A survey of *Cryptosporidium* in donkeys, watering points, humans and waste water in Lamu Islands, Kenya

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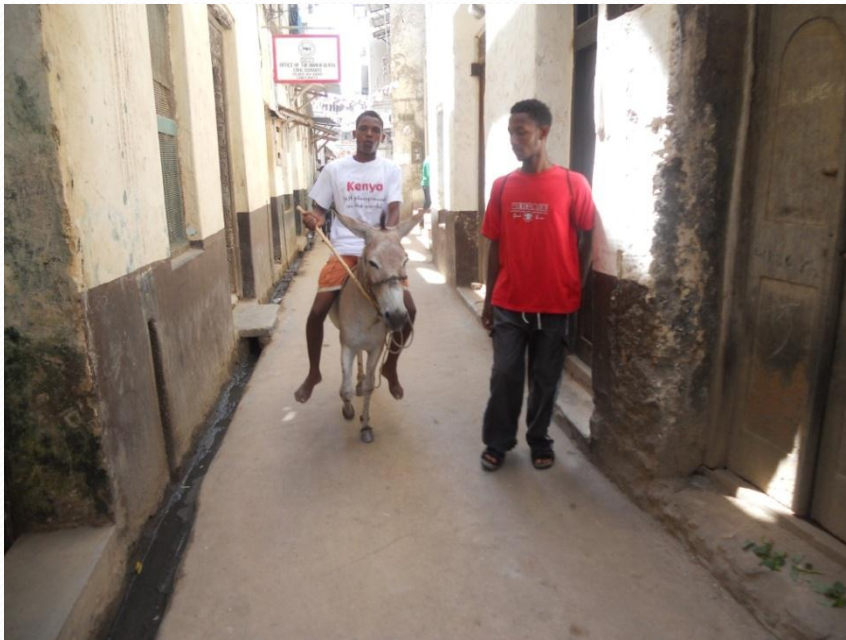
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Overview

- Introduction
- Study Area
- Research Concept
- Sampling
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- Work plan
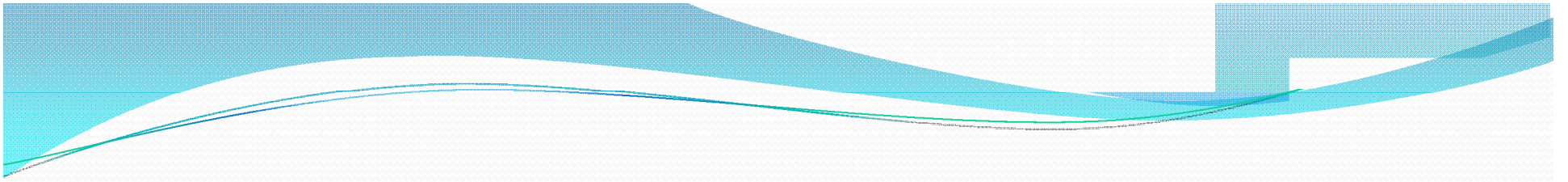- Budget
- Thank you

INTRODUCTION
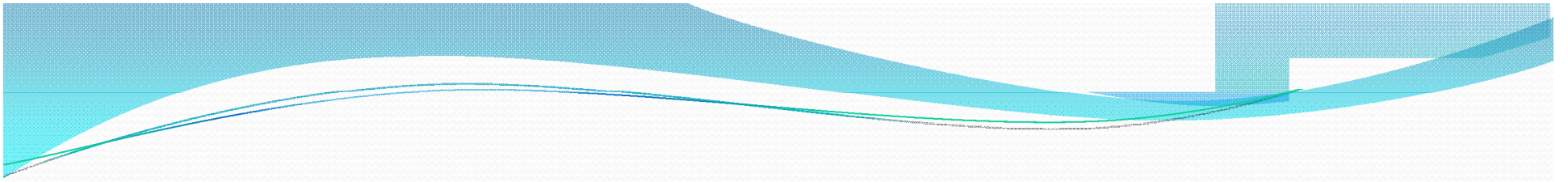

Donkey feaces allover, bare feet & donkey crossness

**Open drainages system
Is piped water safe .....?**

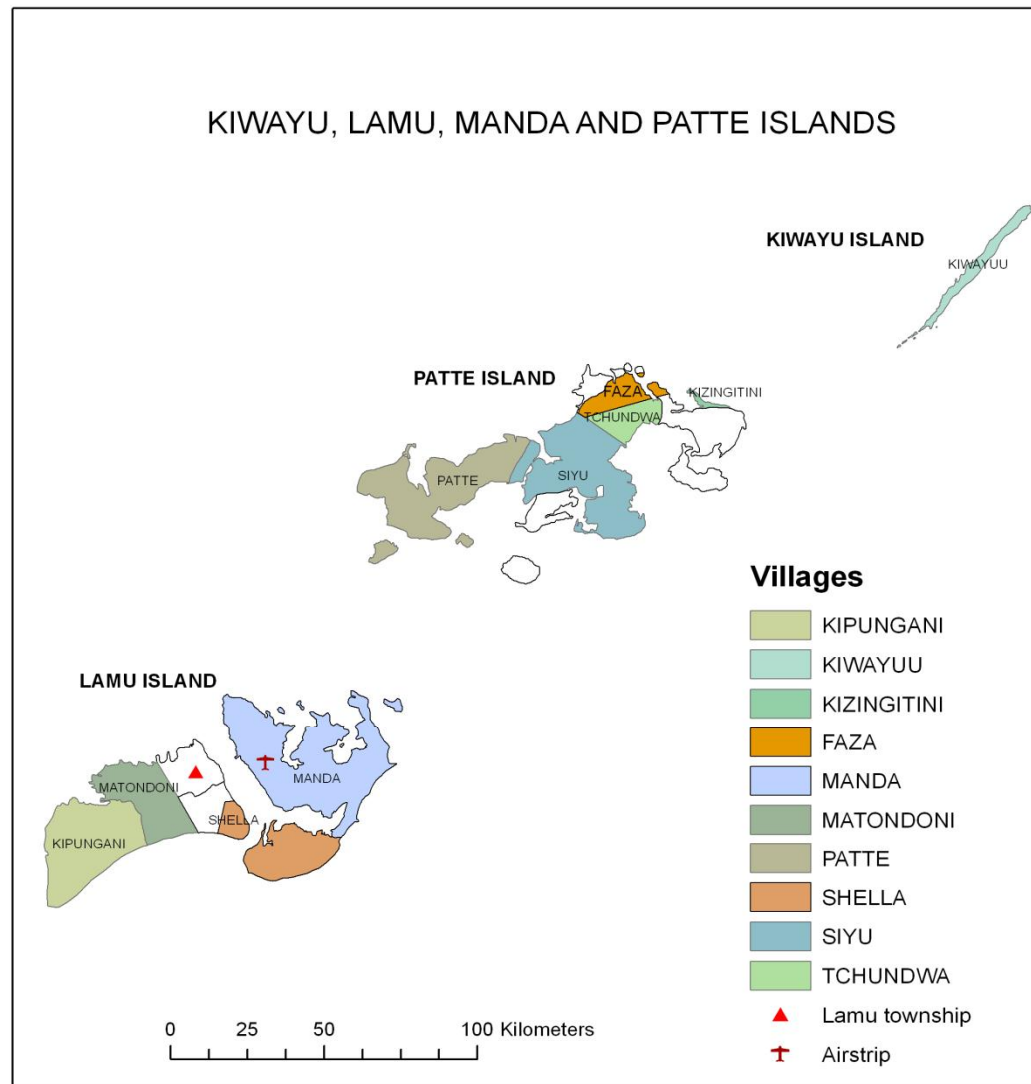# Photo of a Lamu donkey

Study area

RESEARCH CONCEPT
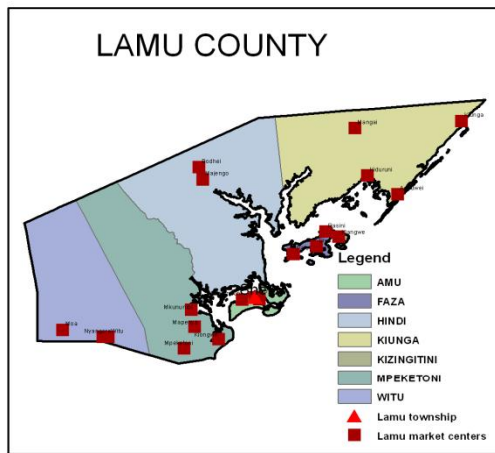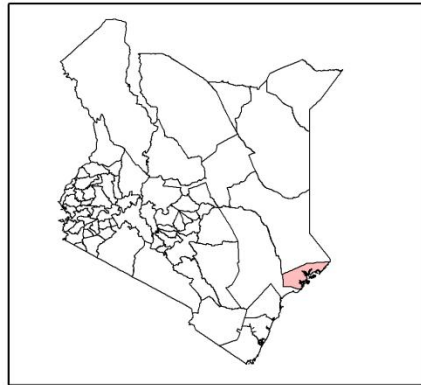
Donkey dung in streets

Waste water drainage

Donkeys

Drinking water sources

Feeding habit

Ocean (swimming, donkey washing, waste disposal

Humans

No shoes

Fecal and water sampling

Sample size for infinite population

Based on formula by Naing et al, 2006; Dohoo et al, 2003

$$n = \frac{Z^2 \, (P) \, (1\text{-}P)}{d^2}$$

- Where: n = Sample size

  Z = Z value (Confidence level, e.g. 95%)

  P = estimate of the proportion or anticipated prevalence (e.g. 20%, $p = 0.2$)

  d = confidence interval or the required precision (e.g. 5%, d = 0.05)

- For alternative hosts, $n = 246$
- Sample size for each category will have to be adjusted

Sample size for finite population

- In small populations, the required sample size (n') is calculated by adjusting downward the sample size (n) obtained from infinite population.

- Donkey Population (N) = 4,931 and n = 246

$$n' = \frac{1}{1/n + 1/N}$$

- Sample size for Donkeys = 234
- Sample size for Humans = 245
- Sample size for drinking water sources = 151
- Sample size for waste drainage water = 82

Sample sizes

Village	Donkeys	Humans	Drinking water	Waste water
Lamu	122	117	82	39
Matondoni	13	12	10	4
Kipungani	6	3	3	1
Faza	26	44	17	15
Pate	11	12	9	4
Siyu	10	10	7	3
Tchundwa	9	9	5	3
Kizingitini	31	35	14	12
Kiwayu	6	3	4	1
Total	234	245	151	82

Fecal analysis

DNA EXTRACTION

GENETIC IDENTIFICATION

- Fayer, 2008 and Xiao and Ryan, 2008

Statistics

- **Data will be entered in excel spreadsheets and exported to SPSS for analysis.**

  - ANOVA including Student *t* test will be used to compare differences in prevalence among Water, donkeys,humans and waste water.
  - Correlation and regression analyses to test prevalence and genetic diversity of cryptosporidium in drinking water, humans, waste water and donkeys.

WORK PLAN

Activity	Year										
	2013					**2014**				**2015**	
	1	2	3 - 5	6 -9	10 -11	12 - 14	15 -17	18 - 19	20 - 23	24-29	30-35
	Feb	Mar	Apr - Jun	Jul - Oct	Nov - Dec	Jan - Mar	Apr - Jun	July - Aug	Sep - Dec	Jan - Jun	Jul – Dec
Registration	▓										
Experiment setup		▓									
Sample collection			▓			▓	▓				
Sample (full) analysis				▓	▓		▓	▓			
Data analysis								▓	▓		
Thesis write up and correction									▓	▓	
Thesis submission and defense											▓

BUDGET

	Item/activity	Unit cost	Quantity	Total cost
1.	Tuition fees	160000/year	3 years	480,000
2.	Subsistence allowance	50000/month	36 months	1,800,000
3.	Assorted research materials			300,000
4.	Sample Analysis			800,000
5.	Field work and sample collection			400,000
6.	Thesis preparation and Production			100,000
	Total			**3,880,000**

THANK * * YOU