

Erdos Eco-Town Workshop

Dongsheng Aug 31, 2007

Organised by
EcoSanRes, Stockholm Environment Institute
& Dongsheng Project Office

Project Initiation, Organisation and Execution

- Part of the EcoSanRes Programme/SEI funded by Sida
- Collaboration between SEI and the Dongsheng District Government since 2003
- Agreement defines the role of DS government (implementation and management) and the role of SEI (demonstration, training and R&D)
- DS project team (9 members) and maintenance team (11 members) led by Mme Sun Lixia
- SEI project team (1 fulltime now 3.5) led by Arno Rosemarin with senior advisors Professor Zhu Qiang and earlier Uno Winblad

Project Description

- The purpose of the China-Sweden Erdos Eco-Town Project (EETP) is to carry out R&D aimed at testing the feasibility of applying ecological sanitation in an urban environment.
- All residuals from the households are collected separately and managed in five flows: urine, faeces, greywater, compostable waste and non-compostable waste.
- Faeces and organic waste are treated on site at an ecostation.
- Greywater is piped to an onsite treatment plant within the ecostation.
- Urine is stored in underground tanks until delivered to the farmers/endusers.
- Urine, treated greywater and processed (composted) faeces and compostable kitchen waste are reused in agriculture and gardening

Project History

- Originally back in 2003, the plan was for a pro-poor peri-urban project for farmers forced to leave their herding areas to urban areas in order to reduce erosion and desertification
- The plan was to build 1-2 storey buildings with small courtyards using dry toilets and on-site greywater treatment
- The coal prices increased significantly in 2004 and Dongsheng became a boom-town for urban development (coal has tripled in value over the last 3 years)
- The project was changed to be a market-based urban building project

Introduction (cont'd)

- This quickly became a large-scale experiment in introducing at full scale, dry sanitation to multi-storey buildings
- During the course of the project there have been three different sets of mayors and vice-mayors
- The various stakeholders were various government bureaus responsible for licensing building projects, the bank, the building company and the people prepared to buy the flats
- Ecosan approaches were introduced through training of the stakeholders and training and site site visits to Sweden for the bureaus' senior staff

Project Facts

- Three-phase project covering 55.6 ha and ca 2500 flats
- Phase one completed in 2006, has produced 833 flats in 43 buildings; all were quickly sold and occupancy is about 400 flats
- Ecosan installations
 - Dry urine-diverting toilets (Swedish-China design; manufactured in Guangdong – Meilong Co.)
 - 22 underground urine tanks
 - Fecal collection - one bin for each toilet
 - Greywater kept separate and piped to the eco-station
 - Eco-station
 - Greywater treatment and storage pond
 - Composting of the faeces and kitchen organics (offsite farm up to now)
 - Sorting and temporary storage of solid waste

Economics

- Project paid for by the DS govt – roads, water, electricity, gas, etc. and the building company
- Households have paid a market price for the flats plus the standard fee for maintenance and waste collection
- Added fee for maintenance of the ecosan system is covered by the DS government (currently shared with SEI)
- SEI has paid for demonstration and testing installations in the first four buildings, two urine tanks, the ecostation, expert advisory services and the R&D studies
- More detailed study on the cost/benefits to come later in the day

The Challenges

- Building quality has varied due to the high pace of urbanisation in Dongsheng and the restriction of not being able to build during the winter
- The building company has responded by making necessary repairs
- Improper installations of ecosan equipment causing odor
 - Urine tanks – piping not built according to blueprints caused back flow of air to the toilets
 - Toilets – some poorly installed causing problems in operation and leaky urine connections
- Greywater system – delay in testing due to low flow of water - because not enough flats were occupied in 2005 and 2006; some pipes crushed by tractors; some wells blocked by soil and debris; flow is now adequate for activated sludge operation (20 m³/hr; capacity is 50 m³)

User Reactions

- Generally positive to the ecosan toilets and urinals
- Toilet functions at all times since no water is used (flush toilets cease to function throughout the city when the water is turned off)
- Some found the change to a dry toilet inconvenient
- Faulty operation of the toilet bowl requiring repair
- Toilet cleaning with excessive water – required training for cleaning
- Odour in the beginning due to the urine tank installation mistakes and leaking urine pipe connections under the toilet, was a various serious problem with complaints going all the way to the mayor
- Some households decided to use the outdoor public toilet
- 3 households installed flush toilets connected to the greywater pipe

The successes

- Urine tanks and toilet installations fixed
- Ventilation improvements including enclosure cabinets in the basements
- Improvements in toilet performance – sawdust dispenser, turning bowl spring
- Modified and improved turning bowl function now being retrofitted
- Urine odour lock and its function – but household maintenance needs to be improved
- Greywater pipes and wells repaired and unblocked following construction phase
- Increased user acceptance - 80%

Training and Maintenance

- Maintenance team consists of 11 members
- Household contact is intensive – social worker
- Records kept for each household
- Both maintenance team and households have received training on operations
- Ecostation is just starting up this summer and new routines need to be developed
- Solid waste source separation at the household level is only starting since the ecostation was not in operation until July this year

Household/Maintenance Team Information

- Brochures
- Posters
- Billboards
- Instruction leaflet
- Instruction poster
- To do
 - update and interesting information brochures and VCD films for households.
 - select demo households as model of using dry eco-toilets.
 - write easy training lectures for the maintenance team
 - compile a specification of O&M procedures for maintenance team
 - strengthen the regulations of the maintenance team management

R &D Studies

- Eco-toilet improvements
- Urine crystal
- Odour problems and ventilation
- Agricultural reuse of urine and compost
- Composting study
- Economic and cost/benefit evaluation
- Greywater analysis
- Weather monitoring (air pressure affects ventilation)

Follow-up R&D

- continued studies on the agriculture reuse of the human excreta and treated greywater,
- composting experiments,
- monitoring of the toilet and urine system,
- experimental studies on three treatment solutions to greywater
- solid waste sorting
- weather condition monitoring studies
- single chute system for a dry toilet system
- social investigation of household using ecosan system
- setting up of a Management Information System (MIS)
- Environment Impact Assessment (EIA)