ECOSAN IN THE REAL WORLD

EMERGING STRATEGIES FOR MAINSTREAMING ECOSAN IN MEXICO

RON SAWYER

SARAR TRANSFORMACIÓN

International Conference in Sustainable Sanitation:

Eco-Cities and Villages

26-31 August

Dongsheng, China

BACKGROUND

The TepozEco Municipal Ecological Sanitation Pilot Project
Tepoztlán, Mexico

- TepozEco was initiated in 2003 supported by EcoSanRes (SEI/Sida) as one of three regional pilot programs.
- Implements working examples of closed-loop ecosan technology and methods.
- Demonstrates the viability of ecologically sustainable sanitation alternatives in a Latin American urban/periurban context.
- Establishes a framework for ecosan to be considered in policy, planning and budget allotments.

PROJECT TIMELINES

2002	2003	2004	2005	2006	2007
TepozEco Project Preparation + negotiations	**Phase I** 12-month baseline pilot phase	**Phase II** Research & Development, Implementation of ecosan systems		**Phase III** Consolidation Demonstration Institutionalization	

San Juan Tlacotenco household-centered ecosan demonstration

Awareness-raising → Logistics + Construction → Operation + Maintenance → Follow-up + monitoring

← Municipal Government (2001-2003)

Municipal Government (2004-2006)

← Mexican 3-year local government term →

Municipal → Government (2004-2006)

$ FUNDING $

UNDP/BDP/EEG Seed Money

EcoSanRes/Sweden

NCCR-N/S (EAWAG/SANDEC) /Switzerland

TEPOZECO ACHIEVEMENTS

- **User-friendly eco-toilet models, flexible prototype**
- **Demonstrated the feasibility of harvesting and using urine as a fertilizer**
  → "Liquid Gold" micro-enterprise
- **Municipal Composting Center: generated >270 m^3 of compost in first 18 months**
- **Developed and tested a range of domestic greywater management systems for different socio-economic contexts**
- **Integrated household-centered ecosan methodology – participatory tools for assessment, planning, O&M and M&E program phases**
- **Consolidated multidisciplinary team of ecosan specialists**
- **Cost-benefit comparison between ecosan and waterborne systems**

COST-BENEFIT COMPARISON

BETWEEN ECOSAN + WATERBORN SYSTEMS

Sanitation system	Costs in USD				Environmental impact			Health	Orientation of responsibility
	Initial investments		Annual O&M cost						
	Family level	Community level *400 families*	Family level	Community level *400 families*	Annual water use for toilet (liters per family)	Community effluent from toilet (kg/year)	Recycling potential for nutrients and organic material		
Ecosan	$1,100	$46,000 *$115 per family*	$12-26	0***	0	BOD: *Very low* Nitrogen: *Very low* Phosphorous: *Very low*	High	Improved	User/ community/ government
Waterborne (WC including sewage system and treatment)	$1,200	$690,000** *$1,725 per family*	$80	$5,500** *$14 per family*	45,000	BOD: *1,360** Nitrogen: *450** Phosphorous: *180**	Low-Medium	Locally improved	Government

* Estimated effluent is based on a compliance with the Mexican norm for residual water discharges (NOM-001-ECOL-1996).
** Based on: (a) Experience gained from the implementation of 30 integrated Ecosan household systems in San Juan Tlacotenco in 2005 / 2006; and (b) Construction of sewage system for downtown Tepoztlán and WWTP proposal.
*** If families assume all costs for O&M of their domestic ecosan system there will be no direct public running expenses.

- **Total ecosan investment is 60% lower than that of conventional sanitation.**
- **Integrated functioning closed-loop domestic systems in San Juan have served to demonstrate that ecosan can be a cost-effective option within a periurban context in Mexico –and by extension, Latin America.**

FINDINGS OF INDEPENDENT EXTERNAL EVALUATOR*
FROM USER + KEY INFORMANT INTERVIEWS

USER ACCEPTANCE

- **All recipients said that they were happy with their toilet and that there are no disadvantages in having one.**
- **Dry toilets as a 'logical' solution due to the fact that they do not smell and do not use water.**
- **Major advantage was reuse of urine as a fertiliser and faeces as a compost/soil-conditioner in home gardens. Many recipients like these products, as they are "natural" or "organic".**
- **Dry toilets require a little bit of extra work to empty the urine and feacal containers.**
- **Many users believed that their family's health had improved since construction of dry toilet, due to a decrease in stomach infections and diarrhoea.**
- **They will continue to maintain their dry toilets in the future, and most said that they would *not* change the style of toilet they have.**

** Christian Davies-Colley – April 2007*

FINDINGS OF EXTERNAL EVALUATOR
FROM USER + KEY INFORMANT INTERVIEWS

REPLICATION + PROMOTION

- **It is possible for people to independently replicate ecosan systems; *however*, the high cost of some of the infrastructure solutions could impede this occurring.**
- **Other barriers to independent replication include people being unaware of the concept, and sourcing components such as urine diverting toilet seats.**
- **Ecological sanitation is still seen as an "alternative technology", so markets for ecosan remain small, or non-existent. The community believes ecological sanitation should be more widely promoted by local and state authorities.**
- **Toilets should be publicised through campaigns, including distributing information brochures and door knocking to talk face-to-face with people.**
- **Users recommend dry toilets to friends, family and others.**

FINDINGS OF EXTERNAL EVALUATOR
FROM USER + KEY INFORMANT INTERVIEWS

TEPOZECO PROJECT

- **TepozEco did a very good job regarding the project – thorough explanations of potential issues, good demonstrations of working toilets in the capacity building workshops, very supportive when issues with the toilets arose.**
- **Adapting designs to meet specific needs of the families was also important to the project's success, and building 'beautiful' toilets gave the families "something to be proud of".**
- **Some recipients believed that TepozEco/SARAR has raised the awareness in Tepoztlán of the need to save water.**
- **That TepozEco/SARAR worked closely with established community groups –and through local youth promoters – was an essential factor in the project's success.**
- **Participatory community education and systematic monitoring & follow-up were critical to user acceptance.**

FINDINGS OF EXTERNAL EVALUATOR
FROM USER + KEY INFORMANT INTERVIEWS

BROADER IMPACT

- **The international exposure helped raise ecosan knowledge, and on a wider scale, the project's success was a learning experience regarding ecosan projects.**
- **The pilot project contributed to the development of expertise and experience for the TepozEco/SARAR staff involved in the project, who are now able to share their experience and expertise with other interested organizations.**
- **The Demonstration Centre, which provides a place where people can see working examples, was one successful way to overcome cultural resistance to the ecosan concept and proves that it is a viable alternative.**
- **The program has refined and field-tested a participatory approach and tools –based on the SARAR/PHAST methodology– for community education, planning and follow-up, as well as training-of-trainers from other programs.**

ECOSAN IN THE REAL WORLD:

A DEMAND-ORIENTED PROGRAM

GENERATING ECOSAN DEMAND

1. **Demonstration Center:** Encouraging interest through working examples

2. **Training courses, workshops & conferences:** Training of community leaders, promoters, ecosan users and TOT. Capacity building generates long-range demand for ecosan projects and programs.

3. **Building alliances:** In its shift from a donor subsidized pilot project –TepozEco – to a demand-oriented resource center, Sarar Transformación is discovering new dynamic partnerships that can insert ecosan within a range of complementary initiatives and thus gain greater synergy and credibility.

4. **Ecosan as an alternative "eco-technology":** Positioning Ecosan as a functional, affordable, user-friendly competitor to conventional technologies, allowing it to find a place within mainstream development processes.

RESPONDING TO DEMAND

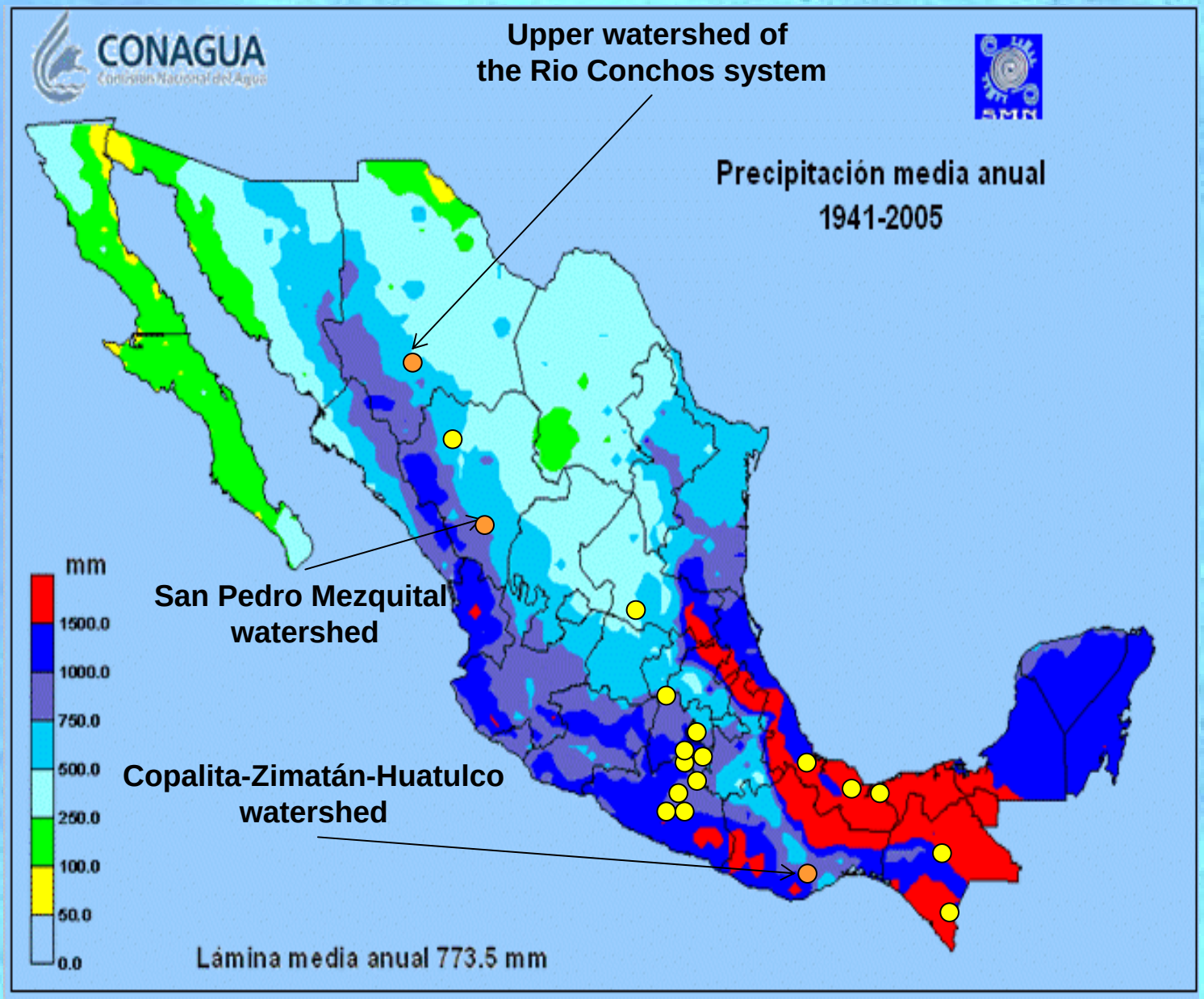
THE TERRITORIAL IMPERATIVE:

- **Integrated Water Resource Management:** SARAR is working with IWRM networks in order to integrate sustainable sanitation strategies, e.g. LA-WETnet/CAP-NET, CIRA/UAEM, IRRI, REDICA, GWP.
- **Watershed conservation and management:** In partnership with WWF/Mexico-FGRA, Sarar is devising strategies to incorporate Ecosan within watershed conservation program in 3 of the major river systems. Other partners include IMTA and the Government of Mexico City, which is developing urban micro-watershed restoration programs.
- **Improved municipal and town W&S services:** In response to a growing demand from small, medium and large municipalities, Sarar is partnering with other institutions (e.g. IMTA, UNDP, Gender&Environment, IRRI, Xochicalli, Xoxitla) to develop a "package" of W&S support mechanisms for planning and developing sustainable "integrated municipal utilities".
- **Rural "micro-region" development:** Training and construction of ecosan demonstrations as part of a strategy for housing & settlement upgrading in extremely poor rural regions. SEDESOL /Guerrero + WVI.
- **Sustainable tourism:** Technical support to eco-tourism projects so that they can comply with newly approved environmental impact standards (Agenda 21) – CONANP, CDI, AMTAVE, ConservAgua.

GEOGRAPHIC DEMAND RANGE

MUNICIPALITIES + MICRO-WATERSHEDS

- Tepoztlán
- Cuautla
- Tlayacapan
- Cuernavaca
- Ecatepec
- Cuajimalpa
- Río Magdalena
- Irapuato
- Sinaloa
- Campeche
- Tabasco
- Guerrero
- Veracruz
- S.L. Potosi
- Chiapas

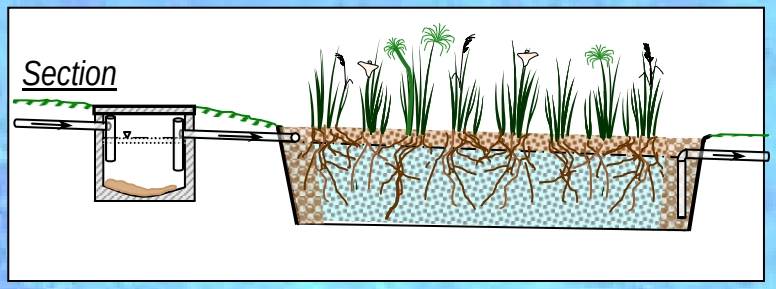


SERVICE PROVISION AND TECHNICAL SUPPORT

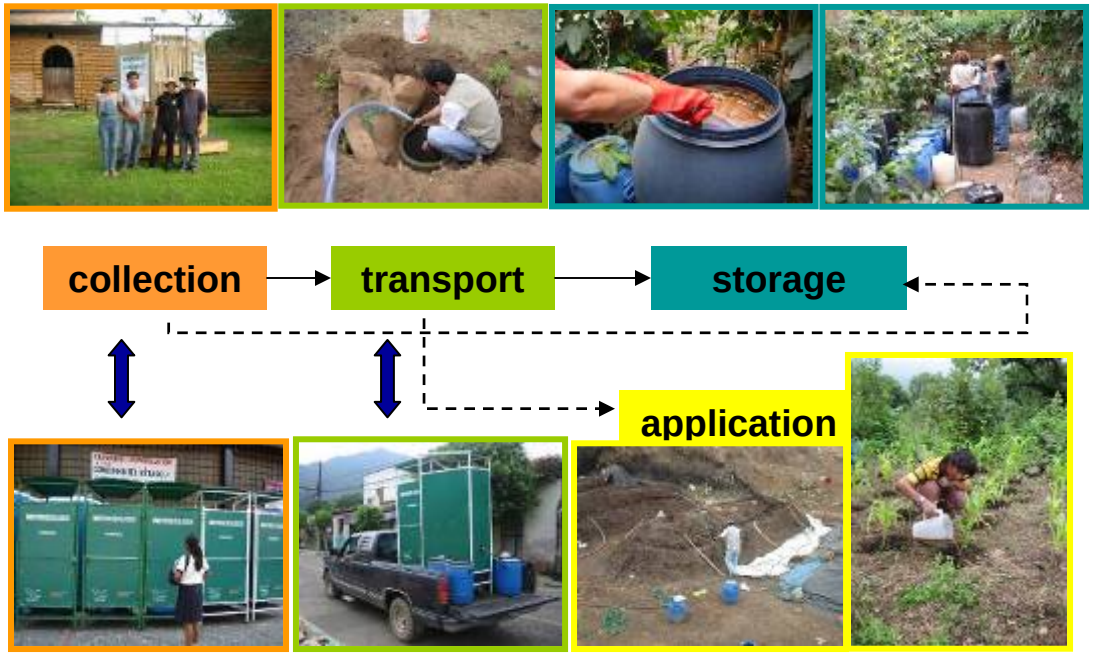
Green retrofitting : Technical assistance and installation of “green” systems

Technologies : Ecological toilets, dry urinals, greywater filters, rainwater harvesting, composting

Clients : Domestic, Institutional (schools, restaurants, government), Public



Urine collection, transport, storage + application



APPLIED RESEARCH & PUBLICATIONS

Applied Research Projects

- *Legal constraints and possibilities for ecological sanitation in Mexico: Constructing a regulation for the Municipality of Tepoztlán* (VERNA Ekologi /EcoSanRes, 2003)
- *Harvesting and reuse of human urine in the municipality of Tepoztlán* (NCCR N/S Project, 2004/05)
- *Household-centered ecological sanitation study in San Juan Tlacotenco* (NCCR N/S + EcoSanRes, 2005/06)
- *Community-based ecological greywater management* (NCCR-N/S–EAWAG/SANDEC + UNDP/BDP/EEG, 2006/07)
- *Comparison between dry ecosan and conventional waterborne sanitation* (EcoSanRes, 2006/07)
- *Municipal Composting Center* (EcoSanRes, 2003/06)
- *The effectiveness of vermicompost in the elimination of intestinal pathogens in human feces* (TUHH Hamburg University of Technology, 2006)
- *"Popostero"- secondary treatment of dehydrateed feacal material* (Stanford University + UNDP, 2006/07)

Educational and Instructional Material

- *"What we know about human urine as a fertilizer and recommendations for application"* (SARAR -- F.Arroyo, M.Bulnes, 2006)
- *Ecosan community promotion tool kit* (SEDESOL, TAO, UNDP, 2004)
- *Technical guidelines: Greywater, Family gardens, Arborloo, Secondary management of dry toilet by-products*
- *Informational and instructional videos and posters*

PRODUCT DEVELOPMENT AND MARKETING

Design of user-friendly prototypes: Porcelain UD toilet pedestal; Waterless urinals; Portable public urinals; Modular greywater filters; Rainwater filters.

Design → **Prototype Construction** → **Pilot Testing-Analysis** → **Modifications/ Production** → **Marketing**

Business and Industrial partners : ***Industrias Makech + Anfora***

Marketing & sales division : ***MexiSan***

CONCLUSIONS / LESSONS LEARNED

1. **Go easy on subsidies:**

- At community level, can help generate demonstrations, BUT can inhibit spontaneous replication.
- At Institutional level, can help to develop capacity, BUT can create dependency and serious crisis if withdrawn unexpectedly.
- Always include a phase-down strategy and risks should be shared.

2. **Political matters always have the potential to be problematic:**

- Individual personalities can play a major role.
- Understand the local political climate & establish a good working relationship with regulatory authorities.
- Plan projects that involve other partners and which generate structures that can bypass purely political interests.

3. **Although there is clear evidence of an increasing interest and demand for sustainable sanitation, high level commitment and funding is still limited.**

- More demonstration programs and case studies are essential to convince decision makers that ecosan is a cost/effective option.
- Ecosan champions need to professionalise marketing strategies.
- Diversify funding --including projects for product R&D for different socio-cultural and physical contexts.

RON SAWYER

rsawyer@sarar-t.org

CONTACT US:

SARAR TRANSFORMACIÓN S.C.

AP 8, Tepoztlán, Morelos 62520 México
Tel: +52 (739) 395-7505 / +52 (739) 395-0364

sarar@sarar-t.org

www.sarar-t.org

SARAR
TRANSFORMACIÓN