

## A COLLABORATIVE APPROACH TO IMPROVE SANITATION IN A MARGINALIZED RURAL COMMUNITY IN MEXICO

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### Introduction

Rural communities in the developing world face many problems that can negatively influence the outcome of development projects. The problems can begin during the project identification, design and construction stages, and can continue during the operation and maintenance. Some of the major problems affecting water supply and sanitation projects in rural communities of the developing world are:

- The analysis, design and implementation of projects are often done conceptually and technically outside of the rural communities. Communities have consistently depended on funding agencies to keep projects functioning after construction is completed
- Lack of involvement of the people to be benefited by these projects creates the expectation that the government will provide the necessary services and funding.
- Poverty has been seen as a factor that can hamper the development of projects because of the low levels of participation.

It has been found that, when development projects are more complex, community support is critical, mainly with respect to technical specifications, drawing and costs estimates, and environmental protection considerations (Cairncross, 1992; De Silva, 2000; Howe, 1993; Lyer et al., 2006; Narayan, 1993; Reed, 1995).

The use of local resources, skills and selection of an appropriate technology for improving public and environmental health in rural marginalized communities is a very important factor that needs to be considered in order to prevent the failure and abandonment of projects. To be able to help rural communities develop and overcome their problems, outside institutions and organizations must work hand in hand with locals to ensure long term benefits.

### The case study of Rosario de Tesopaco in northwest Mexico

This community is located in a region considered among the poorest and most marginalized in northwest Mexico.



Throughout Mexico, since the decentralization process of water supply and sanitation took place in the early 1980's public water supply and sanitation projects became the responsibility of municipal authorities. Local authorities of most rural communities were incapable financially and technically to carry out this type of projects. It has been found that this process tended to deteriorate public services nationwide (Ratner, 2004; Pena, 2001; Pineda, 2006; Tortajada, 2003).

The unique aspect that took place in this community was that the approach followed for the implementation of a wastewater treatment system was different than for most other projects in the country. Traditionally sanitation infrastructure projects in rural communities have been carried out by outside engineers and contractors. The disadvantage to this approach is that communities are left out for the most part during the design and construction phases.

Empowering the local community and creating scenarios that could lead to achieving a sustainable development were based on a multi-institutional collaboration between a Mexican federal agency that provided the funds to build a wastewater treatment system; the participation of an academic institution (Michigan Tech) that provided the technical expertise and advice on selecting the appropriate wastewater treatment technology, and the active participation and political will of the local government officials who encouraged and welcomed this collaboration.

This model of collaboration allowed the community to overcome the technical and bureaucratic barriers needed to obtain the funding and to be able to construct a subsurface non vegetated constructed wetland wastewater treatment system with local resources and labor. The project is a great example of moving from a theoretical practice project to successful implementation in the hands of the local community.



Workers spreading the filter media in cell #1. May 2005.



Local high school students helping with the construction. February 2005.

### Challenges being faced

- The community had been discharging wastewater into a creek and they did not had the financial resources to undertake a wastewater treatment project entirely on their own. The municipality is ranked as one of the top four highest marginalized regions of the state.



House on the perimeter of town.



Original point of discharge, Jan. 2004.

- An alternative that required minimal technical knowledge for understanding the operation of the system, as well as having low maintenance cost was requested by the community and the participating federal officials.
- Lack of interaction between design group (Michigan Tech) and the community during the design process.
- Bureaucratic barriers related to the process of obtaining funding from national programs.
- Local authorities were reluctant to embrace the project as a priority because they were not prepared to face the technical challenges, because they felt that the project was being imposed on them and because they project was not a priority to them.

### Resolutions

- The Mexican Federal Agency for Social Development (SEDESOL) through the program for development of highly marginalized rural communities offered the community support for obtaining funding from their national social development program.
- Michigan Technological University was invited to participate through the International Programs Center at the University of Sonora. In response to this invitation, two alternative wastewater treatment systems were designed by a group of graduate students. The design was supervised by an environmental engineering faculty member.
- The design alternatives based on the technology with lowest maintenance costs and effluent quality that would meet the Mexican wastewater discharge norms.
- The author, who was part of the design group, lived in Rosario during the summer of 2004, while conducting an ethnographic study. This study culminated in a dissertation document as part of the requirements to obtain a MS in Environmental Policy.
- The presence of the author in the community and the data collected in his study allowed for his participation in the process of gaining approval to receive the funding for the project.
- Information that was collected by the author on the impact on public health from the local health clinics and through interviews with the residents in the community was communicated to the local authorities.
- The author was also able to demonstrate using ongoing projects as an example how communications with residents about projects, from planning to implementation, could contribute to the ultimate success of those projects.
- Community officials were educated through a series of meetings in which the author explained and justified the reasoning behind each aspect of the design.

### Lessons learned

- This community was required to meet certain standards with regard to wastewater treatment, but were given no guidance as to what institutional steps were needed to achieve this goal.
- Gaining acceptance of this particular sanitation project gave the community the opportunity to take ownership.
- A social anthropology study played an important role in demonstrating effective ways of obtaining public participation by providing evidence about local attitudes and perceptions with regard to environmental and public health problems. This has enhanced awareness of local problems and has paved the way for the development of local educational programs.
- Water supply and sanitation projects are hindered by the fact that changes in behavior and attitudes towards environmental health problems take a long time to produce results.

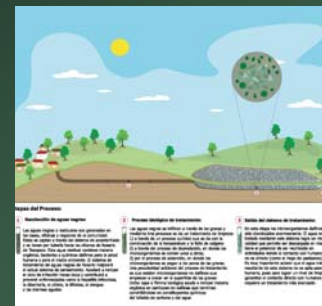


Illustration made for education purposes in the community.



Subsurface non vegetated constructed wetland. August, 2006

### Future work in this community

- To develop an outreach and educational program for the diffusion of information regarding the project and the role of sanitation in public health.
- A technical training program on maintaining and operating the constructed wetland.
- A monitoring program will be established to prove compliance to the Mexican norm for wastewater discharge and possibly reuse in grassland irrigation.
- An article describing the relevance of this case study has been submitted to the Journal of Environment, Development, and Sustainability by Robles, A. Mayer, S. and Durfee, M.

### New projects

- The University of Colorado is working with SEDESOL and the local residents of "Pesqueira, Sonora, Mexico" in designing a wastewater treatment system and a solid waste management plan.
- Michigan Tech, the University of Sonora, the Center for Municipal Development in Sonora (CEDEMUN) and SEDESOL are developing a project aimed at finding integral and sustainable solutions to water and sanitation problems in the Rio Sonora Basin, Mexico.

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