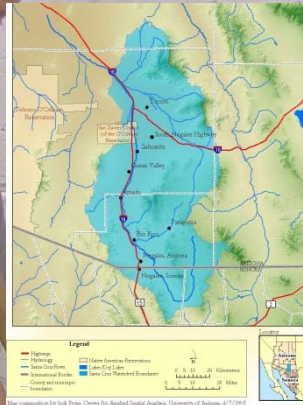


Composting Toilets, Urban Infrastructure, and Sustainability: Complement or Contradiction?

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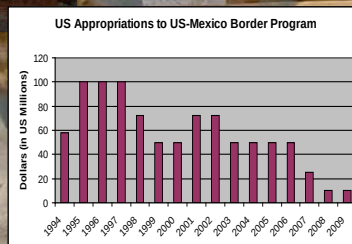
Problem

Economic policies of the US and Mexico have led to border industrialization and massive mobilization of people to the border, resulting in rapid urban growth without sufficient time or resources for developing adequate infrastructure such as water, electricity, roads, and sewage. Water entering the Santa Cruz River via the Nogales Wash and other upstream locations has been found to carry untreated sewage from Nogales, Sonora, contributing to nitrogen and microbiological pollutants such as giardia and fecal coliform bacteria. Consequences include threats to human health on both sides of the border. At the same time, water demand in Nogales, Sonora has led to groundwater depletion within the Santa Cruz watershed and water pumping from the Los Alisos basin to the south. Water shortages are expected to increase with climate change.



Approach

Work with border communities to identify, develop, implement, and evaluate alternatives for capturing and managing human waste, despite limited resources. Alternatives must be appropriate for urban contexts.



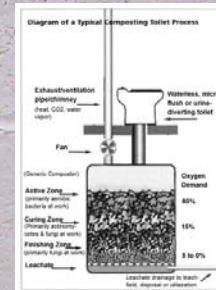
Source: Daniel Chacón, Border Environment Cooperation Commission, 2008 <http://www.cocof.org/ingles.php>

Residents' Concerns

- Pit hole toilets are unsanitary
- Pit hole toilets overflow with heavy rains
- Water must be purchased from trucks at a significant cost

Perceived Benefits of Project Participation

- Receive alternative for household human waste
- Improved sanitation and better community health
- Conserve water and expenditures on water
- Help evaluate technology for other border communities



Implementation of Pilot Project

- Meetings with city officials: Project endorsed, possible neighborhoods identified
- Meetings with community leaders and residents: Community selected
- Establishment of Advisory Board to include:
 - local and state government officials
 - neighborhood leaders
 - academics
 - NGO representatives

Advisory Board: Developed criteria for selecting households; proportion of payment required by households; monitoring program

- Recruitment of U.S. and Mexican students
- Community information meetings: Residents indicated interest
- Household assessments: Households selected
- Workshops for households to receive toilets
- Construction of toilets
- Regular household monitoring
- *Advisory Board: Prioritized search for additional funds to assist low-income families; redesign of toilets to address problems identified in monitoring*
- Development of partnerships with Friends of the Santa Cruz River and Fondo Accion Solidaria, A.C., and identification of other potential funding sources

Key Findings from Monitorings

- High participant satisfaction
- High level of sharing of experience
- Continued high interest in composting toilets in the community
- Biggest problem is insects
- Obtaining sawdust still an issue for some households

Key Challenges of Project Expansion

- Use of local labor a benefit but problems with quality control
- Long delays with funding, materials acquisition, construction
- Inconsistent application and lack of transparency in city process
- Expansion before pilot concluded, little communication
 - project funds ran out and toilets were left half finished
 - inadequate orientation and training of households
 - construction of toilets inside homes discontinued - requires modifications of basic design
 - did not follow protocols for household selection and construction
- No resources for monitoring or follow up to address problems; some discontinued use
- Erroneous rumor that neighborhood would get water and sewer services led some to withdraw
- Interest from rural communities drew government officials there before the completion of projects in Colinas del Sol

Lessons Learned

- While composting toilets are perceived as stopgap— better than pit hole but less desirable than flush toilet — by most urban residents, many households plan on keeping their composting toilet even if sewage is put in place.
- Ongoing development of wastewater projects inhibits acceptance of alternatives
- Monsoon climate requires careful alignment of toilets to avoid damage from heavy rains and wind
- Main perceived benefits are improved health for the family and savings on cost of water
- Large scale projects will require development of capacity (and materials) for repair
- Removal of compost not a barrier for most, however, many households dispose of excess compost in the garbage.

Where We Are Heading...

- Produce manuals for do-it-yourself construction
- Improved and alternative models for toilets
- Apply lessons learned to project in Tucson, Arizona
- Acquire resources to develop neighborhood level project

Ignoring commitment to address the lack of border environmental infrastructure, U.S. government has dramatically reduced funding in recent years.

References

www.omick.net/composting_toilets/composting_toilets.htm
www.compostingtoilet.org
oikos.com/library/compostingtoilet/
www.cityfarmer.org/comptolet64.html

Austin, Diane and Francisco Trujillo. 2010. Composting Toilets and Water Harvesting: Alternatives for Conserving and Protecting Water in Nogales, Sonora. Report prepared at the Bureau of Applied Research in Anthropology, University of Arizona for the U.S. Environmental Protection Agency/Border Environment Cooperation Commission. January
 U.S. EPA 832-F-99-066 "Water Efficiency Technology Fact Sheet: Composting Toilets"

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