

WATER AND SANITATION  
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**LESSONS LEARNED FROM BOLIVIA  
IN PROGRAMMING, DESIGNING, AND  
IMPLEMENTING SANITATION PROGRAMS**

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### Introduction

As part of the overall task, a two-week field trip to Bolivia was undertaken. The purpose of the field trip was to assess and document the lessons learned in programming, designing, and implementing sanitation programs that efficiently increase and sustain coverage levels and effectively reduce disease incidence. During the field trip, policymakers, financing decision makers, programmers, project designers, and project implementors were interviewed from a wide range of organizations, including bilateral and multilateral external support agencies, international finance agencies, government ministries and operational agencies, and local and international nongovernmental organizations and their respective agencies. The trip to Bolivia also included project site visits to two rural projects and one peri-urban site.

The purpose of this chapter is to provide the reader with a synthesis of the lessons learned by those interviewed as well as to provide additional observations by the authors.

### Country Background

Bolivia is situated in the high Andean mountain range and covers 424,163 square miles (1,098,581 square kilometers). It has a population of 6,420,800 (according to the 1992 census), with a 2.8 percent annual growth rate. According to the census, 57.5 percent of the population now lives in urban areas, with the majority of the urban population located in the cities of La Paz, Cochabamba, and Santa Cruz. Bolivia is one of the poorest countries in the Americas, with a 1990 per capita GNP of US \$581. Using the recent 1992 census, a Bolivian think tank (the Unidad de Analisis de Politicas Sociales of the Ministerio de Desarrollo Humano) developed a "poverty map," which shows 70.5 percent of the Bolivian population in poverty or extreme poverty. This national poverty statistic is further broken down to show that 95 percent of the rural population and 53 percent of the urban population are living in poverty or extreme poverty. After years of political turmoil and mostly military dictatorships, Bolivia has had five years of relatively stable democracy, and just recently elected its second consecutive president. In addition, the country is going through a "modernization process" that includes a restructuring of the economy and the public sector.

1. LITERACY, INTERNATIONAL RICE & FENCE  
2. COMMUNITY WATER SUPPLY  
3. AGRICULTURE  
4. P. 100, 2000 AD The Hague  
5. 1970, 31-91, exp. 11/142  
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## **Description of Bolivia's Water Supply and Sanitation Sector**

### **WS/S Coverage**

Bolivia has one of the lowest water and sanitation coverage rates in the Americas. According to the February 1992 Bolivian National Plan for Water Supply and Sanitation, in 1990, 53 percent of the total population had access to water and 25 percent had access to sanitation. Rural/urban breakdowns show that 75 percent of the urban population and 30 percent of the rural population had access to water and 35 percent of the urban population and 15 percent of the rural population had access to sanitation. The Bolivian National Plan qualifies these statistics and suggests that the situation is probably worse than the coverage data indicate, because, for example, in urban areas much of the reported 75 percent coverage simply represents household connections that may only receive poor quality water on an intermittent basis (i.e., a few hours a day). The plan also states that with a few exceptions, sewage collected from the 35 percent of the urban population that has access to sanitation is discharged untreated into surface waters.

Urban and peri-urban coverage rates have not been disaggregated. Nevertheless, urban population and coverage rates seem to include the fast growing peri-urban areas of the three largest cities. For example, the water utility for the greater metropolitan area of the capital city of La Paz (SAMAPA) estimates the total population to be 1.1 million, which includes the approximately 600,000-700,000 people estimated to be living in peri-urban areas. SAMAPA's coverage data show that only 62 percent of the total urban/peri-urban population has household level water connections associated with SAMAPA's formal water system and only 58 percent has sewage connections. Greater La Paz includes the informal/peri-urban community of El Alto. El Alto's population was 4,500 in 1982 and by 1994 was 405,000, with an annual growth rate of 10 percent predicted through the year 2000. Largely because of financing from the Bolivian social investment fund, approximately 65 percent of El Alto's population has access to water but only 18 to 20 percent has sewage connections.

### **Sector Organization**

The national WS/S sector has recently undergone a major restructuring as part of the government of Bolivia's effort to decentralize the public sector. The national plan, approved in 1992, consolidated national level government responsibility from four ministries (including the Ministry of Health) into one government agency, the Secretariat of Urban Affairs. Under the plan, both rural and urban government roles and responsibilities are devolved/decentralized to regional development corporations and then to municipalities. Implementation of WS/S activities in urban areas is largely carried out by semi-autonomous and some private water and wastewater utilities, with NGOs playing a role in peri-urban areas. In the rural areas, implementation is largely carried out by Bolivian and international NGOs.



## **Financing**

Financing of projects comes from both the Bolivian government and international donors and financing agencies. The government of Bolivia appears to be giving a high priority to WS/S. In 1993, 5.3 percent of the government's national budget was appropriated for the WS/S sector (compared with 3.5 percent for the national health sector). Nevertheless, the government of Bolivia is not the major WS/S financing source. In 1993, US \$109 million was budgeted for WS/S projects, of which US \$72 million came from external support agencies. Of the US \$109 million, approximately US \$55 million is going for both rural and urban sanitation. National mobilization/investment of funds for WS/S by the private sector is essentially nonexistent. The national plan largely attributes this to current WS/S project models, in which capital costs are almost entirely or largely subsidized (especially in rural areas), and tariffs that are insufficient to cover even O&M costs (especially in urban areas).

## **Institutional Capacity**

The restructuring of the WS/S sector was a first and important step in strengthening the sector. Developing a national-level policy and plan was a second critical step. Implementing the plan will now depend on the capacity of the public and private sector institutions and on the human resources available. The national plan has highlighted these two areas as being weak, with a resulting inadequate ability to absorb funds and implement projects. For example, according to the Dirección Nacional de Saniamiento Basico (the National Directorate for Basic Sanitation), only 52 percent of the US \$109 million budgeted for WS/S projects in 1993 were spent. The regional development corporations seem to be particularly weak in implementing rural projects.

On a related note, in its analysis of the sector, the national plan points out rural WS/S projects funded by external support agencies have been found relatively successful in meeting their output targets of building systems, but have generally not attempted to strengthen local and national institutions. Therefore, the plan determined that these programs are not sustainable.

## **Sanitation-Related Disease Burdens**

Bolivian health and economic indicators reveal a country at considerable risk for sanitation-related diseases. It has the second highest infant and under-5 mortality rates within the Latin American region, at 90 and 125 per 1,000 live births respectively (Oleh Wolwyna 1991). While the majority of Bolivian children (77 percent) are still being breastfed at 10-11 months of age (UNICEF 1994a) (with an average breastfeeding duration of 17 months), only 43 percent are given breast milk exclusively at 3-4 months of age, decreasing protection against diarrhea and other diseases (DHS 1989). Low birth weight rates, another risk factor for infant mortality, are at 13 percent (UNICEF 1994b) although DHS surveys report a higher rate of birth sizes "smaller than average" at 20.3 percent. While UNICEF estimates a female literacy



rate of 71 percent for the nation, DHS surveys of education levels reveal an expected disparity between urban and rural women. In urban areas 8.1 percent of women have received no education, as opposed to 31.5 percent of their rural counterparts. In addition, Bolivia has the third-lowest per capita GNP in the region, at US \$650.

Against this backdrop of high mortality, low female literacy, nonexclusive breastfeeding, low birth weights, and low income levels, diarrhea is the leading cause of child death. By questioning mothers on the symptoms that preceded child deaths, it was determined that diarrheal diseases account for 48.4 percent of deaths, followed by acute respiratory infection (11.7 percent) and measles (3.2 percent) (DHS 1989).

While diarrheal deaths depend on the host risk factors and medical case management listed above, poor environmental conditions increase morbidity and the consequence of stunting that follows high diarrhea incidence rates. Bolivian children experience some of the highest diarrhea incidence rates in the region. 16.9 percent of children surveyed had had diarrhea within the last 24 hours and 30.9 percent within the last 2 weeks (USAID Health Profile Bolivia 1993). Adjusting for seasonality, these rates correspond to 5.8 episodes per child per year (DHS 1989). This rate is reflected in nutritional indicators. While only 13.3 percent of children are underweight (weight/age) and 1.6 wasted (weight/height), 38.2 percent show cumulative nutritional losses or stunting (height/age).

While diarrhea contributes most to the sanitation-related disease burden, intestinal parasites, hepatitis A, typhoid, and polio reflect contaminated environmental conditions as well. Due to the WHO-sponsored polio eradication program with mass immunizations, no cases of polio have been reported since 1989. According to the Dirección Nacional de Epidemiología, 1990 diarrheal diseases, typhoid, and hepatitis account for 52 percent of the 15 most common diseases in Bolivia. By comparison, airborne diseases are 45 percent of the notifiable diseases, EPI diseases .9 percent, and vector-borne 12 percent. Although hepatitis case reporting is not disaggregated between hepatitis A and B, Bolivian physicians interviewed believe that the majority of cases are A. As an example of the role these other sanitation-related diseases play in Bolivia, intestinal parasites, hepatitis, and typhoid account for 53 percent of all notifiable infectious diseases in a peri-urban area with less than 15 percent sanitation coverage (data from summary statistics of ProSalude). The bulk of this burden is related to parasites (36 percent). *Ancylostoma* (hookworm), a skin-penetrating parasite most directly related to unsafe excreta disposal, accounts for 80 percent of all intestinal parasites, according to previous stool survey studies (Pan American Health Organization *Bolivia Situación de Salud y sus Tendencias* Nov. 1989). Table 5.1 summarizes Bolivian health statistics.



**Table 1**  
**Summary of Bolivian Health Statistics**

Indicator	Value	Source
Infant Mortality	90/1000 live births	CIHI
Child Mortality	125/1000 live births	CIHI
Percent breastfeeding at 10-11 months	77%	Bolivian Situation Analysis-UNICEF
Average duration of breastfeeding	17 months	Bolivian Situation Analysis-UNICEF
Percent exclusively breastfeeding at 3-4 months	43%	DHS
Percent low birth weight (<3.5 kg.)	13%	UNICEF State of the World's Children 1994
Birth size "smaller than normal"	20.3%	DHS mothers' history
Female illiteracy	29%	UNICEF State of the World's Children 1994
Percentage of women receiving no education	Urban 8.1% Rural 31.5%	DHS
Causes of death in children under 5	Diarrhea 48.4% ARI 11.7% Measles 3.2%	Verbal autopsies based on symptoms reported by mothers DHS
Diarrhea incidence	Prev. 24 hours 16.9% Prev. 2 weeks 30.9% episode/child/yr 5.8	CIHI
Malnutrition wt/age wt/ht ht/age	underweight- 13.3% wasting - 1.6% stunting - 38.2%	DHS

In summary, Bolivia is heavily burdened with sanitation-related diseases, not only in terms of diarrhea-related mortality, but other sanitation-related infectious disease morbidity patterns. The specificity of sanitation-related disease burdens not linked to water supply is highlighted



by the contribution of intestinal helminths in regions where it is prevalent, particularly on the part of hookworm case positivity rates. Although data are not available by age, since diarrhea contributes most to the disease burden, children are the most affected. Those of school age are most heavily affected by parasites, which lead to anemia and learning difficulties.

## **Issues, Constraints, and Lessons Learned in Programming, Designing, and Implementing Sanitation Programs**

As discussed in the introduction, interviews were held with a wide range of individuals active in the Bolivian WS/S sector. Many of these individuals represent external support agencies (ESAs), including bilateral donors, multilateral donors, and international financing institutions.

### **Why Isn't More Money Being Invested in Sanitation?**

As discussed earlier, sanitation coverage levels lag far behind water coverage levels, which in themselves are notably inadequate. Historically, relatively few funds have been programmed or invested in the sanitation sector by either the government or the ESAs. Therefore, we asked them a two-part question: What have been the issues and constraints for ESAs in programming grant funds or making investments in sanitation? If ESAs are programming or investing in sanitation, what is keeping them from programming or investing more?

The answers show an overwhelming consensus among the ESAs:

- **No demand.** This answer was consistently the first answer provided. In the experiences of those interviewed, neither rural nor peri-urban communities asked for sanitation interventions. Most admitted that they had a preference for projects that would engender appreciation by the beneficiaries and that would be relatively easy to accomplish. As one ESA professional said, “It is much easier to meet demand (i.e., for water) than to create demand.”
- **Lack of knowledge or experience in implementing successful sanitation programs.** When the ESAs have programmed and invested in sanitation, the projects have received little acceptance from the beneficiaries (this is particularly true for rural areas) and, at best, the latrines have been mostly used for storage. At worst, the money has been wasted (or stolen) and few latrines built. One ESA professional admitted, “We have had a history of monumental failures in our sanitation programs; I am not very motivated to try again.”
- **A high cost per beneficiary for donor agencies.** In programs funded by donations with little cost recovery (the predominant model), sanitation programs per se have a relatively high cost per beneficiary, but when sanitation programs are coupled with water interventions (which is always the case), then the cost per beneficiary is very high and dominates overall development budgets. For example, USAID/Bolivia funded a rural water sanitation program through its child survival program that provided latrines at a total



cost to USAID of approximately US \$75 per household or US \$15 per capita. In contrast, the packaged water and sanitation intervention costs USAID approximately US \$367 per household or US \$73.50 per capita. The water and sanitation component of the USAID Child Survival project accounts for approximately 25 percent of the overall budget. One ESA professional said that if the budget is cut, “It is a lot easier to simply chop off one water and sanitation program than to cut out various programs that total the same budget.”

- **Sanitation programs financed by loans are often deemed not “bankable” by international finance institutions (IFIs).** This is a corollary in the rural projects. In urban and peri-urban areas, sanitation projects are largely financed through loans. Water and sanitation utilities complain that IFIs do not see sanitation projects as financially feasible. IFIs, on the other hand, complain that utilities do not have the political will to charge tariffs that reflect capital recovery and recurrent operation and maintenance (O&M) costs. A utility executive admitted that they were not charging any tariffs for a social investment fund-financed sewerage system and that the water tariffs “were barely enough to cover the costs of printing the bill.”
- **Little advocacy for sanitation programs by personnel of the ESAs.** This was found to be true because decisions were either being made by medically oriented health personnel interested in increasing health services but with little interest or professional background in environmental health or they were being made engineers who felt more comfortable and/or more professionally challenged by water projects than by simple latrine projects. As one health professional said, “We can have a bigger impact on health with health education programs; we don’t need latrines.”
- **No professional incentive to program sanitation projects.** This was found to be particularly true in programs run by health professionals, where rewards and promotions are given for programming projects that result in reductions in mortality rates—achieved more cost-efficiently with curative health services such as ORT. Conversely, little recognition is given to projects that result in a reduction in disease incidence. One ESA health professional said, “Morbidity is not an issue. I don’t care how often people get diarrhea as long as I can save their lives.”
- **Sanitation (and water) programs are operationally difficult.** Water and sanitation programs often require major logistical operations for the purchase, transport and construction of systems. One ESA professional said, “Water and sanitation programs are a pain in the neck.”
- **Disease burden attributable to inadequate sanitation is not recognized nor are health benefits from sanitation programs appreciated.** While the health benefits of water interventions were largely recognized and accepted a priori, very little knowledge was found regarding the relative importance of effective sanitation in improving health. While no sanitation interventions were programmed without a water component, many water interventions were programmed without a sanitation component. Three of the ESA expatriate professionals that we interviewed confidently assured us that, “According to the



Bolivians, fecal material in the high altiplanos is sterilized by the high altitude and ultra-violet rays of the sun; therefore, I don't feel there is a compelling health reason to program sanitation programs."

### **If Money Is Programmed or Invested in Sanitation, How Can We Use It Most Effectively?**

Despite the many constraints found to investing in sanitation, a significant amount of funds are in fact currently being programmed for sanitation (and water). Currently in Bolivia, even though USAID/Bolivia is considering limiting future water and sanitation programming, other ESAs, such as the World Bank, InterAmerican Development Bank, UNDP, UNICEF, GTZ and various international NGOs, are programming more than one hundred million dollars for the sector over the next few years. The question that we then asked was, "What are some of the issues and constraints you face in designing and implementing successful sanitation programs that improve health, are sustainable, are cost-efficient/effective, and effectively increase coverage levels?"

A general consensus was found among the ESAs on this question. First, all of the ESAs interviewed found it difficult, if not pointless, to discuss sanitation separately from water. While most acknowledged the importance of sanitation and that nationally far fewer people have access to sanitation than to water, none of the ESAs designed or implemented sanitation programs that were distinct from water programs. The ESAs either implicitly or explicitly agreed that the four points listed above were good criteria for a successful sanitation (as well as water) program, although very few of the ESAs included all four criteria in their program designs. The overwhelming majority of ESAs had increasing coverage levels as their paramount objective; most of the ESAs strongly believed that increasing coverage levels would improve health. Paradoxically, the few ESAs that had programs designed by a health office and programmed through the Ministry of Health (such as the USAID/Bolivia WS/S program) were the most skeptical about the value of sanitation (and water) programs in reducing the disease burden. Cost-efficiency, cost-effectiveness, and sustainability, while acknowledged by all as important, proved difficult to design for and even more difficult to accomplish or demonstrate. While some of the ESAs interviewed claimed that their programs had successfully accomplished one or more of the above criteria, none claimed to have successfully accomplished all four. In some cases, the four criteria were not found to be mutually compatible. For example, one of USAID/Bolivia's WS/S programs was designed to be implemented through the Ministry of Health, with significant emphasis placed on strengthening the public institution in order to achieve long-term sustainability; a second USAID/Bolivia WS/S program was designed to be implemented by CARE with only minimal involvement and even less strengthening of the corresponding government institution. The first program resulted in some long-term institutional development with relatively few short-term outputs and low increases in coverage levels while the second program has resulted in greater outputs in the short-term but little long-term strengthening of the appropriate public institutions or national



NGOs. Therefore, the following will address separately the constraints to achieving each of the four success criteria.

What have been the issues and problems in designing and implementing sanitation programs that demonstrably improve health?

- Sanitation programs were usually a component of a larger water supply intervention, with excreta disposal added on. As stated previously, this is a result of the misconception that water supply is more critical than sanitation in reducing disease burdens and a result of a lack of demand for latrine services.
- Many programs are not designed to explicitly achieve high community coverage. As an example, programs monitor and report coverage using target beneficiaries that may or may not represent a geographic community unit. Therefore, while a given number of households may have sanitation services, there may not be high community coverage. The importance of community-level coverage over individual coverage to positively impact health was underappreciated by program designers and implementers.
- While the implicit goal of sanitation programs was to improve health, its achievement was often based on a definition of sanitation limited to excreta disposal systems. Therefore, the primary emphasis was on construction and use of latrines as opposed to broader interventions aimed at diminishing environmental contamination. This limited view of sanitation may in part be attributed to the engineering perspective of program implementors who lack integrated coordination with public health staff.
- For those programs that did have a health education component, the primary emphasis was on the use, maintenance, and hygiene of the device, with the addition of handwashing messages. Health education was not based on identified high-risk behaviors such as food handling practices, kitchen hygiene, children's footwear, and the location of animals. Constraints to conducting baseline observational studies included perceived costs, unfamiliarity with the target communities, and the concept that such studies would be time consuming and require complicated ethno-medical research designs.
- Many programs are using adult volunteer "health promoters" to perform the vital role of health educators, although the attrition rates are high. While other NGOs may pay their health educators, after the program has been completed these workers no longer continue their activities. Without a salaried worker, continued hygiene education and surveillance is clearly not sustainable. Meetings are the usual forum for female target groups. Programs report high drop-out rates due to repetition of the same health messages and lack of incentives to participate.
- Programs with a health goal offered water and sanitation services as part of general child survival activities (immunizations, growth monitoring, use of ORT, prenatal care etc). In such cases, hygiene education tended to be diluted, as it was made part of a broader health education package. The difficulties involved in teaching child survival technologies,



such as vaccine schedules, how to make ORS, etc., often take priority over preventive environmental health education.

- Because sanitation programs are offered as a package with water supply and child survival, it is difficult to measure the health impact of sanitation alone or water and sanitation combined apart from the health programs. For instance, if diarrheal disease morbidity is reduced, it could be because of better water supply, less measles from the EPI, or better nutritional status from better growth monitoring and associated improved feeding practices. Only hookworm prevalence surveys on school age children (stool exams) in tropical climates could directly measure the impacts of a sanitation program that controlled for chemotherapy and footwear.
- Most programs did not explicitly target populations with high sanitation-related disease burdens because no reliable health data exist. The public sector covers less than 50 percent of the population; services to that group are intermittent due to staffing and drug supply short-falls. The surveillance data that are reported are frequently misclassified or based on estimates of disease prevalence. Therefore, disaggregated statistics are unlikely to realistically reflect the true community-level picture. This paucity of data dissuades programs from targeting high-risk populations outside of areas known to be impoverished. As stated previously, most programs select their target populations on other criteria, such as demand for services, by the direction of governmental agencies, etc.
- Some programs are not designed or programmed to measure health impacts, either because health is not an intended goal (other goals might include job creation or environmental protection) or because it is assumed that impact studies are too difficult and costly to conduct.
- While the programs that are oriented toward health do baseline surveys of their target populations, water and sanitation coverage was not always measured nor were mortality statistics always consistent with child survival goals. While diarrheal disease incidence has been determined, post-intervention surveys did not appear to use the same instrument to compare rates. Reasons for this included the time and cost of the surveys and the changing post-project interests of the donors. For instance, one donor decided mid-project that institutional capacity-building was a more critical indicator of program impacts than changes in diarrhea morbidity.
- Another obstacle to impacting and measuring health outcomes was the miscalculation of the time necessary for project implementation. Projects are usually run on a five-year grant, with the first and second years often spent setting up the project infrastructure and ordering commodities. Only by the third year does construction begin, frequently continuing through the fourth and fifth years. This leaves little time for the “software” components of health education, capacity-building for sustainability, and long-term impact evaluations. Therefore, projects that are built by year three probably have enough time for software components, but projects that are not built until the fifth year probably do not have sufficient time to adequately include health education components.



What have been the issues and problems in designing and implementing sanitation programs that resulted in increased coverage relative to population growth and coverage that is used effectively (i.e., used properly by most if not all of the family?).

- Coverage levels for sanitation (25 percent) are far below that of water supply (53 percent). The reason for this is partly related to the low priority donors and programmers give to sanitation, but, more importantly, it is also related to lack of demand. This lack of understanding of the primary role of sanitation in reducing environmental contamination and associated disease burdens is a major barrier to improvements in coverage.
- It appears that the current programs to increase coverage are not sufficient to even keep pace with population growth. For instance, in the peri-urban area of El Alto, with a population growth rate of 10 percent, present coverage is only 20 percent at most. The growth of the informal sector, which is the lowest access to sanitation services, far outstrips the national urban growth rate projection of 3.48 percent with sanitation access estimated at 75 percent. Clearly, these rapidly urbanizing areas will be significant environmental health hazards unless adequate sanitation resources are invested.
- Projects focusing on capacity-building and beneficiary financing schemes do not appear to have community coverage as a short-term goal. For instance, in the peri-urban area of El Alto, although demand for hook-ups to the municipal sewer system has been created by an indigenous NGO, the capital to issue credit loans is not available. Thus, the coverage levels remain low, at less than 20 percent. On the other hand, CARE insists that latrines be installed before supplying water, and provides most of the financing. The difference between demand-driven, self-financed programs and those that operate on supply is that the latter reach community-level coverage earlier but at greater outside cost.
- Low-cost technology choices are not necessarily cost-effective when utilization and sustainability are poor. Many donors complained that communities did not use program-supplied VIP latrines. On the other hand, programs that invested in higher-cost, pour-flush latrines have found high and sustained utilization rates long after program implementation, as this technology is more user-friendly for children and is odorless.

What have been the issues and problems in designing and implementing sanitation programs that are sustainable?

In general, a lack of clarity or agreement was found on the definition of sustainability. The term “sustainability” was often used by different agencies to mean different things: some defined it as the ability of a community to operate and maintain a newly built system in the future; some defined it as the ability of national-level NGOs and public institutions to sustain program efforts in new communities after ESAs have left; others defined it as the financial ability of national agencies, municipalities, local NGOs, and communities to continue financing recurrent O&M and replacement costs for existing systems and to finance capital costs for new systems after funding ceases.



- To a very large degree, the ESAs acknowledged that most of their sanitation projects were not financially or institutionally sustainable. At best, the well-implemented rural projects achieved a degree of sustainability at the community level, with households performing adequate O&M on their latrines. The major problem appears to be a very weak public and local NGO sector and a very small capable human resource base. When ESAs have attempted to design and implement sanitation programs through the public sector, the results have been frustration and low output relative to effort. When institutional strengthening and human resources development programs have been explicitly attempted, progress has been thwarted by changes in government and the hiring of all new personnel.
- The dominant sustainability issue for rural sanitation programs is the dependency of the programs on virtually 100 percent financial subsidy. Other than a contribution of labor and local materials by the beneficiaries, the costs for external materials, trained labor, and supervision are covered in full by the implementing organization. No cost recovery for rural sanitation programs was found, raising the question of whether families will spend money for latrine repairs or whether new households will build latrines after the initial project is completed and the implementing agency has moved on to another community. This financial model also makes it very difficult to adapt a rural sanitation program to other communities unless massive and continued grants are provided to the implementing agency—an increasingly unlikely scenario.
- Programs that chose pit latrine technologies found that they were not used or maintained, even with vigorous health education efforts. Furthermore, demand for this technology was not created with intensive marketing initiatives. On the other hand, those programs offering pour-flush toilets found that they were kept clean and well-maintained and were used by all family members and upgraded on the owners' initiative. In one community, an owner hooked up a water tank to ease flushing. This system was copied by other community members at considerable cost.

What have been the issues and problems in designing and implementing sanitation programs that are cost-efficient and cost-effective?

- The major problems found in measuring the cost-effectiveness of rural and peri-urban sanitation programs is the lack of effectiveness data. For example, no health impact studies were found in Bolivia to demonstrate the health effect of a particular sanitation program. Only CARE had attempted to evaluate the health impact of its program, but only of its overall health program; the organization did not try to disaggregate the impact of its water and sanitation programs or of its sanitation program alone.
- A fair amount of cost data for sanitation programs do exist, allowing programmers to look at cost/effectiveness or cost per beneficiary. A reasonable amount of consistency was found in the cost data for rural sanitation programs, which showed that agencies were spending approximately US \$50 per household or about US \$10 per beneficiary (these estimates do not include the costs of labor and local materials provided by the beneficiary households). These costs include materials provided by the implementing agency and



some of the direct costs for technical assistance, trained labor, and supervision, but they do not include hygiene education or indirect costs of project management. Most notably, these costs do not include the cost/beneficiary for the water intervention that all agencies included with sanitation projects; therefore, the US \$50 per household cost is difficult to judge by itself or to compare with other sanitation or health interventions.

### **What Have Been the Lessons Learned in Overcoming Some of the Above Problems?**

- WS/S interventions with user-friendly technologies appear to be more sustainable than child survival program interventions. This was demonstrated in a post-implementation evaluation in an area where CARE had conducted a WS/S and health program. Two years after CARE departed, the only continuing activities were the water supply and sanitation programs. The water committee was still in operation and new pour-flush latrines had been constructed. Child survival activities were not to be found.
- Adult volunteer community health educators usually have high attrition rates. In a program spearheaded by ProSalude, energetic and interested adolescents, who frequently hang around ProSalude clinics, are being utilized as health promoters. These and other children identified within the school system have undergone training and are currently operating in the El Alto peri-urban community. Most of the referrals to the ProSalude clinics are generated by these youths. As their time is not otherwise spent earning income, their attrition rates are not the same as those of adult volunteers. Furthermore, these children frequently function as child caretakers and are future parents.
- Because baseline data collection is expensive and time consuming for most programs, an alternative is to have the community conduct this activity. The indigenous NGO, PROA (Proyecto El Alto) had its community groups perform what they called a “community diagnosis,” covering a broad range of environmental issues. Furthermore, they used a series of pictures depicting varying levels of personal and domestic hygiene practices in group meetings where participants graded themselves on their current practices. These methods of community-based monitoring and evaluation have tremendous health education value. Such an interactive and more creative approach to health education would solve the problems encountered in communities that quickly become bored with repetitious lectures. Using this system, a community could also monitor its disease incidence and death rates to measure health impacts.
- One lesson learned in Bolivia is that in general, rural families will use a pour-flush latrine effectively especially if a water source is conveniently located nearby. All of the agencies that had implemented pour-flush latrines found their sanitation components to be “successful”; families used the latrines and kept them clean even if there had not been a strong hygiene education component. The major benefits to the families seemed to be that the latrines were easy to clean and did not smell or have flies.



- While lack of demand was identified as a major constraint, one lesson learned in Bolivian peri-urban communities was that demand could be created. This was accomplished by providing effective hygiene education and working with the communities to allow them to identify their priority problems. No successful examples of creating demand in rural areas were identified.
- Providing access to credit was used effectively in Bolivian peri-urban areas as a means to overcome the constraint of lack of capital for household-level sewerage system hook-up and to build household bathrooms. Providing credit for peri-urban sanitation included the goal of achieving full cost recovery for the sanitation interventions. No attempts at providing credit or seeking cost recovery for rural sanitation were identified.
- Another lesson learned in Bolivia is that making households build a latrine as a condition for receiving a water intervention (the “hook approach”) is an effective way to increase coverage in a given community. If the latrine is a desirable latrine (i.e., a pour-flush latrine) then the household will use the latrine effectively. Hygiene education has a positive impact on actual use as well.
- The sanitation programs that appeared to be most effective and that successfully improved health were almost always part of a broader integrated health program that included not only water but health education, health services, and even household vegetable gardens and fruit trees to supplement family nutrition.

#### **What Technical Assistance Should WASH Provide?**

Technical assistance should play a role in trying to overcome four major obstacles: 1) the lack of knowledge on the part of programs and donors on the relative importance of sanitation versus water and other health interventions; 2) the lack of demand by beneficiaries; 3) how to make these programs more cost-efficient through the promotion of much greater cost recovery and credit programs; 4) and how to monitor and evaluate hygiene education and health impacts. WASH could assist in the following areas:

- Educate programs and donors, either through workshop forums or printed materials summarizing the health impacts of effective sanitation interventions. This would include information on the benefits of sanitation in relation to water supply and methods of programming sanitation interventions to maximize the health impacts.
- Assist programs with developing low-cost rapid assessment techniques to determine high-risk hygiene behaviors. This would involve training staff on observational research techniques, in a series of communities representing the various ethnic groups of the country. Based on this observational data, indigenous staff would be asked to develop specific educational strategies to address these high-risk behaviors and to develop monitoring tools.
- Assist programs with developing community-based monitoring systems for health and hygiene behavior changes. As a participatory activity, communities could be asked to



gather baseline data on sanitation-related diseases, coverage, and environmental/hygiene hazards. To minimize problems caused by adult constraints, the possibility of using adolescents under the supervision of community leaders could be explored.

- Assist program epidemiology staff with improving and using health post-surveillance data so they can determine their own health priorities apart from donor-driven data demands. Included would be the clustering of disease morbidity by routes of transmission, i.e., vector-borne, water-borne, excreta-related, water-cutaneous, etc.
- How to make these programs more cost-efficient through the promotion of much greater cost recovery and credit programs.

