



Global Perspectives - What is EcoSan?

Ass. Prof. Dr Björn Vinnerås
Swedish University of Agricultural Sciences
National Veterinary Institute



Dr Björn Vinnerås



- Assistant Professor in Environmental Engineering
- Have been working with EcoSan since 1997
- Main research in Ecological sanitation and Treatment Technology for safe nutrient recycling
- 15 peer reviewed papers in different aspects of ecological sanitation
- Have experience of Ecosan in over 10 different countries



What is ecological sanitation



1. Proper toilet
 - Aesthetic
 - Robust/well functioning
2. Hygien safe
 - Collection
 - Treatment
 - Reuse
3. Acceptable products/wastes
4. Safe fertilisers



EcoSanitation ladder



- No toilet
- Peepoo bag
- Simple squat or pedestal UDD toilet
- Semi advanced squat or pedestal UDD toilet
- Advanced squat or pedestal UDD toilet
 - Water flushed toilet not a sustainable option
 - 6 billion flushed toilets = 25% of the average flow in Ganges for flushing



PeePoo bag



- Single use
- Self sanitising
- Biodegradable
- Low cost 1 Rupie each
- Uses the fertiliser urea for sanitisation
- No traces after 3 months (1 crop season)



Simple UD toilet



- Modelled out of concrete
- Pedestal based on bucket
- For squatting concrete slab
- Both can be either single or double vault



Advanced UD toilet



Advanced UD toilet



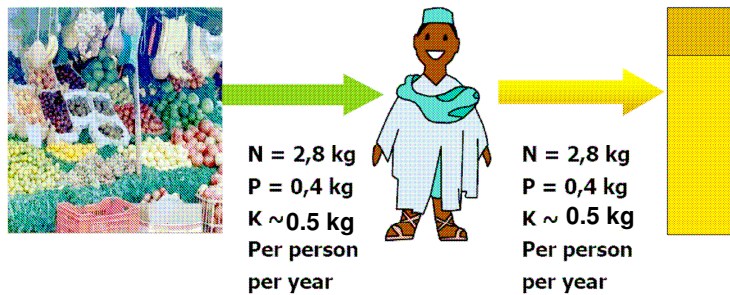
Sanitation roll out



- Toilet Focus
 - Often the reuse included when having a product – no farm interest
- Re-use is an incentive for ecosan – not the opposite
- If not reuse the so called EcoSan is just another pollutant



Productive Sanitation



EcoSan Fertiliser Ladder (value)



- Biosolids
- Septic tank sludge
- Faecal matter **!hygiene!**
 - Proposed treatment (Anaerobic, composting or ammonia treatment)
- Blackwater **!hygiene!**
 - Proposed treatment (solar heating, ammonia treatment)
- Concentrated human urine – dry or un-diluted



Biosolids



- From waste water treatment plants
- Uncertain of source (households & industries)
 - Quality?
 - Hygiene?
- Fertilising value
 - N 10-20%
 - P >90%
 - K <5%
- Farmer interest medium



Septic tank sludge



- Sediments over long time
- Hygiene
- High heavy metal content
- Nutrients
 - N < 10%
 - P < 30%
 - K < 5%
- Farmer interest low



Solid faecal matter



- Additives
- Composted/biologically degraded?
- Hygienic quality
 - Look like soil
 - Not as safe as soil
- Fertiliser
 - N < 5%
 - P 25%
 - K 30%
- Appreciated by many
- Can be spread by conventional spreader or by hand



Blackwater/latrine



- Urine + Faeces (+Water)
- Pit latrine sludge
- Require treatment
- High hygienic risk
- High nutrient potential



Biogas slurry



- Additional source of income – Energy
- Quality depend on
 - Source
 - Municipal waste
 - Faeces
 - Latrine
 - Treatment method
 - Temperature
 - Hygienic quality
- High content of NPK ~100%
- Good fertiliser for both machine and hand spreading



Urine



- Highest quality organic fertiliser
- Easy to collect separately
- Best undiluted
- High content of
 - N 90%
 - P 75%
 - K 70%
- Very clean fertiliser
- Value
 - In Uganda 20L urine sold for 45R for organic farming



Value of fertiliser - urine



- 2.8kg N = 6kg Urea 15R/kg = 90R
- 0.4 kg P = 2kg TPS ~20R/kg = 40R
- 0.5 kg K = 1kg KCl ~21R/kg = 21R
- Total value 150R per person and year = 0.5R per person day
- Value per jerry can 20L ~10R
- Can at least pay for transport and spreading



Conclusion



- Excreta holds a fertiliser value
- But not a commercial value if no one pay for it
- For market – it has to be a recognisable product
 - Liquid – like animal slurry
 - Solid
 - Solid manure
 - Mineral fertiliser
- The potential use of the waste products are as important as the actual toilets.

