

Sink or Swim: Environment, Health Sectors Part of Water Solution

By Urinda Alamo and Enrique Cifuentes | July 11, 2005

Environmental and public health policies within the water and sanitation management sector at the northern border of Mexico lack a long term and integrated vision. The sector is characterized here in a study to provide a point of departure for the task of generating policy recommendations that could deflate conflict and reduce the health risk among the populations on both sides of the border, while laying some groundwork for environmental justice and sustainability.

Common denominators of the scenario that managers face are: scarcity and insufficient treatment of water, vested interests and negligent practices, poor exchange of information and inefficient coordination. The water and sanitation management sector is seen as being responsible for the maintenance of the networks and distribution of water, as well as a vehicle of transport for municipal, commercial, industrial and agricultural wastes. But components related to environmental and health protection are largely neglected.

Northern Mexico Not Alone

Human activities have negatively impacted the viability of ecosystems upon which we depend. Around the world each year, 2 million people die and 2.3 billion people get sick due to unmet sanitary needs and poor water quality. The United Nations world water report estimates that 1.1 billion people have seen no improvement in their water supplies beyond a basic minimum and that 2.4 billion do not have adequate means for excreta disposal. Climate and economic driving forces have the potential to bring greater inequalities and social conflicts, as well as new public health risk (e.g., through crop irrigation with untreated wastewater).

Tensions about water are a rising threat to safety all over the planet, especially in countries and regions with scarce water resources, such as China, India, Africa and the Middle East, where the courses of rivers have been diverted in order to irrigate staple crops for a constantly growing population. Human activities on the U.S.-Mexico border increase the demand for the water as well as its deterioration, while creating discord among its various users. The water in this area reflects a history of disputes between farmers and cattle ranchers, sometimes on the same side of the border.

The exploitation of the Colorado River has made the expansion of agricultural irrigation possible, involving an explosive growth of cities in the desert. Irrigation and

other urban uses have increased so much that the river hardly reaches its outlet in the Gulf of California.

Not far from there flows the Rio Bravo, or Rio Grande, one of the principal sources of water for agriculture in the El Paso del Norte region (Ciudad Juárez, El Paso and Las Cruces). Around 2 million people who live and work in this nucleus have had to resort to the aquifers designated as the municipal supply of potable water, a practice that has resulted in the over-use of the resource. The impact on the underground waters, which have been excluded from discussions up to this point, raises a warning flag for possible future confrontations about the aquifer underneath the border wall.

Recent conflict has motivated a thorough revision of differences and similarities in the interpretation of the laws, historical litigation and agreements on water. This, together with an examination of interaction among environmental health stakeholders, helps identify the main strengths and weaknesses of the sector, as well as suggest long term measures for improving transparency, coordination and governance.

Conditions Have Sickening, Deadly Results

In the study area of Mexicali, Nogales and Ciudad Juárez (Figure 1), water availability is uncertain. Ciudad Juárez gets its supply from the Bolson del Hueco, which is 70 to 80 meters deep. It has been predicted that this water source will be dry by the year 2030. In the case of Nogales, obtaining water is a more costly operation because the supply comes from sources located 40 and 45 km to the south (Los Alisos Basin) and southeast of the city (Santa Cruz River Basin). Currently, the depletion of the aquifers along the border between Mexico and the United States is an example of the consequences of abuse of the resource in Nogales and Arizona. Mexicali (along with Tijuana and Tecate) is supplied from the Colorado River and has



received 1.85 billion cubic meters of water per year since the signing of the Water Treaty of 1944.

The cities chosen for the study are located in a large desert area between 20° and 40° north latitude. The total of water extraction per inhabitant on the northern border is 6.37 times less than water extraction per registered inhabitant on the national level. The index of availability in Mexicali per year was 1,610 cubic meters per inhabitant; in Nogales it was 3,398; and 1,512 in Ciudad Juarez -- all below the national mean of 4,841, according to 2002 data from the National Water Commission.

Meanwhile, the Health Ministry's statistics show that in Mexicali, Nogales, and Ciudad Juarez in the year 2002, diarrhetic diseases were among the main causes of infant mortality and the second cause of death in the general population -- with considerably higher rates than in neighboring U.S. cities. Studies conducted on the Texas-Mexico border indicate that potable water sources and inadequate systems of excrement disposal are risk factors for infectious *Cryptosporidium parvum* and hepatitis.

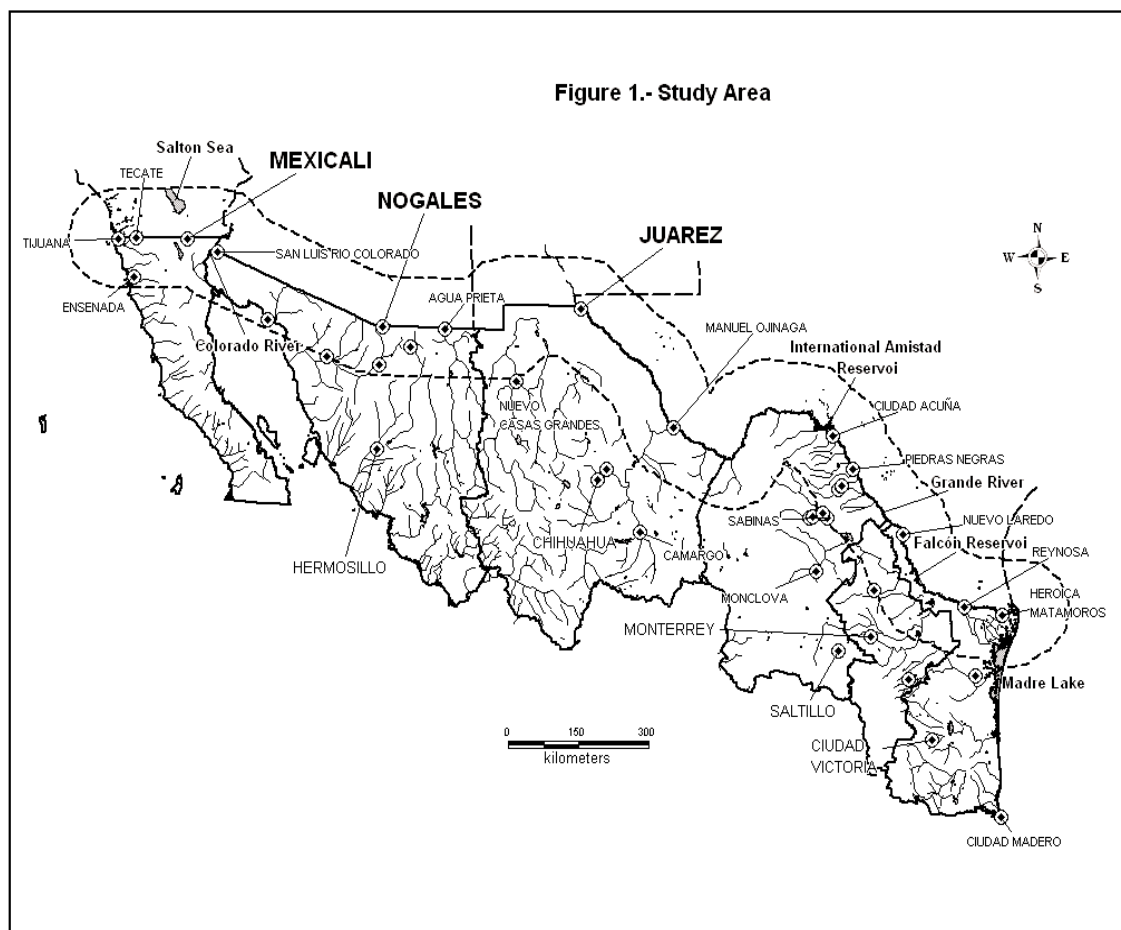
Alternatives Diminish Water, Sanitation Threats

Researchers found that institutional weakness deepens existing water woes. The lists of actors linked to the water and sanitation sector on the Mexican side of the border are long. (See sidebar.) But the gaps are wide in management of public health activities. Differences exist between pockets in the study area, but they share an almost complete absence of professionals with experience in environmental health policy.

According to the information gathered in this research, only in the most formal manner do the Ministry of Health, National Water Commission (CNA), the Bi-national Border Health Commission (CSF), the Pan American Health Organization (PAHO) and the Border 2012 Binational Working Groups formulate coordination strategies, which in theory would support project certification by the Border Environmental Cooperation Commission (BECC) for North American Development Band (NADB) project funding.

The investigation revealed that water and sanitation

policies rarely are based on evidence and data from environmental health research. According to the people we interviewed, reliable information (e.g., the impact of programs) is hardly available or simply does not exist (especially on the Mexican side of the border), does not flow coherently or is found to have been manipulated, and has not been communicated to the general population. A spirit of inter-sector coordination is barely even present in the work culture, and the exchange of deficient information, even within an organization, seems to be the norm.



Problems

Recommendations, Methods

Scarcity	Water reclamation, at all levels; treatment according to potential uses. Collaboration between the agriculture sector (mainly improving irrigation systems), the water and sanitation sector and the energy sector. Use of technology to avoid the high percentages of lost water.
Poor quality of available water	Make river water potable. Encourage desalinization. Improve collaboration between the agricultural sector, the health sector, the educational sector, and the water and sanitation sector. Conduct inter-institutional studies on the exact quality of the aquifers, sources of water and water after treatment. Fulfillment of the responsibilities of the International Boundary and Water Commission (IBWC), CNA and operator organizations. Spread information, through strategies of risk communication, about obtained results. Repair drainage systems. The CNA does not have a particular objective in water protection; CNA focuses almost all its efforts towards water administration. Its organization is designed for construction. It is necessary to reinforce the CNA, change its structure, and give it more resources, as well as to ensure that it is subject to the legal enforcement to avoid corruption. It also has no mission to protect the environment and therefore should be separated from Semarnat.
Insufficient sanitation	Promote at all levels the importance of sanitation. Change paradigms. Establish a drainage system that differentiates between rain waters, used domestic water, and water coming from industrial uses. Secondary treatment of wastewater, at least. Reuse of sludge, e.g., as soil conditioner.
Perception that water is not an important risk to health	Better coordination between the water and sanitation sector and the health sector. Communication of the results of research. Educational measures, taking advantage of the efforts of NGOs, BECC, PAHO, CSF, etc.
False perception that water is cheap or free	Initiate information campaigns. Educational measures that orient the culture of water towards conservation.
Lack of economic resources	Collaboration between involved institutions, both national and bi-national. Some propose that the resources of the region should remain in the region and not contribute to the general budget, given that this zone has the disadvantage that the profits of the factory industry (for the most part) do not stay in Mexico.
Infrastructure problems: leaks, caving in, homes without methods of measurement, low % of collection of funds from users	Make operator organizations more efficient and empower them. Create funding sources for these problems and greater community participation. Take advantage of the research done by academic institutions.
Lowest taxes in the country	Spread information about the real value of water. De-politicize the resource. Eliminate subsidies. Install a system of taxes with equity criteria.
Absence of self-financing of the operator organizations	Empower. Transference of budgets and autonomy for the planning of activities and decision-making.
Problems in the coordination and exchange of information	Identify priorities in an inter-institutional and bi-national manner, share information. Promote networks of information for water for the exchange of data and results of research, not only including academic institutions, but also taking advantage of the information generated by official organizations, while avoiding the duplication of efforts or repetition of studies that have already been carried out.
Insufficient or poorly managed research	Research should be more efficient through the promotion of multidisciplinary studies that undertake social, legal, political, economic, environmental, and technological perspective of water and sanitation. The results of studies should then be utilized.
Strengthen the legal framework.	Develop procedure to make the legal framework more effective. Propose a project for federal law regarding water services and sewage (on how to manage and utilize the resource). The laws should relate to the environment in an integral manner. Laws about biodiversity, forests, water, climate change, etc., should have reference to a central environmental legal framework. This would imply that all of them would have to take into account the river basins, not only with respect to responsibility for damages, but also with respect to responsibility for the risk of damages.
Lack of qualified and experienced human resources	Integrate the concept of environmental health into the universities with a focus on community and social development.
Insufficient community participation	Base the participation campaigns on the opinion and proposals of alternatives of the population.
Planning	Identification of priorities and alternatives in an inter-institutional and bi-national manner, while involving local and community institutions. Optimize bi-national planning in environmental infrastructure that takes into account new forms of funding and environmental indicators relevant to both countries. Improve in this manner the percentages of coverage of potable water supply, sewage and treatment of residual waters. Promote plans of use, management and administration of the water with a holistic vision and a focus on the ecosystem using hydrographs of the river basins as units of regional planning, which should naturally take into account social, economic, environmental, technological and politico-administrative factors with regard to water.

Our results showed repeated references to the overlapping of functions and the lack of completion of functions that institutions claim to be completing. Although more than 80% of the Environment and Natural Resources Secretariat (Semarnat) budget is destined for the CNA, which concentrates primarily on water administration and building structures, legal guidelines for the protection of the environment in general and water in particular are almost completely lacking. Against this backdrop, sewage drainage coverage is always lagging behind access to potable water, with less than 75%, compared to 90-95%. New colonies along both sides of the border (e.g., El Paso and Ciudad Juárez) rely mostly on defective septic tanks, which constitute an environmental health risk.

Institutional weakness translates into inefficiency in the operating groups and the absence of long term programs, which creates a series of implications: Sanitation is simply understood, and in the best of cases, as wastewater treatment. Water is used for transporting wastes of all kinds, without further consideration. At the local, municipal, and state levels, the absence of real protection measures as part of human activities facilitates negligence, causing environmental, social and economic damages that are impacting rivers downstream and underground water reserves.

We isolated these and other basic problem categories, then developed a list of provocative recommendations and simple methods to address them.

Simple Integration Methods Could Improve Community Health

To our knowledge, this is the first study illustrating how simple methods may provide the necessary basis for rational debate on environmental health policy, particularly related to water and sanitation. Our procedures allowed us to detect a series of contradictions, which were reflected in the objectives and policies of the institutions linked to the sector. We have borrowed from various disciplines that are developing explanatory frameworks of relationships between state, society, political actors, donors and interest groups. This approach provided a map of actors and a retrospective assessment of their performance, along with their relative strengths and weaknesses. Put in perspective, this exercise may allow different ways for investigating which groups or actors may be benefited or affected by particular policies.

This study, of course, has its limitations. The possibilities of generalizing the results, low external validity, and bias (e.g., of the researcher in conducting the interview or in

omitting important information) must be taken into account. Furthermore, our study does not allow sufficient consideration to the vested interests of rich farmers or industry, two major users of water in this region, and their political influence on local institutions and governments. This investigation gives little explanation of the recent conflict over water between rural populations and growing colonias and cities along the U.S.-Mexico border. It provides no discussion whatsoever on the potential implications of the bi-national treaties (e.g., the 1944 Water Treaty) that despite the increase of economic activities and changes in the climatic conditions in recent years, resulted in an accumulated debt in 2001 of over 1.7 million cubic meters of water. No attention is paid to policies included in the same treaty regarding adjustments in the assignments of the proportions of the use of water during times of “extraordinary drought”. Not surprisingly, the meanings of “extraordinary drought” and “uses for consumption” remain to be defined and updated. All of these issues need a rational and fresher evaluation, while stronger water and health policies are being implemented.

Policy makers in the environmental health arena need a substantial background in evidence-based interventions. Of course, well designed epidemiological and toxicological research requires a high level of skills, which is expensive and time consuming. More funding and attention is needed to make sure this research is not so scarce in developing countries. Both training and capacity building must be recognized as cornerstones in strong institutions, as well as a sound response process that creates a capability for change. When available, retrievable data from credible literature may help to develop water, sanitation and health protection policies. Unless community health is thoroughly integrated with environmental priorities, the whole performance of the water and sanitation management sector is likely to remain weak.

Urinda Alamo is an MSP and Enrique Cifuentes is an MD and Ph.D. at the Instituto Nacional de Salud Pública (CISP) Centro de Salud Ambiental (CENSA), of which he is the director. This is an excerpted and revised edition of their original study, “Water, Sanitation and Environmental Health on the Northern Border of Mexico: A Policy Analysis Approach,” for which they acknowledge the Pan American Health Organization (El Paso) and the Mexico USA Foundation for Science and Technology, as well as Carla Carvalho, Julia del Palacio and Dolores Gonzalez, for initial research planning, and J. Shenk for translation and editing.