

Water, Sanitation and Hygiene in Temporary Settlements of Farmers in the Kilombero Floodplain, Tanzania

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Introduction

Tanzania is not on track to meet the Millenium Development Goals (MDG) targets. In rural area s only 49% of the population have access to improved water sources and 7% have access to improved sanitation. 17% still practise open defecation. In the Kilombero flood plain, many farmers move to distant fields (*shamba*) during the growing seasons, where they stay in temporary housing. There is little information available on how the water and sanitation supply in the fields differ compared to the villages and if the prevalence of diarrhoeal diseases is affected by time spent living on the farms.

The objective of the study was to compare the water sources used, sanitation and hygiene practices in the villages and farms. The influence of water supply and sanitation coverage, on the diarrhoeal prevalence in both locations was analysed and the risk factors responsible for diarrhoea determined.

Table 1:
WASH situation and diarrhoea prevalence in the villages compared to the shambas

	Village	Shamba
Water sources used		
Boreholes with tank	47%	-----
Boreholes with hand pump	40%	10.9%
Water brought from home	----	5.9%
Open wells	16%	65.4%
River	4%	17.8%
Water use per person and day	28.5 l	21.6 l
Using <7.5 l per person and day	1%	8.9%
Distance to water source	345 m	466 m
Water treatment rates	8%	3%
Improved sanitation	20%	1%
Open defecation	-	66.3%
Diarrhoea prevalence	8.9%	12.9%



Methods

1. Survey

- Rural agriculture practicing population, that cultivate a *shamba* and occasionally stays there overnight => Recruitment questions
- 101 households interviewed at their main place of residence and in the *shambas*
- Villages along the road from Lumemo to Miwangani

2. Water quality tests

- Samples were taken from storage containers in the *shambas*
- Faecal contamination: *Escherichia coli* as indicator organism

3. Sanitary Survey

- Assessment of water sources with respect to possible risk of faecal contamination
- Risk of contamination based on 11 criterions

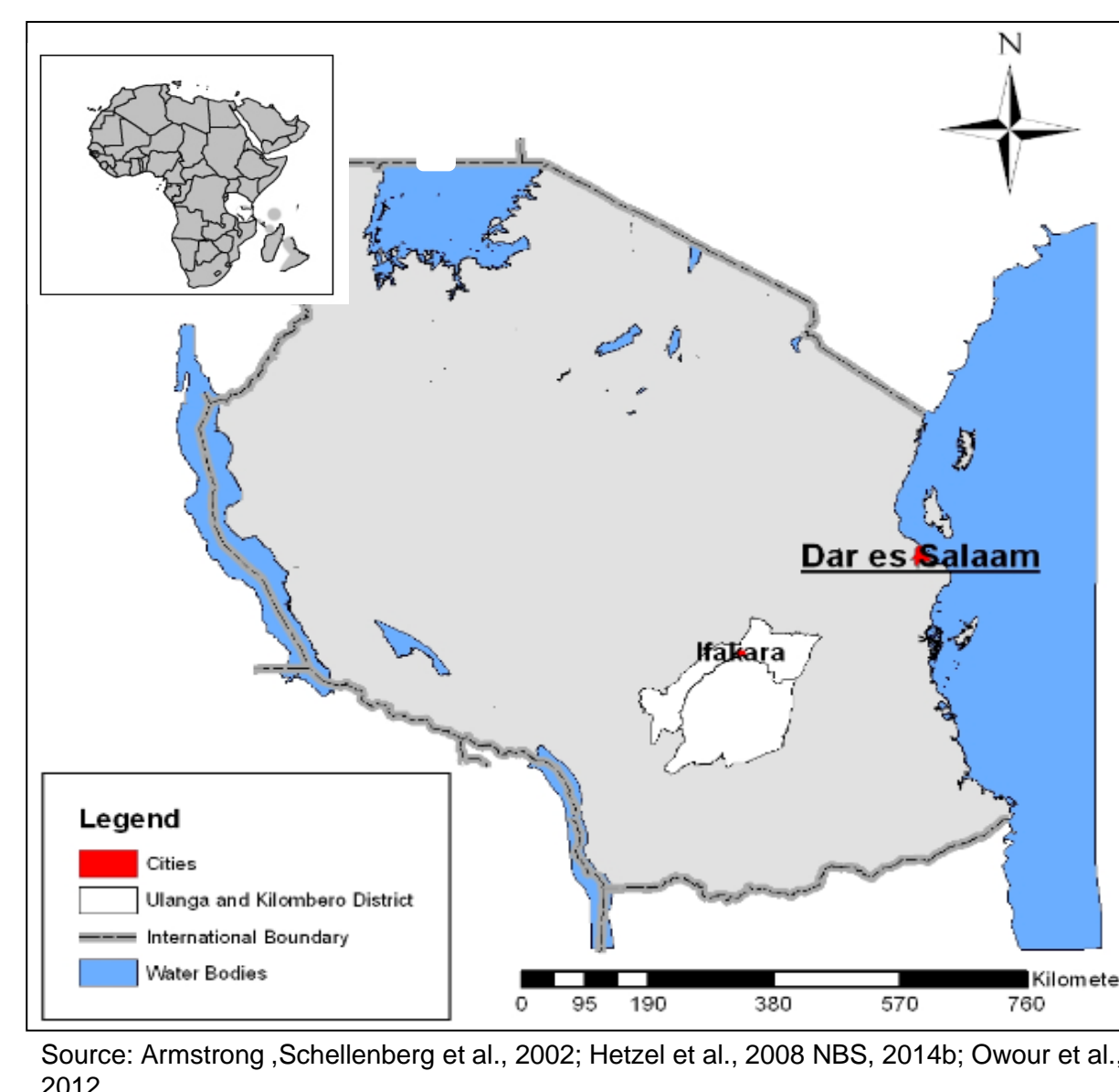


Fig 1: Map of study area (top)
Fig 2: Location of villages and shambas

Shamba (Field) Characteristics

Distance to main house (average): 16.94 km
Time needed (average): 122 min
Farm sizes (average): 3.12 ha
Crops: Rice, maize, vegetables, potatoes, peanuts

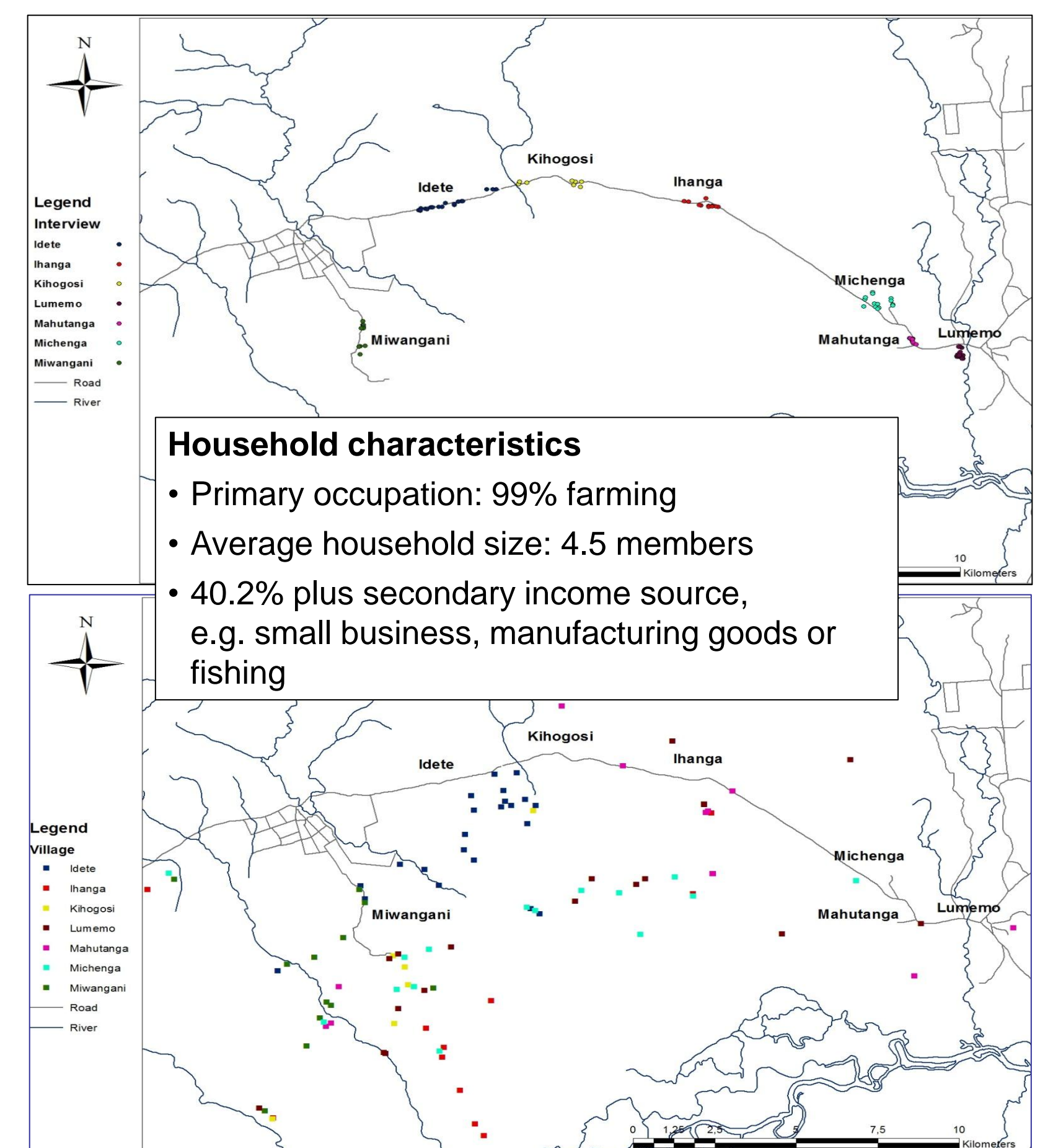


Table 2:
Factors affecting the Relative Risk for diarrhoeal diseases in the vilages and the shambas

Village	Relative Risk	p-value	Comment
Sharing a toilet	5.1	0.032	Very high compared to 1.44 (odds) (Heijnen et al., 2014)
No soap in the toilet	1.15	0.06	All diarrhoea cases did not have soap close to toilet, low compared to a 48% risk reduction (Cairncross et al., 2010)
Use of improved source	0.218	0.026	Very high compared to 11% risk reduction (Wolf et al., 2014)
Shamba			
Using <7.5 litres per person and day	4.429	0.037	
Pit latrine without slab or open hole	4.013	0.031	6 out of 10 households that reported diarrhoea used this sanitation types
Practicing open defecation	0.249	0.031	2 out of 10 households that reported diarrhoea practiced open defecation

Results

- 95% spent the preceding night in the *shamba*; 8.8 nights during the last two weeks
- On average 54 nights spent during the last year
- Predominant months: February, March and May, June
- Is there any soap available? Yes: 52%, No: 48%

- Only samples that originated from boreholes conformed to WHO norms or had a low risk to human health

- Boreholes provided, on average, significantly better water quality than open wells and rivers; there was no difference between rivers and open wells

WHO classification	Boreholes (n=11)	River (n=14)	Open wells (n=36)
Conformity (<i>E. coli</i> =0)	1	0	0
Low risk (<i>E. coli</i> <10)	2	0	0
Intermediate risk (<i>E. coli</i> 10 – 100)	4	4	3
High Risk (<i>E. coli</i> 101 – 1,000)	3	7	20
Very high (<i>E. coli</i> > 1,000)	1	3	13

Conclusion

- Water sources and sanitation in use and less water availability indicate negative health consequences of dwelling in the shambas
- Consumed water in the shambas is in general not safe
- The main water sources in the shambas (open wells) have a higher associated risk than the main used sources in the village (boreholes)
- Sanitary surveys are not able to predict the water quality in storage containers and might not be useful for source in areas with a low population density
- Hygiene practices in the shambas, lack of soap and lower water quantities available for hygiene, negatively influence the health

Conclusion

- Diarrhoeal prevalence of farmers that stayed at least 7 nights in the shamba is higher than in the villages,
- Open defecation, the common sanitation practice in the shambas, has no negative effect for farmers
- Accurate estimates with regard to water supply and sanitation coverage in the region can only be made, if the situation in the *shambas* is considered.

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