CONSTRUCTED WETLANDS FOR WASTEWATER TREATMENT IN UGANDA

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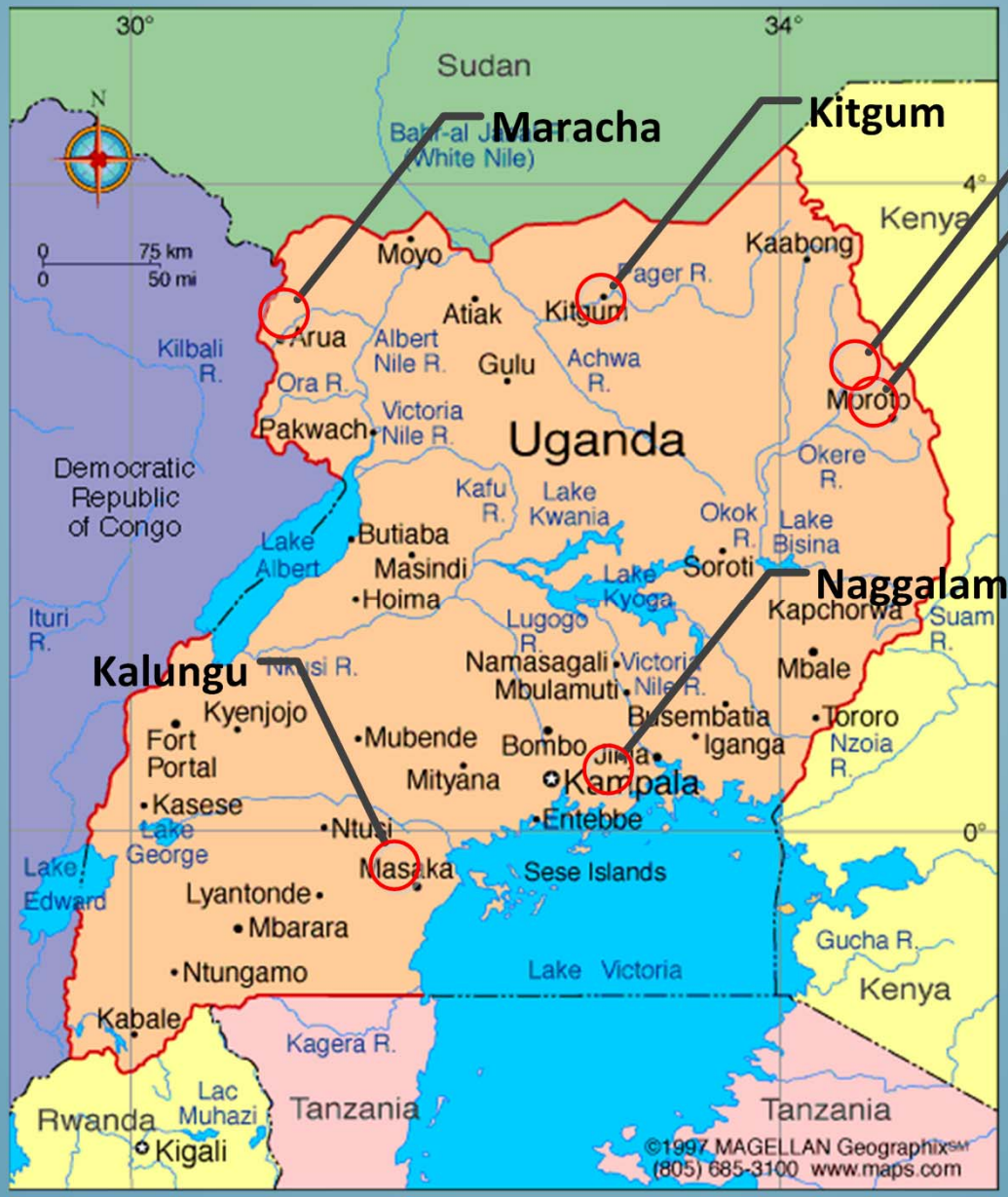
EcoSan Cub Austria

BACKGROUND

- *WWTP Matany Hospital (1997-1998)*
- *WWTS Maracha Hospital (2001-2003)*
- *WWTS Naggalama Hospital (2002-2005)*
- *WWTS Kalungu Girls Secondary School (2003-2004)*
- *WWTS Kanawat Health Centre (2003-2004)*
- *WWTS Kitgum St. Joseph Hospital (2005-2008)*
- *WWTS Nyapea Hospital (2006)*


Maracha
Kitgum
Kanawat
Matany
Naggalama
Kalungu
Sudan
Kenya
Uganda
Democratic Republic of Congo
Rwanda
Tanzania
Tanzania
Lake Victoria
Sese Islands
Kampala
Entebbe
Jinja
Mbale
Soroti
Lira
Gulu
Kitgum
Atiak
Moyo
Arua
Pakwach
Kaabong
Moroto
Kapchorwa
Butiaba
Masindi
Hoima
Kyenjojo
Fort Portal
Kasese
Mubende
Mityana
Bombo
Iganga
Busembatia
Tororo
Namasagali
Mbulamuti
Lugogo
Kafu R.
Lake Kwania
Lake Kyoga
Okok R.
Lake Bisina
Okere R.
Suam R.
Nzoia R.
Albert Nile R.
Victoria Nile R.
Achwa R.
Ager R.
Ora R.
Kilbali R.
Ituri R.
Lake Albert
Lake George
Lake Edward
Ntusi
Mbarara
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Lac Muhazi
Kigali
Gucha R.
30°
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0 75 km
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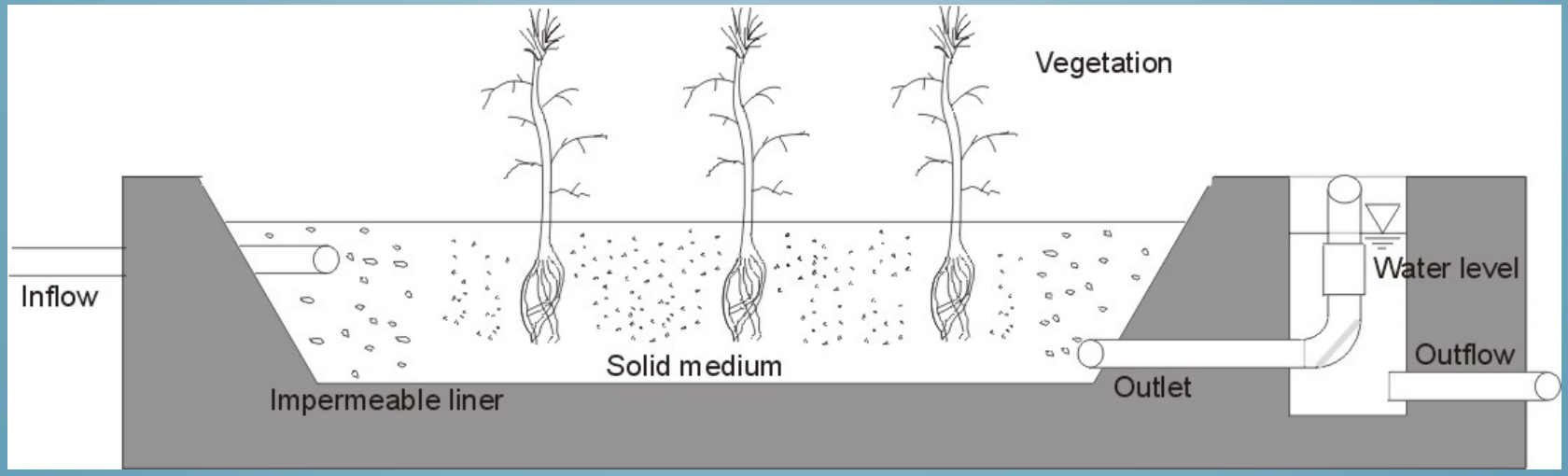
STANDARDS

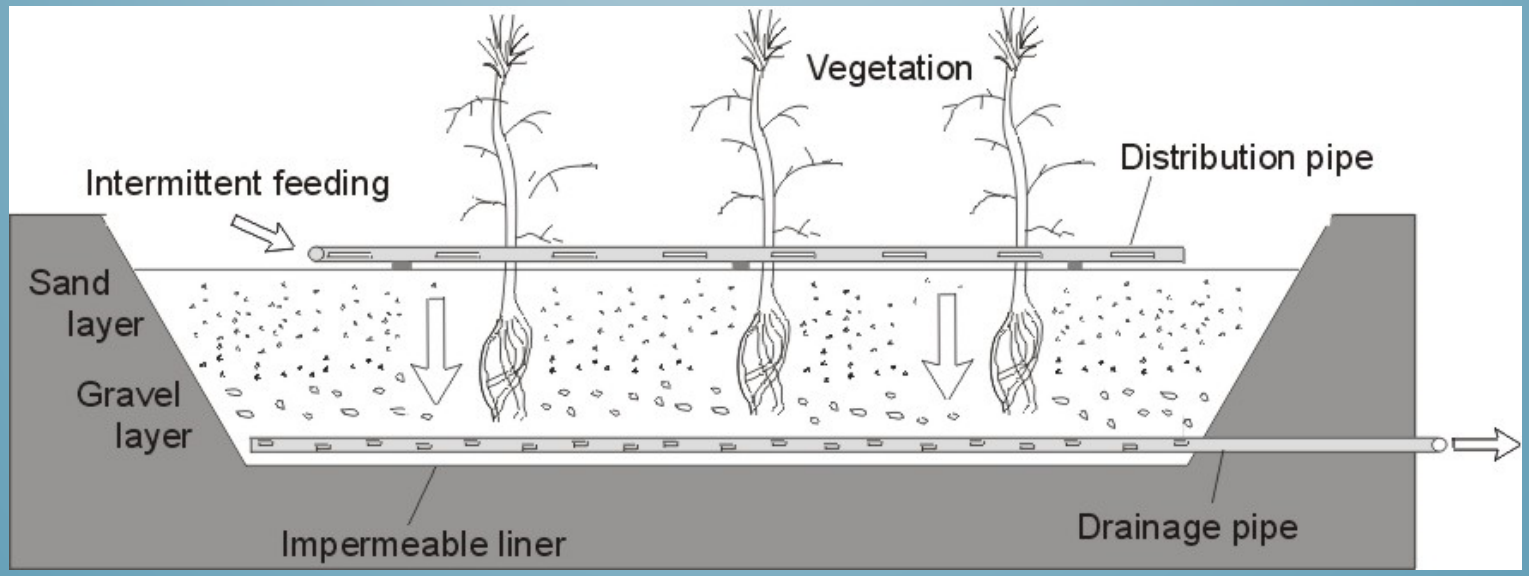
COD	*100 mg/l*
BOD5	*50 mg/l*
NH4-N	*10 mg/l*
Ntot	*10 mg/l*
Ptot	*10 mg/l*
PO4-P	*5 mg/l*

The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, S.I. No 5/1999

HORIZONTAL FLOW CWS



VERTICAL FLOW CWS



PRE-TREATMENT

PRE-TREATMENT

PERFORMANCE

VERTICAL FLOW CW		MATANY			MARACHA		
Parameter		#	Average	Stdev	#	Average	Stdev
Physico-chemical paramters							
COD	mg/L	6	86	48	5	130	70
BOD5	mg/L	4	20	14	2	14	2
NH4-N	mg/L	3	1,4	0,5	5	43,4	28,2
PO4-P	mg/L	5	7,8	1,9	6	10,0	14,7
SO4-S	mg/L	3	34,7	6,1	3	26,7	6,0
Turbidity	NTU	4	7,1	9,1	4	17,0	15,6
Ph value	-	5	7,1	0,7	5	6,8	1,2
El. conductivity	µS/cm	5	1550	147	5	1841	360
Temperature	°C	4	25,8	2,1	4	26,2	1,8

PERFORMANCE

HORIZONTAL FLOW CW		KANAWAT			KALUNGU		
Parameter		#	Average	Stdev	#	Average	Stdev
Physico-chemical paramters							
COD	mg/L	6	87	31	5	121	31
BOD5	mg/L	3	22	4	3	65	7
NH4-N	mg/L	6	46,6	27,3	5	29,2	15,1
PO4-P	mg/L	5	5,8	2,4	4	7,5	5,5
SO4-S	mg/L	3	43,3	9,0	2	34,5	6,4
Turbidity	NTU	4	18,8	22,1	3	34,0	27,6
Ph value	-	5	7,7	0,2	4	7,4	0,6
El. conductivity	µS/cm	5	2046	375	4	1145	332
Temperature	°C	4	24,4	2,6	5	23,9	2,5

CONCLUSIONS

- *most effective and efficient treatment system among near natural systems*
- *space requirement significantly less compared to ponds/lagoons with better performance*
- *o&m possible even in remote areas*
- *o&m improved in case of additional benefits (e.g. irrigation - Matany, Kanawat; compost - Maracha)*
- *investment cost app. 100 EUR/PE*
- *additional research required for further optimisation (design)*

- *HF appropriate for carbon removal*
- *VF appropriate for carbon removal and nitrification*


Thank you!