

# Clean Water for a Remote Village

PROJECT PROPOSAL FOR CHIPAYA, BOLIVIA





# Project Summary

Chipaya is a remote Indian village high in the Bolivian salt plains rarely visited by outsiders. Its 1,800 villagers live in mud huts with no electricity, no sanitation, and without clean drinking water. On a recent medical trip by Healing the Children, doctors found almost 80% of their patients infected with water-borne diseases. With funding volunteers hope to install a low cost, highly durable purification system that will destroy 99.9% of all bacteria and viruses in the water. With the purification unit attached to their current water delivery system, clean drinkable water would be accessible to every single person in the village.



A CHIPAYAN CHILD STANDS OUTSIDE HER HOME

## Chipaya's Water

Safe drinking water has never been available to the Chipayans. Their groundwater is contaminated, a lake fifteen miles away is salt water, and rainfall is scarce in their desert climate. Having no other option, they chose to drink from the least contaminated water supply, the Lauca River located five miles away. They have dealt with this problem for so long that poor water even shows up in their ancient mythology. Until the villages' conversion to Christianity in the past twenty years, the people believed in long-haired creatures called *Serenos* who lived in the rivers and caused people to fall sick. Believing the river to be cursed, the Chipayans began digging wells in the 1970's; however, the wells produced a muddy brackish water that the villagers deemed unacceptable and they soon returned to the river. In 1990 the Lauca was channeled to the village and a water tower and piping system constructed. Although many of the pipes have been severely damaged, the system is still running today, but has no purification apparatus attached to it.

Recently, believing the area's ground water to be potable, the United States based organization Water for People partnered with UMAG- a Bolivian NGO- to dig a series of new wells in the village. Unfortunately, the project was abandoned because they could not keep the wells working. Annual floods, during which snowmelt from the Andes covers the entire salt plains for a few weeks each spring, destroyed many of the pumps. In addition, the high salt content of the ground caused erosion of the well materials. Furthermore, the groundwater is not deep enough to remain naturally uncontaminated and it is therefore impossible to bring safe drinking water from the ground, even with functioning pumps (See Appendix C for a complete project evaluation).



Chipaya, Bolivia  
Location: Western Bolivia  
Elevation: 12,000 feet  
Population- 1,800  
Language- Chipayan, Spanish as second language  
Climate: Desert like conditions  
Education: Kindergarden through Sixth grade  
Religion- Predominantly Catholic

## Proposed Purification System

A variety of different water purification systems are used in Third World applications. Among the most common are chemical filtration, gravity filtration, sodium hypochlorite filtration, and ultraviolet light filtration. All of the different systems were considered for Chipaya. The chemical system was deemed too expensive and unmaintainable. It requires compounds not easily available or transportable to the village and the units themselves are large and extremely expensive to transport. Next, a gravity filtration system simply cannot produce enough water for the village. Finally, the sodium chlorite system requires constant maintenance. It also uses dozens of pounds of salt per day, which is too difficult to obtain, transport, and store.

However, ultraviolet light systems are simple to maintain and transport, affordable, efficient, and long-lasting. The system works by first passing water through a pre-filter to clear out any dirt and major particles. The water then flows through a stainless steel tube with a UV lamp inside. The ultraviolet rays emitted from the lamp immediately kill 99.9% of all bacteria and viruses in the water.

This UV light system has been chosen for a variety of reasons, the first being cost. Because of its simplicity and



A TYPICAL CHIPAYAN YARD

size, this is the lowest priced of all the systems and because it requires little cleaning and only occasional replacement parts it is also affordable to maintain. The pre-filters are reusable up to four times, lasting three to four months each, and the UV lamps need to be replaced only once per year. The second reason is that this system is extremely durable: it is small, compact, made of stainless steel, and has proven itself in a variety of other locations around the world. (See Appendix B for a story about its success in El Salvador.) Third, and perhaps most important, it has the highest pathogen kill rate of all of the systems. Finally, the UV light system fits in with the existing structures and piping network. This means that it will be easy to install and will allow Chipayans to continue normal water gathering without any additional work, thus guaranteeing its acceptance and use by the people.

## Supporting Non-Profit Organization

Healing the Children is a non-profit organization with chapters around the nation. Their goal is to improve the lives of children by offering medical services to people around the world who would not otherwise receive them.

The Michigan/Ohio Chapter became involved with Chipaya in 1999 when Sister Sylvia Sherwood, an Irish nun living in the village, read about them in a missionary resource book. National Geographic photographer Maira Stenzel put the director of Healing the Children, Helen Salan and Sister Sherwood in touch. Their first project was to bring Candido Condori, a severely burned Chipayan boy, to the states for surgery. Sister Sherwood transported Candido to the states and was able to meet with Mrs. Salan. That meeting led to the invitation of a Healing The

### History of Outside Intervention in Chipaya:

\*In the late 1960s a Protestant and Catholic priest join the community but are asked to leave a few years later.

\*In the 1970s Project Children with the Catholic church and World Vision with the Protestant church support the village.

\*Between 1972 and 1992 French anthropologist Nathan Wachtel studies the village and after being asked to leave he writes the book, *Gods and Vampires, Return to Chipaya*.

\*In 1991 the water tower is built and pipes run under the dirt streets.

\*In 1994 Sister Sylvia Sherwood joins the community as a Catholic missionary.

\*In the late 1990s the Bolivian government builds a school and a clinic.

\*In 1998 Maria Stenzel from National Geographic photographs the village; Water for People begins digging wells.

\*In 2000, 2002 and again in 2004 a medical team from Healing the Children works in the village.

Children medical team to Chipaya. The first group worked there in October 2000, with two more trips in 2002 and 2004. These trips are for many of the villagers the only time they can see a doctor. On all three trips the doctors confirmed that the majority of the people were sick from bacteria and viruses found in the water. At that time Sister Sherwood mentioned that this has long been a problem and we began to talk about possible solutions. After many months of discussion with her,

the leaders of Chipaya, and a variety of organizations across the United States, all parties agree that this ultraviolet filtration system is the best solution to their problem.

Healing the Children is a registered non-profit and all donations are tax deductible. It has committed to support this project by providing flight and transportation costs every two years for people and parts needed for the system's maintenance.



HEALING THE CHILDREN DOCTOR WITH PATIENT

## **Project Implementation**

The project has three phases, which have a budgeted scope of fifteen years, though the filtration system will continue to work for many years after that.

### *Phase I: Installation*

The preparation for this phase includes ordering the parts as well as preparing Chipaya for our coming. The filtration system will be ordered and shipped to Michigan, where it can be put together and tested. Meanwhile, villagers will prepare to replace broken pipes and install the UV system in Chipaya. Also, Sister Sherwood will educate the villagers on what we will do and how they can help. The UV system is small enough that it can be safely transported on a commercial flight. Upon reaching the village it will only take a few days to install the system, as replacement of the broken pipes should be nearing completion upon our arrival. After arriving we will first clean out the existing tank and pipes by flushing chlorine through them. This should kill off anything currently in the system and allow clean water to flow through clean pipes. On the second

day the UV system will be installed and checked. (See Appendix A for a diagram.) On the third day, along with some of the villagers, we will build small mud brick boxes around the pre-filter and UV unit to protect them. During and after this time we will train the men and women who currently run the old system how to use and maintain the new equipment.



CHIPAYANS CONSTRUCTING A COMMUNITY CENTER

### *Phase II: Annual Maintenance*

The pre-filter bags must be taken out and rinsed every three to four months and replaced after four washings. The UV lamps eventually lose strength and therefore need annual replacement. The work of this phase can be accomplished entirely by the villagers as long as we provide them with the necessary parts. We plan to bring enough extra parts to last until another visit can take place. We are able to send additional parts with HTC medical teams, who are committed to biannual missions to Chipaya.

### *Phase III: Major Maintenance and Part Replacement*

The villagers have taken on the responsibility of paying for the gas needed to run the generator, for the people in charge of running the system, and for all construction work to replace the piping network. We hope to take care of all other costs. This involves replacing the pump, generator, and any broken parts as they occur. The UV unit and the filter housing are made of stainless steel and should last for dozens of years. The circuit board and ballast have an estimated 5-7 year life span; we have budgeted for two of each to guarantee functionality for many years. In addition to the regular filter and lamp replacement we will also need to replace the water pump and generator. Again, we have budgeted for two to guarantee the system's long life.

## Funding Needed

Sister Sylvia Sherwood has been raising support for the village for the past ten years bringing many needed services to them. Over the years she has received funding from the Bolivian Government and the Catholic Church in Bolivia. However, both have reached their donation limit and are unable to give any further. Sherwood is continuing to lobby for funds from other sources but is having little luck. Those in the region consider Chipayans outcasts and subhuman and this problem has been with them for as long as anyone can remember: even the Chipayan's ancient mythology states that they are a rejected race, left over from a past era. Other Indian groups in the area continue to believe this and will not allow them on their land. Trapped between the groups, Chipayans cannot easily move about and show the world who they are. In addition, people living in the region's cities (the closest is ten hours away by bus) dislike them because they are uneducated and lack modern hygiene, as water is too scarce to bathe regularly. This negative mentality persists even in La Paz, Bolivia's capital city. On the night before flying to the United States with Candido Condori Sister Sherwood could



SISTER SYLVIA WITH CANDIDO CONDORI

not find a hotel for him and his family in La Paz; hotel owners refused to let the Candori's inside, calling them "the dirty people."

Furthermore, Chipayans are not easily accepting of outsiders. Few outsiders have ventured into the village, and most who have were asked to leave. Chipayans are simple farmers, and proudly uphold their traditional culture as one of the oldest indigenous peoples in South America.

History, dating back to the Americas' ravaging by European conquerors, and their own ancient mythology have left a fear of white people in the hearts of Chipayans. (Nathan Watchel's book *Gods and Vampires* offers an in-depth explanation.)

Fortunately, Healing the Children's medical team has forged a solid bond with the village. When the team first wanted to come it took months of lobbying Chipaya's elders by Sister Sherwood to allow us in. But we are now welcomed with open arms as often as we can return. Through this relationship we have a unique opportunity to help the people of Chipaya.

## **Contacts**

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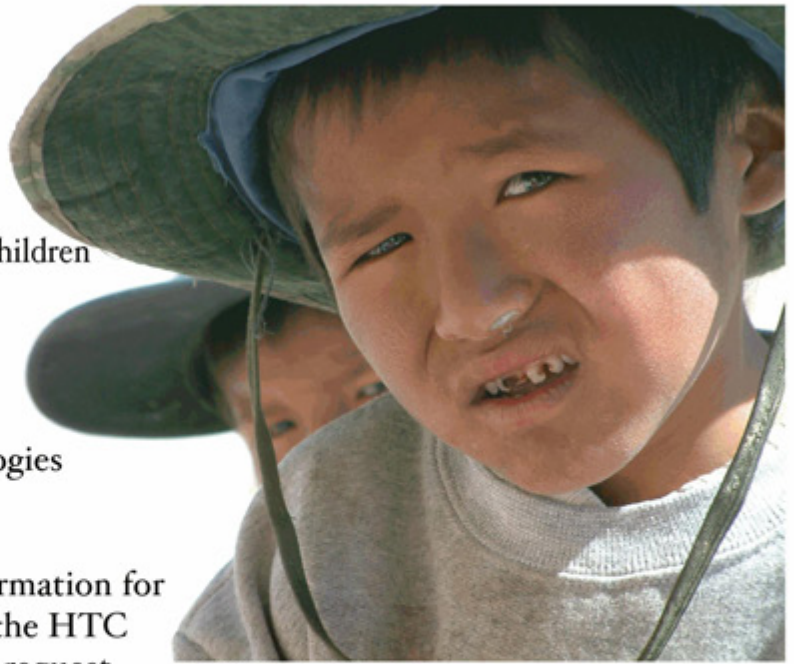
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We are happy to provide contact information for Sister Sylvia Sherwood, as well as for the HTC doctors who have visited Chipaya, on request.



CHIPAYAN CHILD

## **Additional Information**

*Appendix A*

Diagram of water purification system

*Appendix B*

Jerome Bohl's letter about a similar system in El Salvador

*Appendix C*

Evaluation of Water for People's failed hand pump project

*Appendix D*

Further information on Healing the Children's work in Bolivia

*Appendix E*

Further information on Chipaya



CHIPAYAN SUNSET