ASSESSING THE USE OF EXCRETA STREAMS IN AGRICULTURAL TRIALS

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Problem Statement/Context

- Challenges involved in sanitation roll out.
- Inability to dispose wastes from DEWATS treatment plant, UD and VIP toilets directly into the environment.
- Potential of these waste to be processed into fertilizer materials thus supplementing inorganic fertilizers.

Aim

Investigate the use of human waste products from sanitation installations in a beneficial way through agriculture.

Methodology

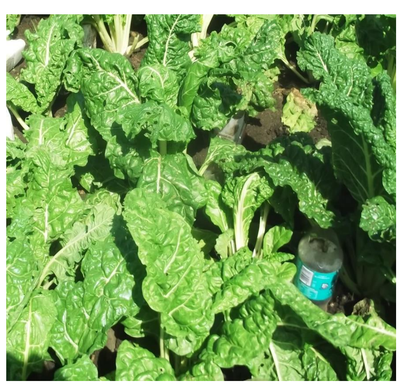
Tunnel trials

- Column studies to investigate the leaching and uptake of N and P by perennial ryegrass.
- Pot trials to assess uptake of plant available nutrients from DEWATS effluent and excreta derived products(LaDePa, nitrified urine concentrate and struvite) by soybean, black nightshade, Swiss chard, maize.

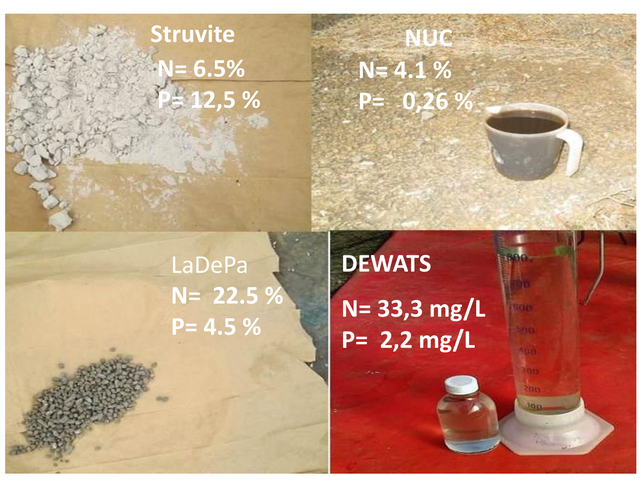
Field trials consisting of Swiss chard irrigated with three different sources of water and a banana/taro intercrop under wastewater irrigation.

Pot trials

Banana/taro intercrop



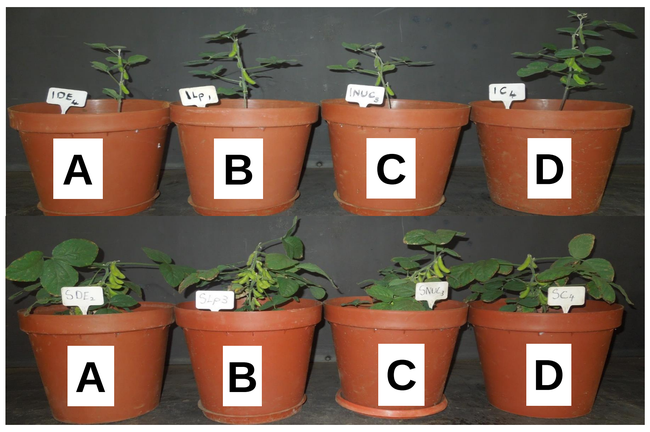
Swiss chard



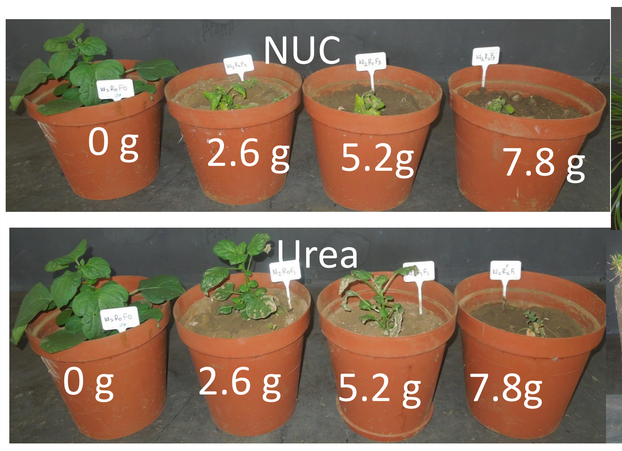
Waste products

Results

Maize grown to maturity



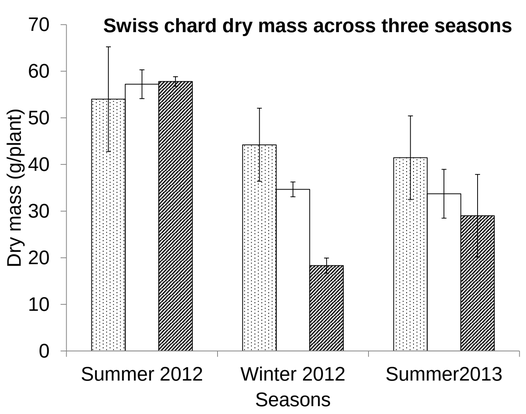
Soybean response to (A) DEWATS (B) LaDePa (C) NUC (D) Control

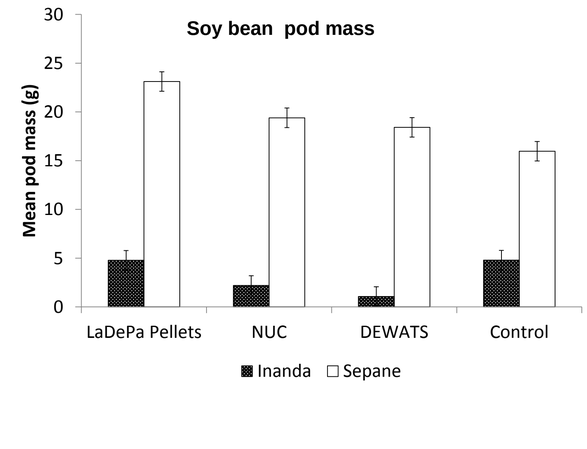


Black nightshade response to NUC and Urea

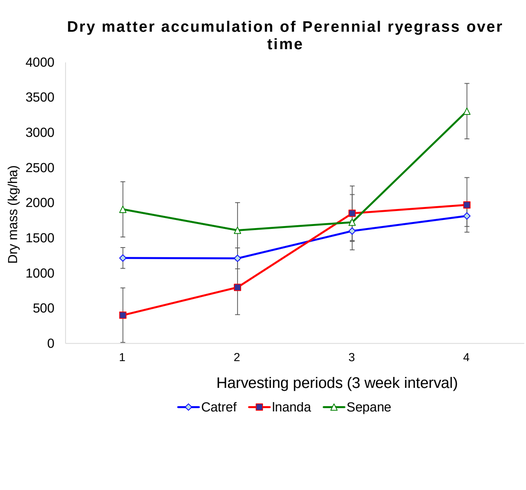
Effects of DEWATS effluent on ryegrass grown in different soils

Interaction effect of water, fertilizer and application rate on biomass (g) in black nightshade

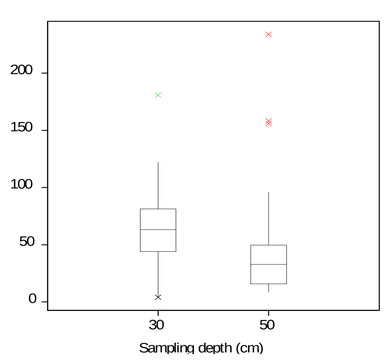




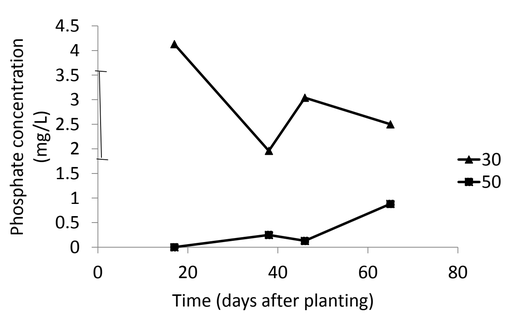
Rate	Water levels					
	100%			50%		
	Urea	Manure	NUC	Urea	Manure	NUC
Low	1.88	4.48	3.36	2.34	3.31	1.89
Medium	1.85	3.51	0.44	1.28	3.74	1.64
High	1.34	3.68	0	1.03	3.63	0



Nitrate-N concentration with increasing soil depth under Swiss chard cultivation



Phosphate-P concentration with increasing soil depth over eleven week period of Swiss chard cultivation



Conclusions

- DEWATS effluent can supply N and P for plant uptake.
- Minimal leaching in the field as plants were able to take up nutrients.
- Effect of NUC is crop dependent and needs further investigation on rates of application, and dilution effects.