

Characterization of Greywater from Urban and Peri-Urban areas of Nakuru Municipality, Kenya

By

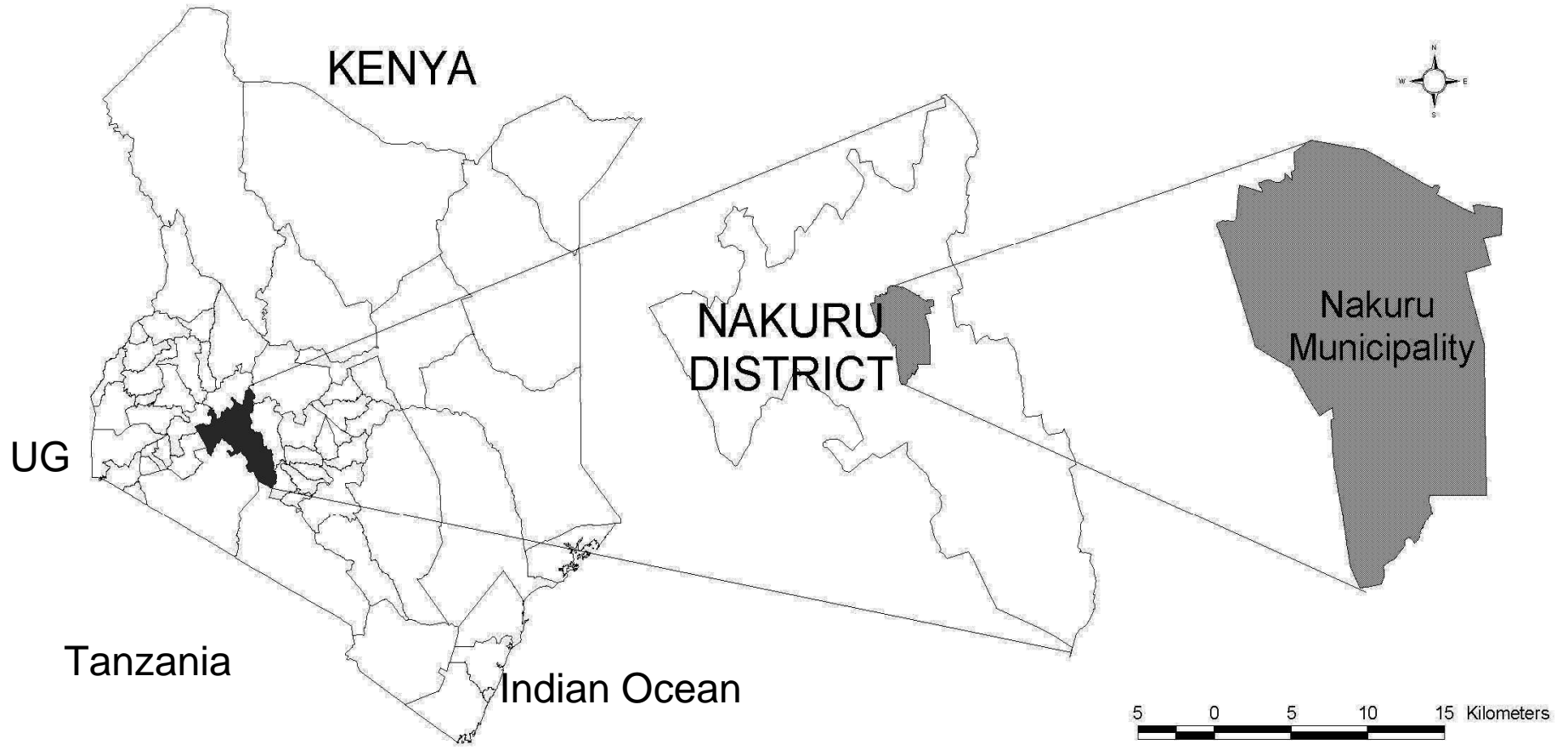
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Introduction

- Background
 - Nakuru municipality 4th largest town after: Nairobi, Mombasa & Kisumu
 - Population estimated at 450,000 (MCN,1999)
 - Site high-density, low-income areas of Nakuru Municipality
 - 2/3 live in peri-urban areas
 - Insufficient access to safe water and basic sanitation.



Domestic wastewater

- Greywater
- Yellow water
- Brown water
- Beige water
- Black water (Night soil)

Greywater disposal

- Major challenge in Urban and Peri-urban areas where majority of population live
- Hence, sanitation a big challenge
- Proper sanitation will go along way to fulfill children's rights to a safe environment
- However, in Kenya, in Water supply and sanitation, has attracted a small proportion of investment

Problem: Careless disposal of greywater

- Water used for domestic purposes is discharged after use as 'wastewater'
- Thus, both public health and the environment are under threat



Solution(s)

Erecting barriers to prevent agents of disease transmission. This approach will also lay foundation for sustainable sanitation development (SSD).



HOW: Improved sanitation hygienic behaviors involves change which takes time.

This involves both hardware & software components

MATERIALS AND METHODS

- On-site greywater sampling and analysis from selected settlements was conducted over a period of eleven months.
- The volumes of greywater generated were calculated from the amount of water consumed per household (determined by no of 20 ltr jerricans of water collected during each day).

RESULTS

Greywater disposal Kaptembwo

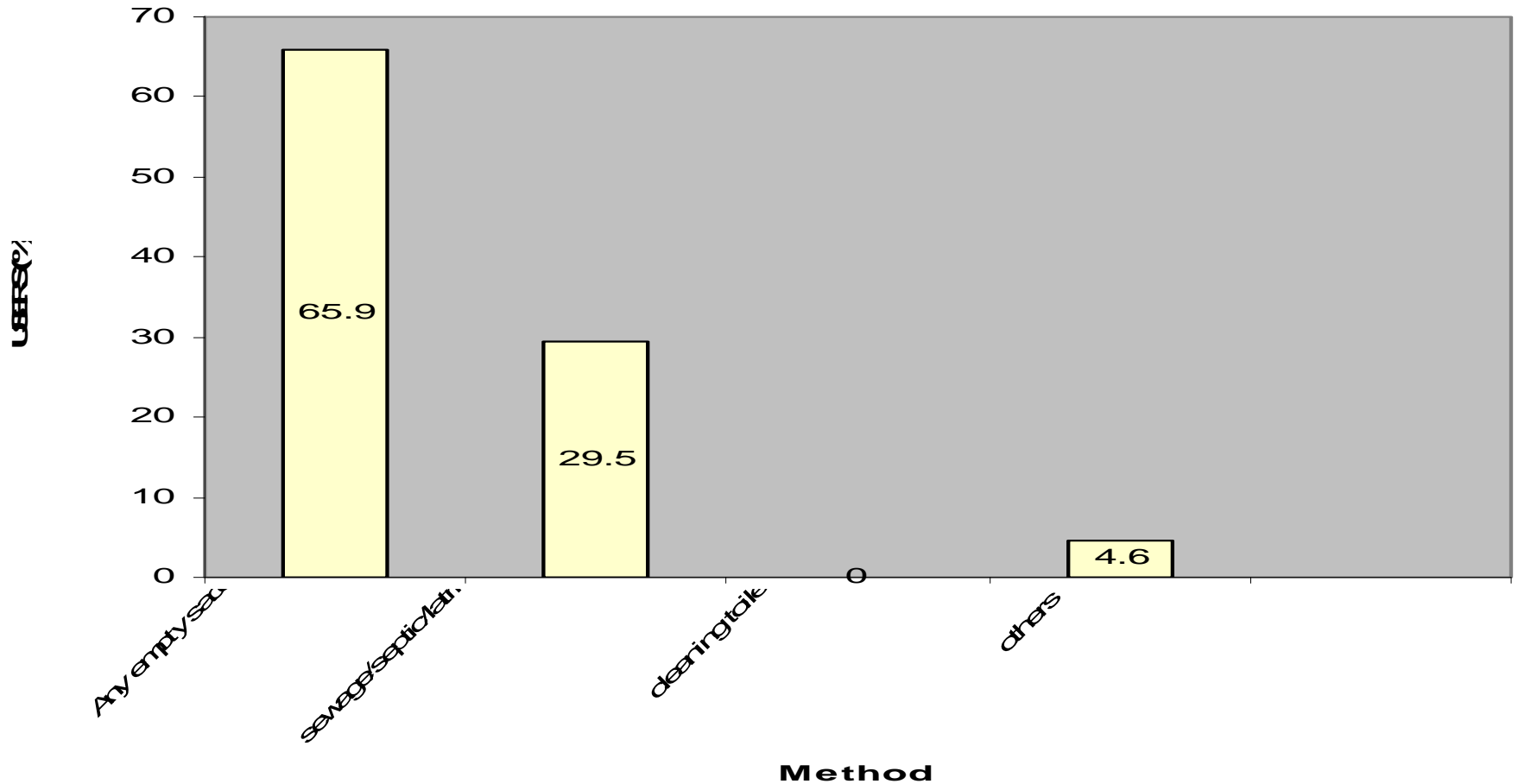
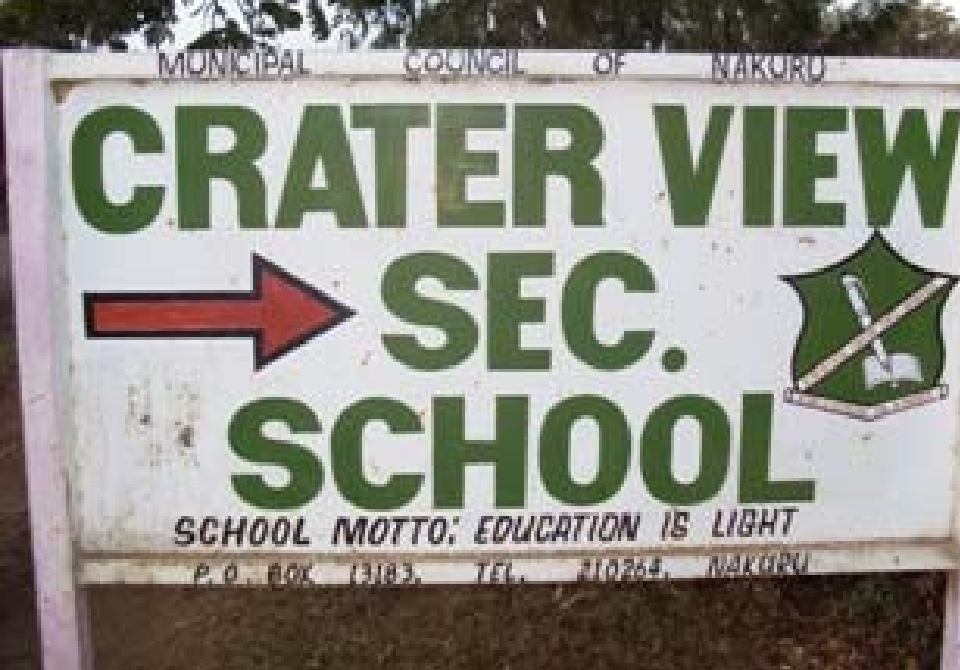


Table 2: Parameter (study sites)

Site/ parameter	pH	EC (mS/cm)	TSS (Mg/l)	NH ₃ (Mg/l)	TN (Mg/l)	TP (Mg/l)	BOD ₅ (Mg/l)	COD (mg/l)
Bondeni	8.6	1.67	1,750	88	340	13.1	1,570	8,320
Kaptembwo market	5.7	1.10	1,120	63	143	11.2	1,610	3,840
Speedway Primary	7.6	0.73	560	32	75	5.3	800	1,840
South Cementry	7.2	0.85	600	43	57	3.7	780	1,600
Kaptembwo Primary	6.6	0.38	220	21	55	2.0	320	320
Manyani drain	6.0	0.79	180	17	65	2.3	820	1,680
Mbugwa	7.3	0.44	28	20	45	1.2	140	290
Menengai factory	5.9	1.56	700	236	145	2.3	820	400

Summary of Greywater composition

Parameter	Units	Range	Kenyan standards (KEBS-KS 05-459,PART 1: 1996) (mg/l)
pH		5.7-8.6	6.5-8.5
EC	mS/cm	0.38-2.35	NS
Ammonia	mg/l	0-15.54	0.5
Total nitrogen	mg/l	2.21-340	NS
Total phosphates (TP)	mg/l	1.2-13.1	NS
Total suspended solids	mg/l	200-3,580	2000
COD	Mg/l	290-8,320	1000
BOD ₅	mgO ₂ /l	115-1,610	500
Oils & Grease	mg/l	8-241	NS
Faecal coliform		480,000-1,800,000	NIL



Conclusion

- Characteristic among the different greywater discharge sites is highly variable (due to: water source, age, health, no of HH occupants, life style characteristic, product used).
- Guide in designing treatment systems that reduce, N, P and Susp Solids loads into water bodies

RECOMMENDATION

Based on this, greywater reuse without treatment is not recommended

Acknowledgement

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End of Presentation

Thank you

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