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Final Report:

Community Cost & Benefit

Analysis

Marquette University
Applied Global Business Learning
Guatemala 2010

Abstract: This report is an overview and analysis of the social and economic costs and benefits of implementing potable water systems within Patzará, in San Antonio Ilotenango, Quiché, Guatemala. The findings of AGBL are based on local and national data and collected data from Caritas and the local community.





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Project Objectives:

Applied Global Business Learning is a unique student program that looks to assist communities in developing nations. By providing micro-enterprise solutions, it is the hope of the organization to foster sustainable business practices while preserving cultural ideals.

AGBL partnered with Caritas. Caritas provides assistance to the poor, the vulnerable and the excluded on behalf of a billion of Catholics around the world. Caritas works on humanitarian emergencies, on human development, and on campaigning against poverty, exclusion, intolerance and discrimination. In particular, Caritas Guatemala works to achieve greater participation by men and women in civil society and politics, the advancement of common human values and cultural expression, poverty reduction through integral human development, and increased capacities in organization, management and advocacy so that communities gain access to basic services.

The Water Team associated with the El Quiche Branch of Guatemala's Caritas International Organization has worked with rural Quiche communities to establish sustainable self-operating potable water systems. The Marquette University Global Business Learning team joined Caritas in compiling the following assessment of the water system implemented in the community of Patzalá. The project's core objective was to interpret the economic and social externalities of a community potable water system.

Literature Review:

The literature on water needs is a more recent body of work, starting primarily with the analysis done by the United Nations Brundtland Commission leading up to the initial Earth Summit conferences. Gleick (1996) did an analysis to begin the process of defining water requirements for society. His conclusion that fifty liters per capita per day is the right number has only met mediocre acceptance; however, his analysis points to the problem experienced in Guatemala today. Out of the 55 nations that had domestic water use below 50 l/p/d, only five were from the western hemisphere. To further extend this comparison we can look at the 1990 per capita GDP for the three countries in Central America that use less than 70% of their basic requirements of water: Jamaica, \$1,921.43; Haiti, \$416.99; Guatemala, \$860.19¹. This would suggest that Guatemala has the only slightly better access to water than the poorest nation in the western hemisphere. Although with organizations like Caritas, this number should be better today than it was in 1996; much work is still needed.

Furthermore, in 1997, the United Nations estimated that between 14 and 30 thousand people, mostly children and the elderly, die every day from water related illness resulting from drinking contaminated water or food. Gleick (2000) even

¹ www.nationmaster.com

argued that the “right to water could also be considered even more basic and vital than some of the more explicit human rights already acknowledged by the international community (p. 131)”. The case for implementing safe drinking water systems and the benefits could not be greater.

Country	1990 Population (millions)	Total Domestic Water Use l/p/d	Total Use as a % of 50 l/p/d
Jamaica	2.46	30.1	60%
Haiti	6.51	30.2	60%
Guatemala	9.2	34.3	69%
Paraguay	4.28	45.6	91%
El Salvador	5.25	46.2	92%

Gleick (1996) p. 89 extracted from table 10.

Another issue that cannot be overlooked is how these data are accumulated. They are found for a country as a whole. Since population data over-represent urban dwellers, it also skews the pictures making things look more favorable for rural areas than it is. The UN’s 2010 GLAAS report, “Disparity between urban and rural areas ... only 45% of the world’s population living in rural areas uses improved sanitation facilities, compared with 76% of the urban population.” For the people of Quiche, who live on an annual GDP per capita of roughly \$465², in a country where the estimated 2009 GDP per capita is \$5200³, the situation is nearly desperate.

Methodology:

The Marquette GBL team conducted its research using both direct data inspection (community interviews and discussion) as well as outside research from Caritas data, and regional data. Prior to departure, the team compiled research on the economic development and social structure within Guatemala. This data gave the team a foundation for understanding the general economic well-being of Guatemala’s indigenous and rural communities. When our group arrived in Quiche, we met with the Caritas Comisión de Aqua (Water Commission) and re-examined the methodology of the project.

Our team was asked to survey community members of the rural village of Patzalá. The survey was to analyze the costs and benefits of a recent potable water project installed in 2006. The team and the water commission split up into groups equipped with a note keeper, a Spanish speaker, and a Spanish-Quiché translator (a member from the Caritas Water Commission). Each group was assigned to a group

² Calculated from estimates by the Patzalá community during our interviews.

³ CIA world factbook for Guatemala

of community members, ranging from 5 to 18 persons. The discussion was based off of a survey questions that were designed and created by the MU team with the help of the Caritas team and professors. Questions were asked about the general health and welfare of the community, the accessibility to clean drinking water and the effectiveness of washing, bathing and retrieving, and how all of these things had changed since the introduction of the water system. Each group interacted with their community audience and tailored or customized the specific survey questions to best suit the “conversation”.

Overall the intent of our student group’s methodology was to apply classroom learning to a real life case study. This trip included accounting, marketing, economics, communication, Spanish and IT majors. Such a variety of backgrounds allowed us to create a holistic way of engaging in and documenting the project. Our methodology also embraced Marquette’s AGBL’s vision of empowering students to change the world. We sought not only to empower each other through work on the project but also Guatemalans in their continuing clean water efforts. Our work was spent among the people of Caritas and Patzalá. Time was equally spent working on the project as it was getting to know the Caritas and Patzalá community. It is our hope that our joint efforts with the Caritas team will give growth to future water projects and to substantiate the need for clean water initiatives in Guatemala and the rest of the world.

Findings:

Prior to the installation of the water system into Patzalá, the process of retrieving safe drinking and bathing water severely crippled the efficiency and productivity of the community. Access to water sources was limited and often diverted both time and resources away from child rearing, health care, schooling, profit utilizing and self-sustaining labor. Prior to the implementation of a centralized and potable water source within the community, the water for bathing, washing clothes and feeding animals all came from water sources far from the home—some as far as 15 kilometers away. Washing clothes and bathing typically took each family nearly an entire day to complete the task. Trips to the water sources typically consisted of day long treks, regardless of weather conditions. Our group found that it was more likely that the women in the Patzalá community took these trips to the water sources for clothes washing and bathing providing less time in the home caring for children or providing necessary health care, or even supporting their family and community financially. Beyond the loss of time, the overall health of the community suffered from the poor quality of water available. Prior to implementation, many children suffered from illnesses such as diarrhea, bacterial infections, skin rashes, coughs and asthma-like symptoms. Their symptoms kept them out of school reducing their access to education. Further because trips to water sources were infrequent, individuals were only able to bathe roughly once every 20 days reducing the quality of health, especially in children.

Aside from the health and time costs of a lack of centralized, safe water system in Patzalá, other social externalities associated with retrieving water occurred as well. While the community tried to control the number of trips to water sources, disagreements arose between families in the communities regarding fair utilization of the water sources. While these effects cannot be directly measured, it can be assumed that this affected not only the coordination and cooperation of the community as a whole, but also the productivity.

After the implementation of the water system in Patzalá, the community realized a number of positive and beneficial externalities associated with healthier drinking water and greater convenience and accessibility.

Primarily, the community recounts that the main benefit of the water system has been the overall improvement in health conditions from better quality drinking and bathing water. Community members have seen a significant decrease in illness among children and a depletion of the costs associated with doctor's visits and medicines. The centralized water system has provided the women in the community more time to attend to children and family needs within the home, which we believe has also led to better health for both children and adults, in general.

With safer drinking water, the families have been able to feed their livestock healthier water, which in turn produces healthier and more valuable animals. Patzalá, like other communities, uses livestock to nourish the village and supplement incomes. However, the main source of communal income is the creation and sale of indigenous textiles and apparel. The water system in Patzalá has allowed the community to dye yarn more quickly and efficiently. Decorative skirts are now spun, dyed, woven and sewn in very little time and with greater economies of scale. The community now is better able to take advantage of the sale of these items to raise income in less time.

The women in the community, who previously were responsible for water needs like bathing and washing clothes, now have more time to spend in the household completing the necessary tasks (roughly .5 more hours per day).⁴ Assuming that the women have the potential to earn a small but steady income for the community, the extended hours per day that are possible with the water system could bring in roughly 0.56 Quetzales per day (additional family income).

Children are now able to spend more time in school as less of their help is needed to fulfill household duties like washing clothes and feeding animals. The men in the village have also been able to benefit from the central water system implementation in new construction in the community. Because water is an essential element in the production of the building materials (i.e., cement), the access to water at the turn of

⁴ This measure is based on the claimed income from the women in the community, and is calculated using the incremental time addition per day prior to the water implementation project.

a knob has made the construction of new homes, churches and community buildings simpler and less time consuming. Also, families have claimed that the new water system has eliminated much of the conflict among one another in regards to the use of water sources. Further, research in Mexico clearly points to significant health benefits from cement floors over dirt, including a 78% reduction in parasitic infestations and a 49% reduction in diarrhea.⁵

While much of the discussion around the water system in Patztlá was positive and recounted the major benefits of greater access, the community also discussed new worries and concerns associated with the project. With the new reliance on the functioning water system and pump, the community worried about the pump malfunctioning and the community not receiving the proper repairs to fix it. The community members are not familiar with the technology and the engineering behind the pump system, and therefore fear that a malfunctioning would put the community out of safe drinking water until the system could be replaced. A limited understanding of the relationship between the electrical system and the pump seemed to generate concern as well among community elders.

The community also described concerns regarding the change in costs over time to maintain and support the system. While income in the community fluctuates by family and by month, the costs of the water system do not fluctuate and could become a burden on some families. The uncertainty of future potential costs of maintenance was disturbing to some, especially when considering the availability of water in the connected source miles away. It was mentioned that political and social divisions have caused rifts in the community prior to the water project; however, we were unable to determine if these rifts are still a threat to the unity of the community.

Concerns over the general wellbeing of the environment are also prominent, as Patztlá community members fear that the implementation of the water system could result in depletion of water throughout Quiché. The environment has a special significance among the indigenous Guatemalans and Quiché people. Mayan culture teaches the profound gifts of nature as a center of Mayan life, thus a pure respect and nurturing relationship between the people and the earth has raised some concern in the artificial access of a water system. While these concerns may be strictly internal, they are important factors in the process of creating other water projects throughout Quiché.

Conclusion and Recommendations:

Water is the most urgent need of the indigenous people of the Santa Cruz del Quiché region of Guatemala. The negative effects of unclean water—severe illness and an overall shortfall of time, productivity and income—became clear after surveying the of Patztlá community. The Marquette team found that the installation of a potable water pump in Patztlá met the community's vital need for clean, drinkable water.

⁵ See Cattaneo, et. al. (2007)

However, in order to provide the best service to the rural communities of Santa Cruz del Quiché through the implementation of water systems, it is important to address the issues and externalities discussed by the Patzalá community. Serving as a case study for other communities, Caritas and other project organizations can use these benefits and concerns as constructive improvement for the next project.

After the installation of the pump, the people of Patzalá reported a number of positive changes in community life and wellbeing. First and foremost, they experienced substantial decrease in illness. This led to a subsequent decrease in medical costs. The community was also able to recover time previously spent trekking up and down the mountain to obtain fresh water. Women now use recovered time to care for younger children and the home. With fewer hours spent collecting water and doing household chores, older children are able to attend school more regularly. Extra time also allows women to create goods to sell, thus contributing to family income. With a centralized fresh water source, animals can be watered more sufficiently. This makes them a substantial source of nutrition for Patzalá, and allows community members to achieve a better price for their livestock at market. Disputes among community members have also decreased, as families no longer have to compete for limited water from the mountain source.

However, discussions with community members revealed a need for knowledge or assistance in maintaining the water system throughout Patzalá. In order for these projects to be fully successful and continually useful in any community, the proper investment in human capital within the village is necessary to ensure the proper up-keep of such water systems. This goal could be accomplished through the designation of a few community individuals as maintenance providers. The overall education and training on basic functions and repairs of the water system will provide the community with a sustainable resource of water for years to come.

Although the Marquette team would recommend the implementation of a potable water system in other areas of Santa Cruz del Quiché—provided that the community receives proper maintenance education—the ultimate determinant of the success of a project is funding. The system implementation in Patzalá in 2006 cost approximately \$80,000 and was funded primarily by German missionaries. The Water Commission of Caritas has identified dozens of other areas in Santa Cruz del Quiché with suitable topography and potential to sustain a water project. However, Caritas struggles to secure the necessary funds to implement the self-operating drinkable water systems. It is the hope of Marquette's Global Business Brigade that our joint efforts with Caritas will lead to the growth of such initiatives not only in the Santa Cruz del Quiché area, but also worldwide.

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