effective in their communities.

On their return home, they outlined the project in a start-up workshop in Santa Cruz and received the endorse-

ment of regional and municipal authorities as well as civic clubs and local leaders.

The basic elements of the intervention model being applied are shown in the box below. The basic concept is to initiate a regional- and community-level skill-building process, on a foundation of knowledge about the community, to achieve sustainable reductions in childhood diarrheal disease risk factors.

Looking Ahead

The start-up workshop and two of the four scheduled skill-building workshops have been completed. These workshops drew heavily on the Epi/KAP survey data and developed skills for autodiagnosis of local conditions contributing to diarrheal disease.

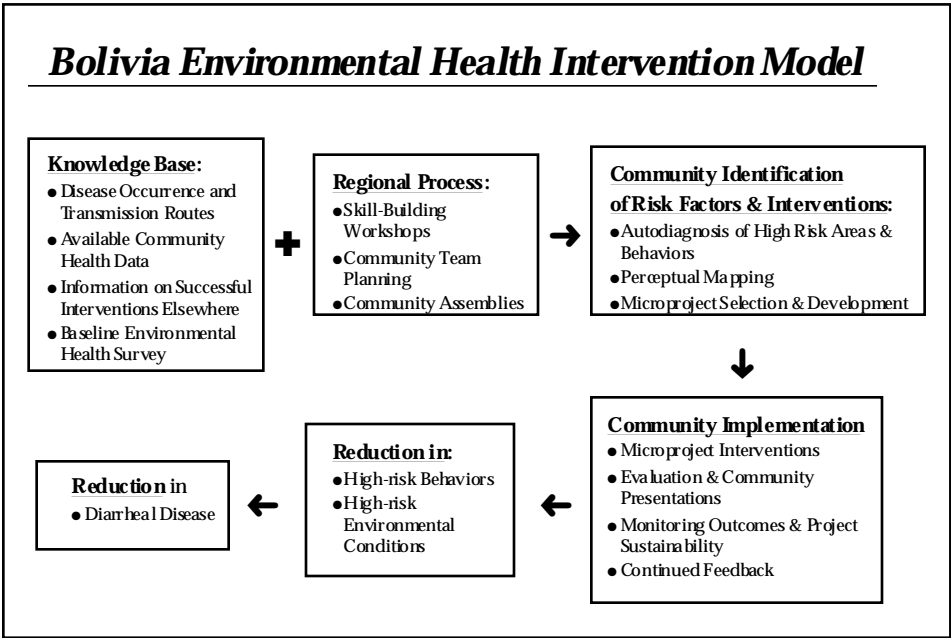
At the third workshop in October 1997 small projects will be defined, to be carried out early in 1998 as soon as local financial mechanisms and monitoring indicators have been established.

Throughout 1998, the local EHP staff (a pediatrician and an educator) and CCH staff will continue to assist regional and community teams with project implementation and monitoring results.

The Epi/KAP survey will be repeated about a year after initiation of the microprojects, diarrheal disease rates at the household level will be monitored at least twice—during both dry and wet seasons, and health center data will be updated. Data collected in these ways will be compared with baseline information to track results. The communities' investment in the overall project—both private and public sectors—will also be closely monitored.

The major indicators of success will be reduction in diarrheal disease rates as measured at the household level and continued community involvement and investment in promoting improved hygiene behavior.

— Andrew A. Arata



Results: Some Sanitation Successes in Jamaica

Since 1995, EHP has provided training and technical assistance with funding from USAID/Jamaica to the Jamaican NGO, Construction Resource and Development Centre (CRDC), for a demonstration urban environmental sanitation program in the slum areas of Norwood and Rosemont in Montego Bay, Jamaica. The project has two basic health goals: (1) to increase the number of households that possess adequate sanitation facilities and use them correctly and (2) to improve hygiene behaviors related to diarrheal disease—especially among children.

A recent evaluation of this project compared data collected at project initiation with a follow-up monitoring survey six months later. The encouraging results are shown in the accompanying figure, including significant improvements in behaviors most effective in preventing diarrhea.

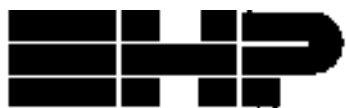
<i>Indicator</i>	<i>Baseline (Jan-Feb 96)</i>	<i>Monitoring Survey (Aug 96)</i>
Acceptable sanitation solution present or under construction	28%	99%
Facilities meet Jamaican public health standards, are currently used, and are clean	21%	52%
Presence of an organized handwashing place (basin, water, and soap)	44%	83%
All water storage containers in household are covered	71%	92%

A substantial number of households have been affected: 520 households (close to 3,000 persons) had constructed and were regularly using their sanitary facilities at the time of the monitoring. It is estimated that this figure will grow to 620 households (about 5,000 persons) by the end of the project in December 1997. The project's environmental goals are also being met: 18,240 gallons of untreated wastewater per day are now being disposed of in an environmentally acceptable manner.

The project was implemented by CRDC's Sanitation Support Unit (SSU). The unit provided hygiene and health education to create and expand demand for sanitation, helped householders obtain loans from the Caribbean Housing Finance Corporation for constructing or improving their sanitation facility, provided technical assistance in technology selection, and helped ensure that the facilities met the requirements of the Jamaican Ministry of Health. Sanitation facilities were paid for by the households; construction was carried out by private sector contractors; and households paid for SSU's services.

To follow up, EHP assisted USAID/Jamaica to identify new sources of credit for households so that this program can be replicated in other peri-urban areas in Jamaica.

— Eduardo A. Perez



ENVIRONMENTAL HEALTH PROJECT

1611 North Kent Street, Suite 300
Arlington, VA 22209-2111 USA