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Water and
Sanitation
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Andean Region

Improving Peri-Urban Water and Sanitation Services: Early lessons from the El Alto Pilot Project

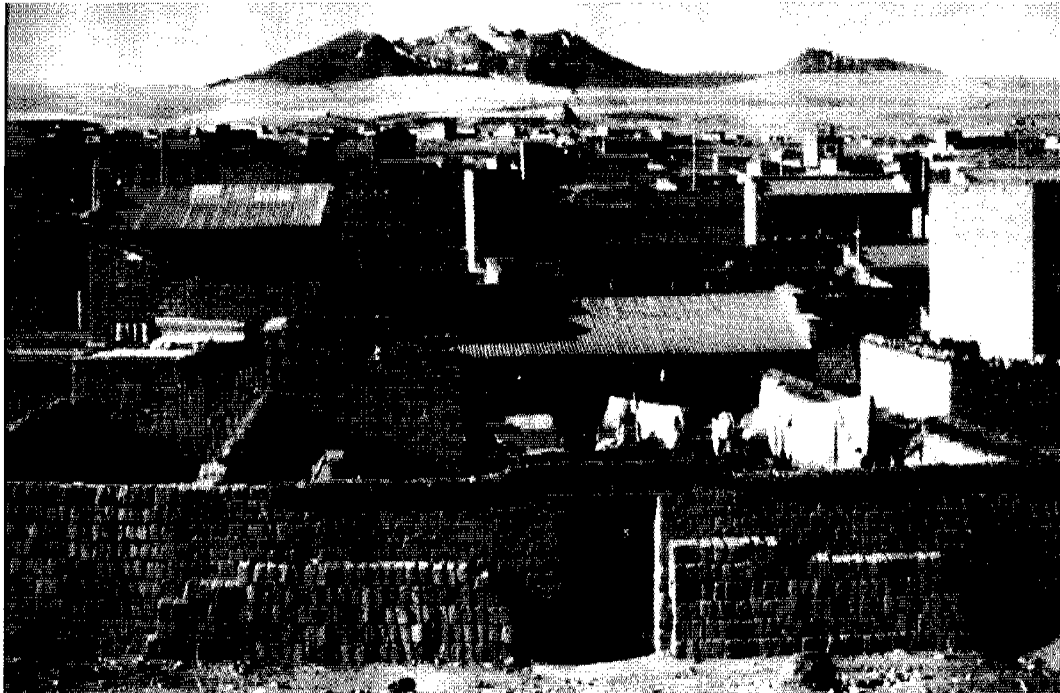


PHOTO 1: OVERVIEW OF THE NEIGHBORHOOD VILLA INGENIO

INTRODUCTION

In July 1998, the Government of Bolivia requested the support of the UNDP-World Bank WSP-AND (WSP-AND) to initiate a pilot project in the peri-urban areas of La Paz and El Alto, Bolivia. The project aims to identify and test innovative solutions to provide water and sanitation services for the urban poor. In the short run, the project will provide in-house water and sewer connections to 10,000 low-income households. The long-term objective of the pilot project is to develop technology options, social intervention methods, cost recovery and financing options that can be replicated in other peri-urban areas.

The pilot project is funded by three entities: Aguas del Illimani funds the infrastructure expansion and social intervention components of the project, while the Swedish International Development Agency and

the Water and Sanitation Program (WSP-AND) provide funding for technical assistance, institutional strengthening, documentation, and dissemination. A host of other institutions serve on the project's steering and technical committees: the Vice-Ministry of Basic Services, the Regulatory Agency for Water, and the regional and municipal authorities of La Paz and El Alto.

Phase one of the El Alto pilot project is well underway. Project staff, construction contractors, and neighborhood residents have started to build sewer systems in two neighborhoods. Water system construction will follow shortly. But infrastructure construction is only one component of this integrated pilot project: construction work is preceded and accompanied by neighborhood organizing, hygiene education, and microcredit loans for internal plumbing features.

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Phase two extends the project to other neighborhoods in El Alto and La Paz and will incorporate the many lessons learned in phase one. Site selection for phase two began in February 1999, and construction is planned for July 1999.

PRINCIPLES OF THE EL ALTO PROJECT

The El Alto pilot project is based on six key principles:

- **Establish institutional participation in project planning and implementation**

The purpose of the El Alto pilot project is to provide lessons and experience that can be replicated in other cities and mainstreamed in Andean water and sanitation policy. With replication in mind, WSP-AND staff concluded that it would be critical to include a wide range of institutions in the planning as well as the implementation of the pilot project. The WSP-AND therefore sought the early participation of many Bolivian institutions in the design of the project. This participatory process started in March 1998, with a workshop to establish the project objectives, project components, and the institutional framework for project implementation. Today, the active participation by many institutions continues. The project's steering committee includes representatives from the Vice-Ministry of Basic Services, the Prefecture (or regional government) of La Paz-El Alto, the local governments of the two cities, Aguas del Illimani, and the WSP-AND.

The Regulatory Agency for Water is closely involved in all decisions concerning tariffs and standards of service to be implemented in the project.

- **Reduce service access costs**

A major hurdle to overcome in providing water and sanitation services in peri-urban areas is lowering the high cost of conventional water and sewer networks. In La Paz-El Alto, the cost of a water and sewer connection is US\$335 -- 5 months of income for the average household living in the peri-urban areas of El Alto. High costs also pose problems for utilities that may be unable or unwilling to invest in extending the network if they do not expect to be able to recover the costs. For these reasons, finding ways to reduce the cost of access to improved water and sanitation services is a major goal of the El Alto project.

After considering a number of different technical options for reducing costs, the project's steering committee settled on condominium water and sewer systems. Condominial systems have been used

extensively in Brazil for the past 20 years. These systems reduce the cost of in-house water and sewer connections by using smaller pipe diameters, using less pipes, and burying the pipes in shallower trenches.

Shallow trenches are possible because condominium systems run through household lots or under sidewalks rather than under the street where heavy vehicles would damage them. Community members assume responsibility for maintaining the pipes that run through private lots, while the utility maintains principal collectors.

Early evidence from the El Alto pilot project demonstrates that the condominium system does dramatically reduce installation costs. The following table presents cost estimates prepared for the first project sites.

Table 1: Connection cost estimates for water conventional and condominium systems.

| Project Area | Condominial | Conventional |
|--------------|-------------|--------------|
| Vila Ingenio | \$47 | \$133 |
| Cosmos 79 | \$41 | \$159 |

Source: El Alto Pilot Project and Aguas del Illimani

Table 2: Connection cost estimates for sewerage conventional and condominium systems.

| Project Area | Condominial | Conventional |
|---------------|-------------|--------------|
| Vila Ingenio | \$58 | \$194 |
| Huayna Potosi | \$66 | \$290 |

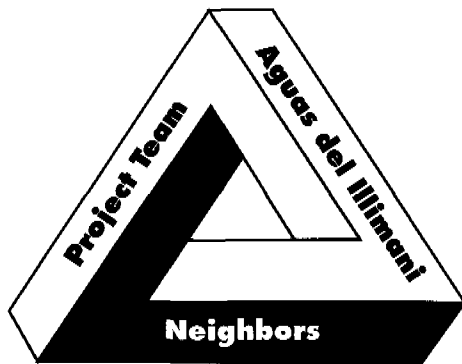
Source: El Alto Pilot Project and Aguas del Illimani

- **Institutionalize neighborhood participation**

Encouraging community members' ongoing participation is critical to the success of the pilot project. Condominial water and sewer systems are a new technology in Bolivia. Communities know very little about these systems, but the nature of the condominium system requires that households be actively involved in the maintenance of the systems. Moreover, the experience of one neighborhood with the new system will affect whether other neighborhoods choose to participate similarly. To ensure sustainability, the El Alto project includes on-going participation of community members in the design and installation of the systems.

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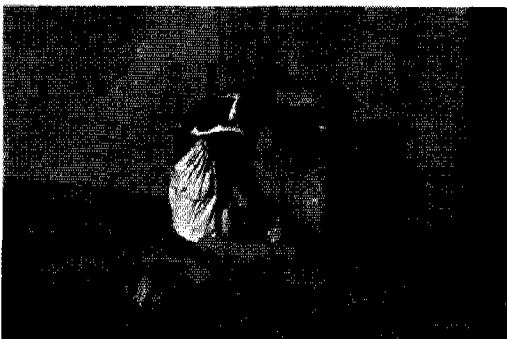
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- **Recover all investment costs**

Along with lowering installation costs, the El Alto pilot project is designed in such a way that subsidies from sources outside the community are unnecessary. Subsidizing water and sanitation projects in peri-urban areas can never guarantee universal coverage or sustainability because the source of the subsidy is outside the control of the community and is unreliable. True sustainability must come from resources -- both human and financial -- that the community is able to generate itself. Recognizing this reality, the El Alto pilot project has planned 100% cost recovery as part of the financing arrangements. Initial investment is laid out by Aguas del Illimani and ultimately paid for (through fees and tariffs) by the households that benefit from the project.

PHOTO 2: COMMUNITY WATER STANDPIPE IN VILLA INGENIERO



Of course the El Alto pilot project does have project subsidies, but these are not supporting the development of infrastructure. Rather, the WSP-AND and SIDA, by providing technical assistance, project start-up and documentation costs are able to ensure that the valuable information the project experience generates is not lost but becomes a model for replicating similar projects elsewhere.

- **Offer choices and respond to community demand**
Studies that have analyzed what makes water and

sanitation projects sustainable have shown that responding to the community's demand is an essential component in achieving sustainability. Offering choices is the practical way to respond to community demand. Residents can choose from three basic designs for their condominal systems: pipes may run along the back of household lots, through household lots, or under sidewalks. There are also three payment options for water systems: billing based on individual meters, group meters, or an unmetered charge. Each block that participates in the El Alto pilot project may choose the water and the sewer option that it prefers. Blocks make this informed choice after hearing a presentation by project staff about the maintenance implications and the price of each option.

- **Implement easy payment arrangements for clients**

Poor households usually do not have the resources to make large one-time payments for water and sanitation services or the installations necessary to make the best use of these services (sinks, toilets, showers, etc.). Experience in El Alto has shown that connection rates are often very low for households within easy connection distance to conventional water and sewer lines. The cost of installing a simple bathroom plus sinks for washing dishes and clothes can run around \$500. Furthermore, even given household connections, a common practice is to save costs by using polluted water sources -- in the case of El Alto, the rivers -- for personal hygiene and washing clothes.

The El Alto pilot project's strategy to increase connection rates, installations, and water used is to reduce the burden paying a lump sum for the connection fee. Instead, the El Alto pilot project allows households to pay the fee in monthly installments over a five-year period, interest free. In addition to reducing the necessity to front all the money at one time, the project includes a microcredit component in which microcredit institutions collaborating with the project offer households loans so that residents can pay for plumbing fixtures over time. Finally, the pilot project integrates hygiene education as a part of the project so that residents learn how to maximize the benefits that having access to clean water and adequate disposal methods for human wastes give them.

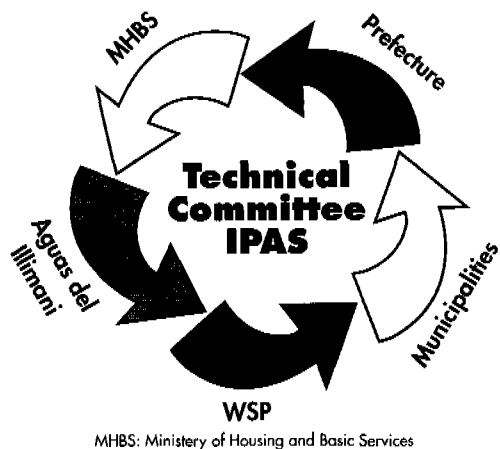
- **Monitor and evaluate project results**

As with any pilot project, the El Alto pilot project serves mainly as a learning experience for larger scale projects in the future. This pilot project allows participants to test possible solutions for the peri-urban water and sanitation problem and to make

adjustments based on experience gained in the process. Monitoring and evaluation is therefore critical. The project's monitoring and evaluation system will track the impact of the project on individual households and neighborhoods and will compare the costs of building and maintaining condominial with costs for conventional water and sewer systems. Like other components of the pilot project, the monitoring system was developed through a participatory process to ensure that it addresses the interests and concerns of all institutions involved in the project.

EARLY LESSONS FROM THE PILOT PROJECT

With construction underway in phase one, the early lessons of the El Alto pilot project are becoming clear. Project staff, with the support of the steering committee, are taking steps to incorporate these lessons in the design of phase two.



MHBS: Ministry of Housing and Basic Services

El Alto Pilot Project Steering Committee

Lesson 1: Participatory project planning is time-consuming but worth every minute.

Developing the El Alto pilot project with the participation of many different institutions was unquestionably time-consuming, yet after a year into the process all stakeholders are still interested and actively involved in the project. Moreover, the benefits of institutional participation are increasingly clear. Support from government organizations minimized opposition to the project, produced interest in expanding the project approach to other areas of Bolivia, and helped overcome obstacles to implementing a new technology.

Lesson 2: Professionally managed pilot projects lessen the resistance to new technologies.

Bolivia has no previous experience with condominial water and sewer systems, so implementing the El

Alto project has meant introducing a new way of thinking for water utility staff, sanitary technicians, community members, and even El Alto project staff. The project has met with opposition at many levels from those who simply do not understand how a sewer system with 4-inch pipes (as opposed to the standard 6-inch pipes) will work.

The El Alto project staff has discovered that it takes constant communication and a high degree of professionalism and technical expertise to overcome this type of skepticism. The team's top manager, Luis Lobo, is a Brazilian architect with years of experience designing and building condominial systems. The team's other technical and social intervention specialists are also highly qualified. This staff has spent many hours with community members, water utility staff, and construction contractors explaining how the design of the new system works. The work has considerably slowed progress in phase one, but the learning process is necessary to ensure the viability of the system.

Another obstacle to implementing the condominial system in El Alto was the lack of appropriate materials. Sewer pipes in El Alto have traditionally been made of concrete; the condominial system on the other hand calls for PVC pipes. The few factories manufacturing PVC pipe did not offer pipes of the diameters used in the condominial system, nor were inspection boxes made of PVC material available. Project staff had to negotiate with factories to produce appropriate materials.

These problems would have been very difficult to handle in a full scale rollout of the new condominial technology. By introducing the technology in a pilot project, all involved have had the opportunity to learn about the system and to handle problems as they arise. Moreover, the phase one systems (once operational) should further boost confidence in the efficiency and effectiveness of condominial systems.

Lesson 3: Responding to community demand is critical, even in a pilot project.

Responding to the community's demands is a principle of the El Alto pilot project. And yet in phase one, the project did not follow its own advice. The three neighborhoods included in phase one were chosen based on technical criteria (such as housing density and proximity to existing networks) rather than on their interest in the project. Moreover, these neighborhoods were only presented one of three possible designs for their condominial sewer system. The idea

was to simplify the implementation process in the first phase of the pilot project, but instead these decisions have led to complications that probably could have been avoided had the community been offered choices. Project staff quickly faced opposition in two of the three neighborhoods selected to participate. In one neighborhood selected for the project, a cooperative from an adjoining neighborhood is lobbying to extend its own water and sewer system into the area selected for the pilot project. The leaders of a second project neighborhood are opposing the project because they feel that they will lose power in supporting an initiative that they had not proposed and developed themselves. These types of problems have increased the amount of time that project staff must spend working with and negotiating with community members.

In phase two, there will be a pre-selection of neighborhoods based on technical feasibility criteria, but project staff will only install systems in neighborhoods where at least 60% of households support the project after receiving detailed information about conditions, costs, etc. The project schedule will then be determined on a first come first serve basis: work will begin in the first neighborhoods to present their formal requests. Each block in these neighborhoods will select from among several technology options based on their willingness-to-pay and their understanding of maintenance obligations.

Lesson 4: Demand for new water and sanitation options is distorted when prices for existing services do not reflect true costs.

The connection fees for conventional water and sanitation systems in La Paz and El Alto are set in Aguas del Illimani's concession contract: \$155 for water and \$180 for sewerage, regardless of the actual cost of connection. As Table 1 showed, in some instances these fees are a fairly accurate reflection of the true cost; in other cases, they are significantly lower than actual cost. This creates a number of interesting problems for the condominium system.

First, in neighborhoods where the conventional connections are subsidized, the condominium system (priced at true cost) is less attractive than it would otherwise be. Second, when prices of the conventional system are not set based on true cost, deciding how to price the condominium system is tricky: should the condominium system be subsidized by Aguas del Illimani at the same rate as conventional connections?

In the El Alto case this is further complicated by the requirements of the concession contract. Discussions between project staff, Aguas del Illimani, and the Water Regulatory Agency resulted in fees of \$90 for condominium water and \$105 for condominium sewer for phase one of the pilot project, but these prices are not yet approved for phase two.

Lesson 5: The private sector can play major role in improving water and sanitation in low-income peri-urban neighborhoods.

Two of the principle actors in the El Alto pilot project are private companies. Aguas del Illimani is the private water and sewer utility in the La Paz-El Alto area, and Caja Los Andes (the microcredit provider for the pilot project) is a private, commercial lending institution that normally provides loans to small entrepreneurs and artisans. The pilot project did not start out with the goal of cooperating with private sector organizations. The WSP-AND originally considered implementing the project in a number of cities with public water utilities, and both private and non-profit lending institutions were considered for the microcredit component of the project. In the end, however, the private companies demonstrated both the interest and the capacity to participate in the pilot project, without receiving any subsidies. This experience suggests that private companies can and will play active roles in improving water and sanitation services in peri-urban areas.



PHOTO 3: NEIGHBORS OF HUAYNA POTOSI TAKE DECISIONS REGARDING THE NETWORK LAYOUT

Lesson 6: Installing water and sewer can have a dramatic impact on urban development.

El Alto is sparsely populated. Streets, blocks, and lots have been laid out in grids, but many of the lots are empty. Project staff have noticed that as they begin installing water and sewer connections owners of the empty lots appear and start building in order to be able to connect their lots. Many owners say

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that they have been waiting to build or to sell their lots until urban services arrived in the neighborhood. Early evidence from the pilot project, therefore, suggests that the installation of water and sewer services may increase the density of settlement. Water and sewer companies often cite low density of urban development as a reason not to extend urban services into certain neighborhoods. If the early impressions from the pilot project remain true over time, they will suggest that density is not necessarily a good screening criteria for choosing expansion areas.

Lesson 7: Demand for sewerage connections is much higher than generally believed

It is commonly thought that demand for access to water systems is much higher than demand for access to sewerage lines. Early evidence from the El Alto pilot project however suggests that demand for sewerage connections is as high as demand for water connections. In fact, since El Alto has high coverage of water connections (estimated at 86%), most households are interested in gaining access to the sewerage network. Households in the El Alto

project are investing large sums of money to install the toilets, showers, and other plumbing fixtures that will enable them to take full advantage of their new connections.

CONCLUSIONS

The first phase of the El Alto pilot project has shown that demand for water and sanitation improvements is high and that the project's integrated program (infrastructure, education, and microcredit) can have a positive impact in gaining household and neighborhood participation. While the project has not been problem free -- installing condominium systems in the first three neighborhoods has been slower than expected -- these early difficulties have been an unavoidable step in the learning process for the project team, Aguas del Illimani, and stakeholders. Phase two will offer the team the opportunity to apply the lessons learned in the first phase as well as encountering and solving new challenges. Ultimately, the important lessons learned will benefit policies and decision-making taken on behalf of the ever-growing number of peri-urban inhabitants in the Andean Region.



PHOTO 4: COMMUNITY CONTRIBUTIONS OF MANUAL LABOR

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For more information about the El Alto Project,
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1. These subsidies are in fact paid for by consumers through the water tariff.