

MOBILE SANITATION FOR SLUM AREAS IN CAPE TOWN, SOUTH AFRICA. EMERGENCY SERVICES

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The case of Cape Town, South Africa

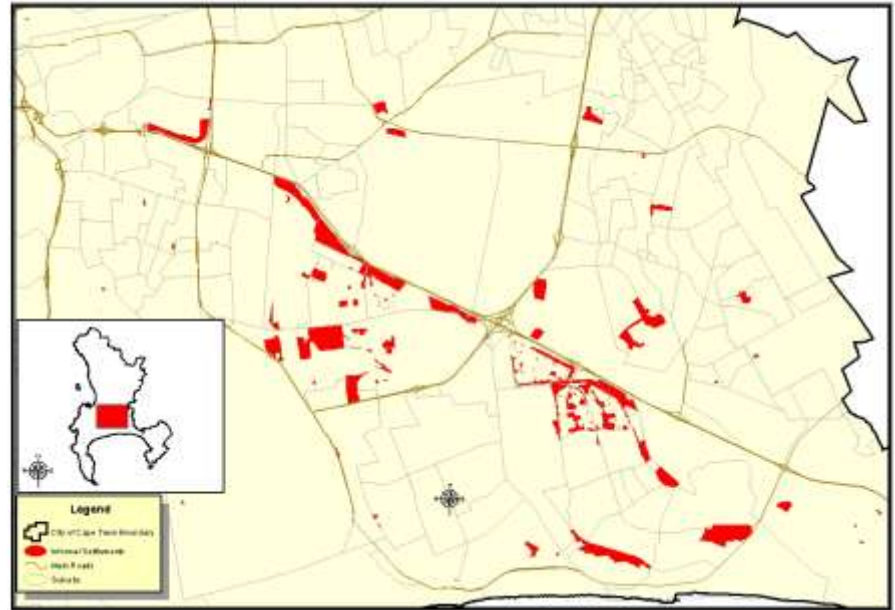
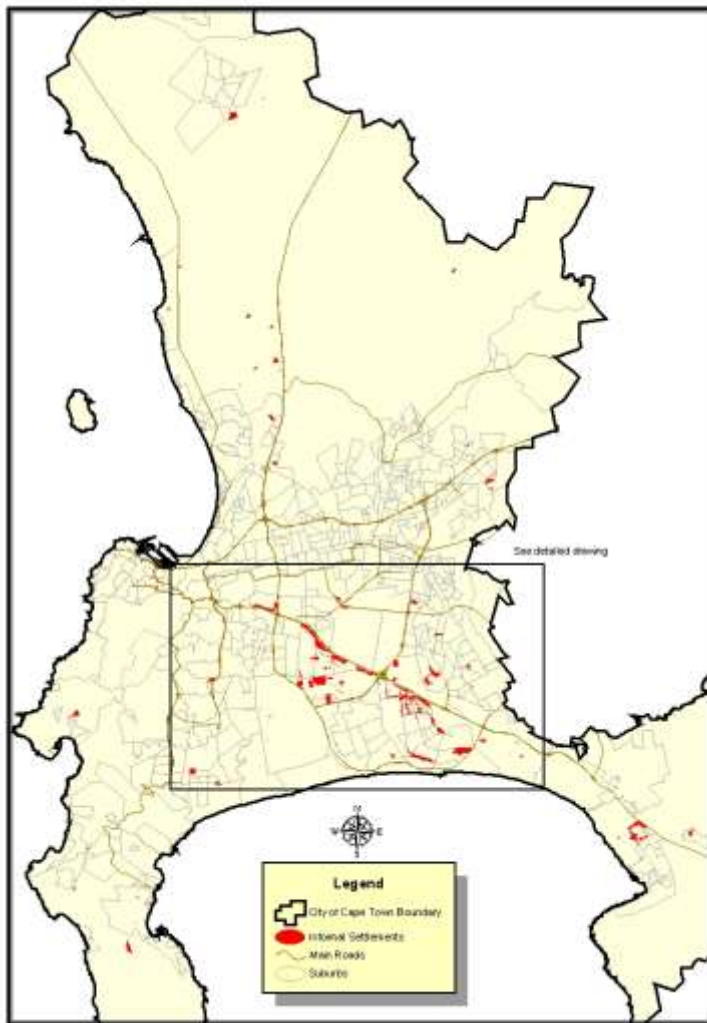


Informal settlements in Cape Town

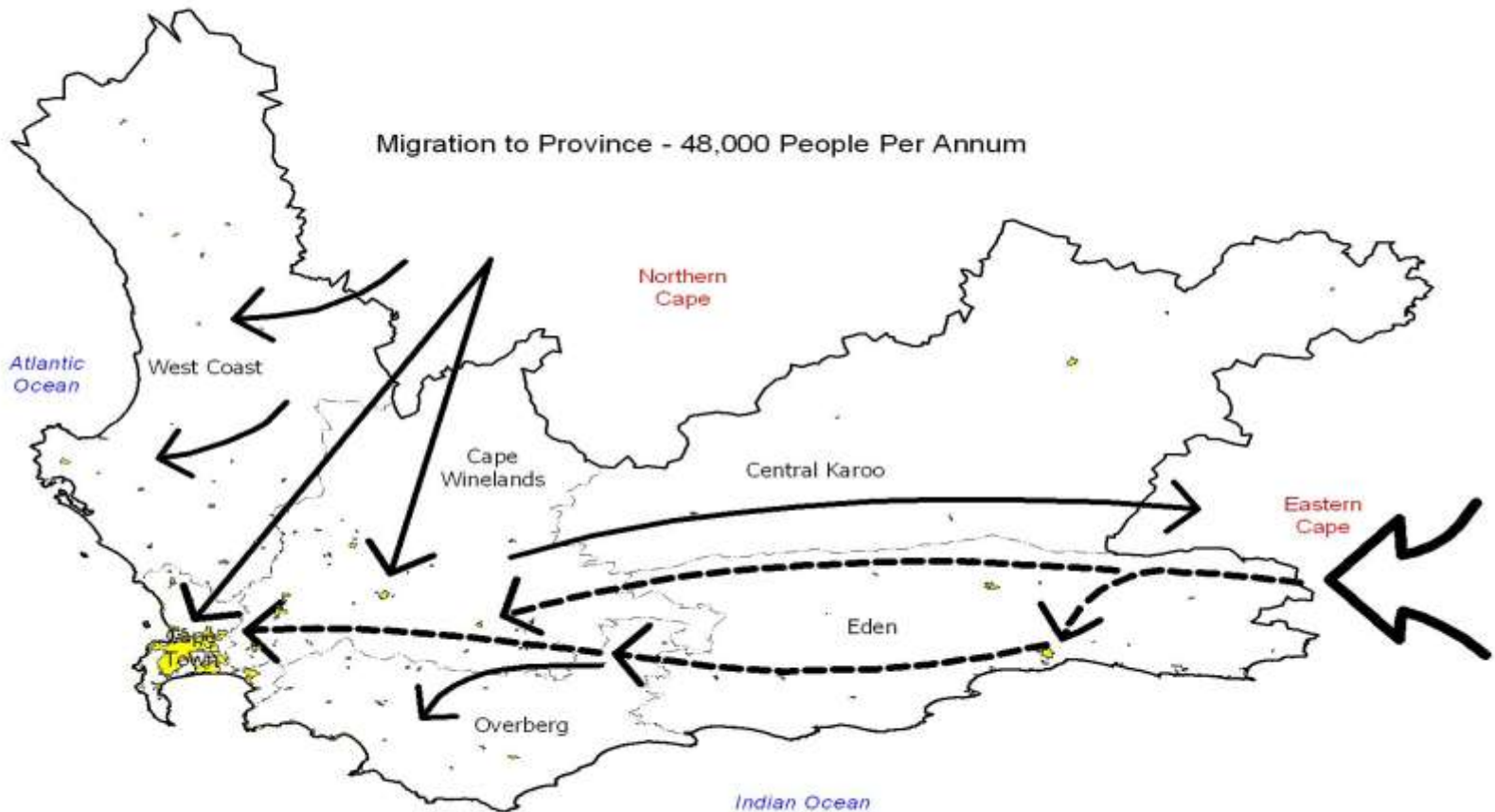
- About 3 million 'formal' citizens
- About 0.9 million people in informal settlements
- Water Services Department takes responsibility to provide water and sanitation to informal settlements



Informal Settlements



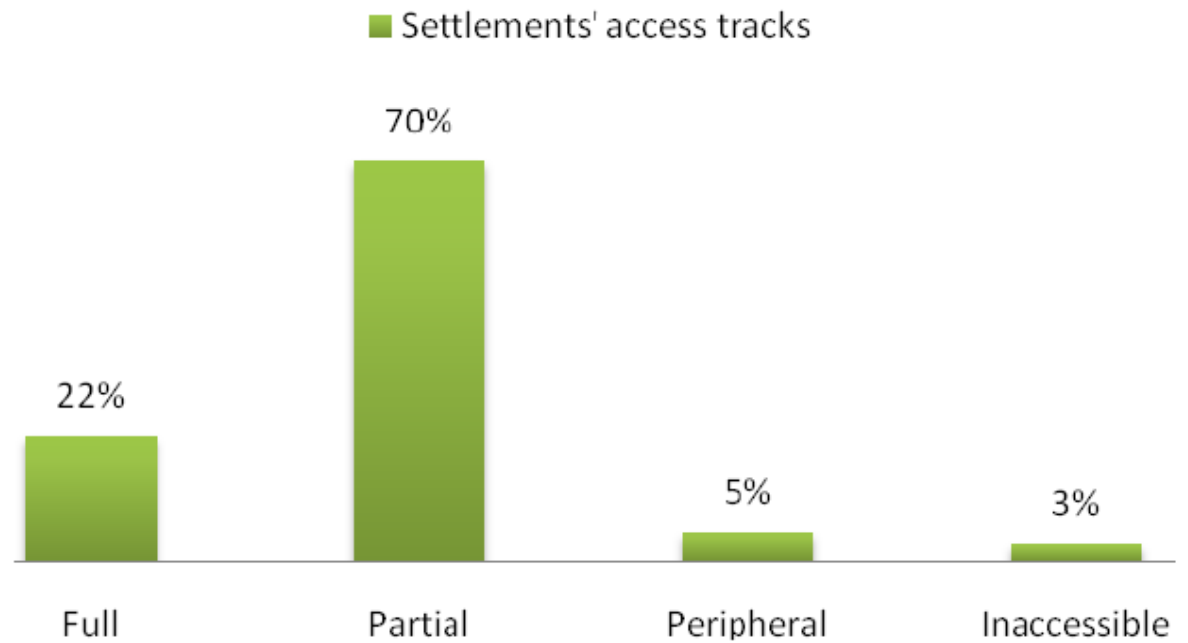
Number of informal dwelling units (1993-2005)



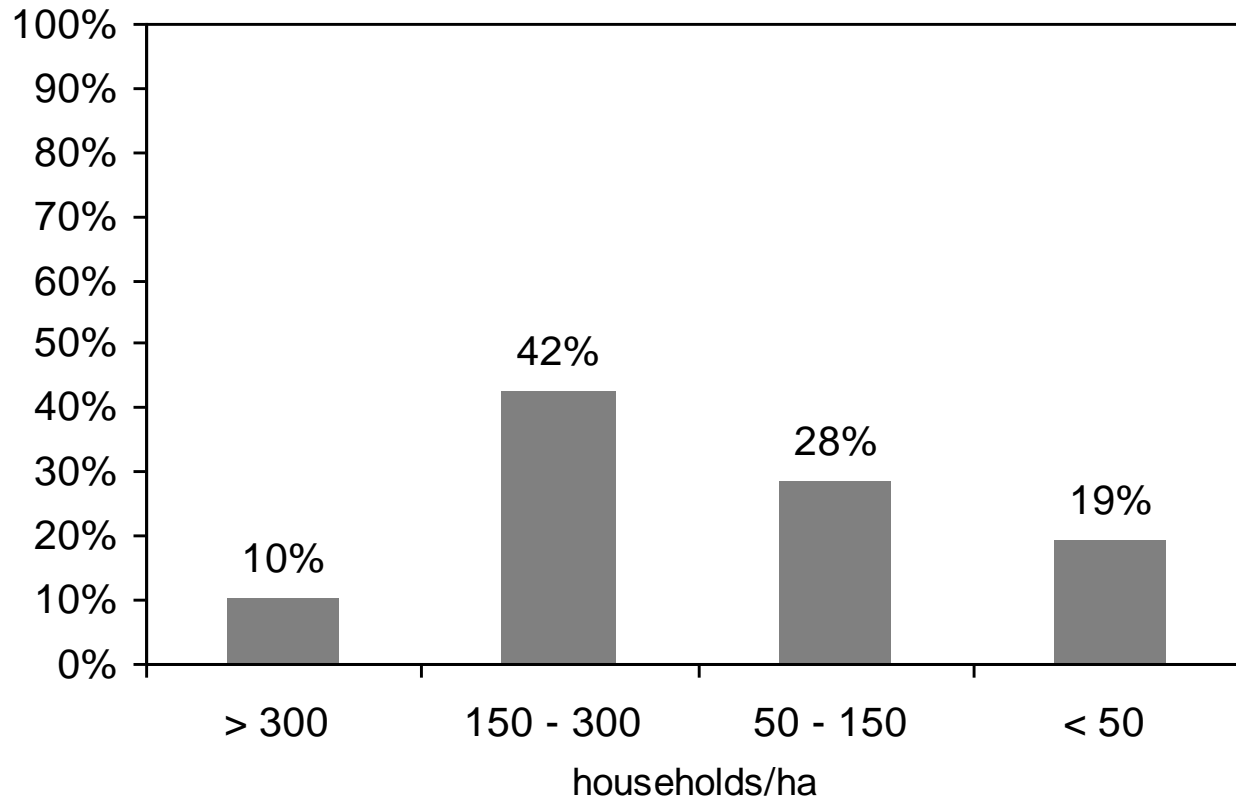
Settlements Lay-out



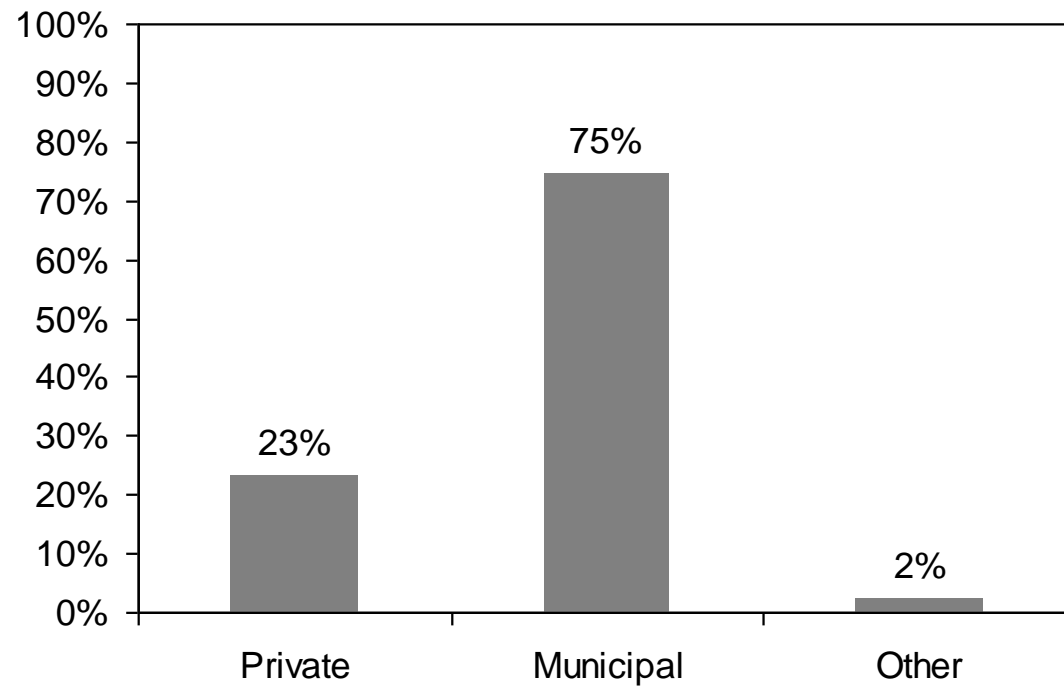
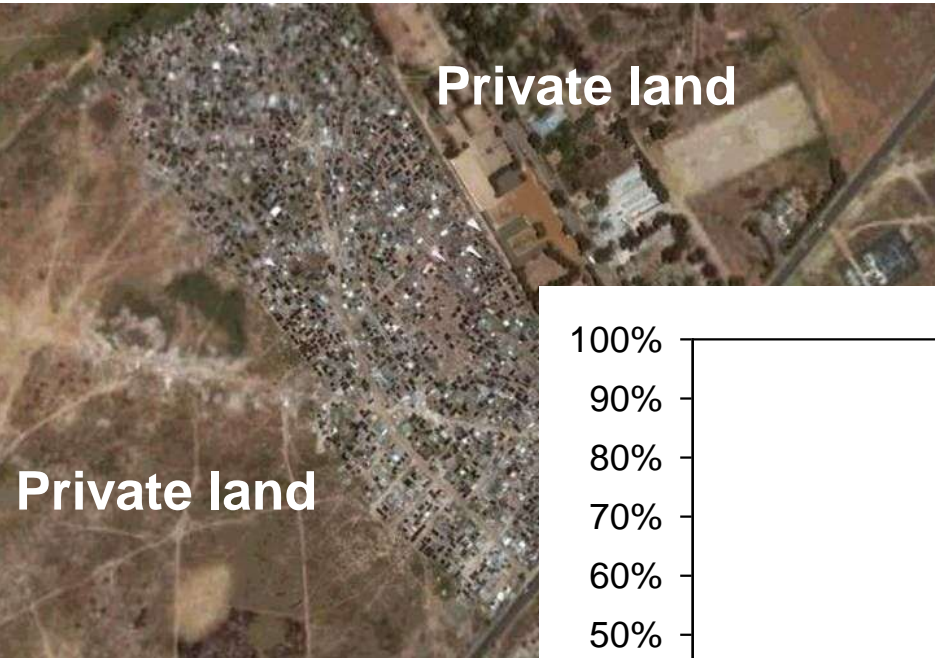
Land Accessibility



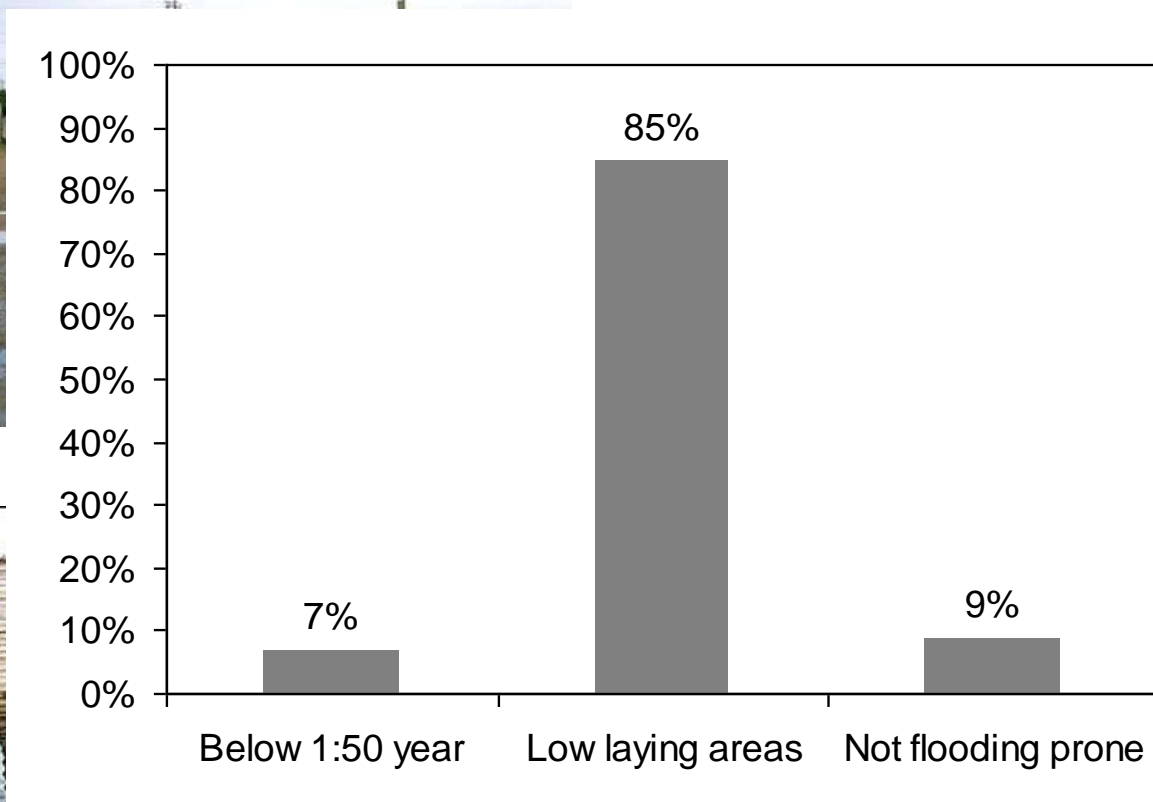
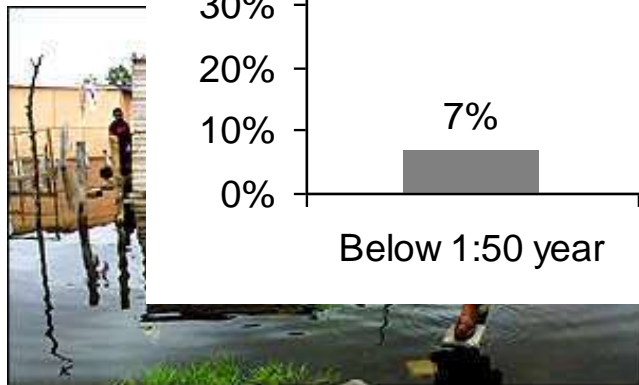
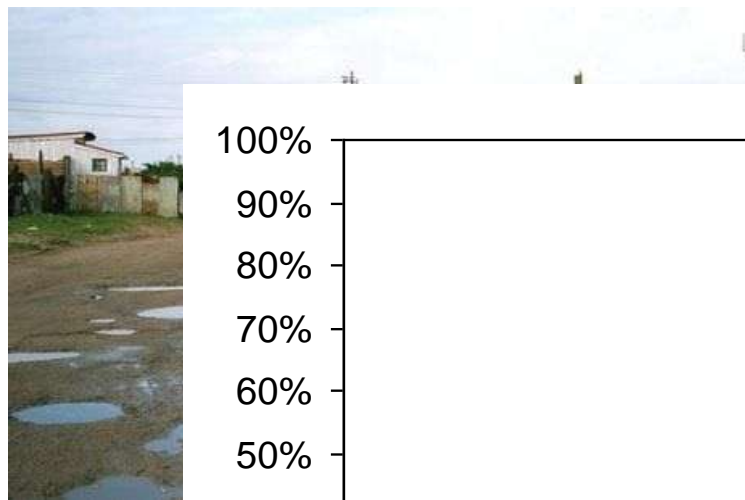
Housing density



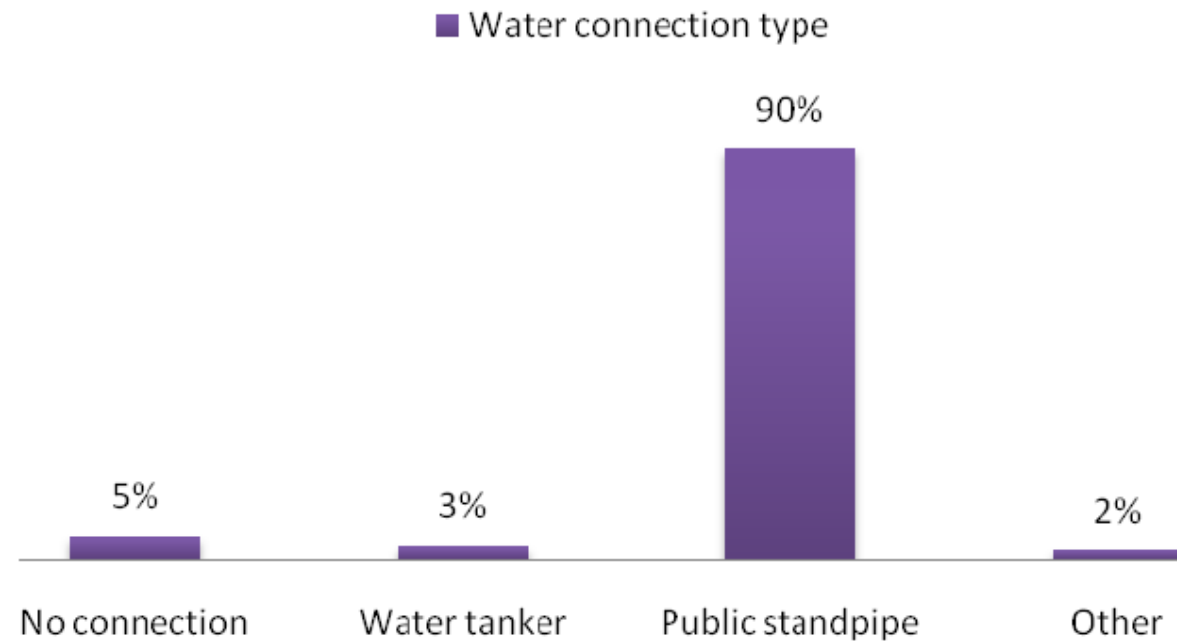
Land ownership



Flooding prone areas

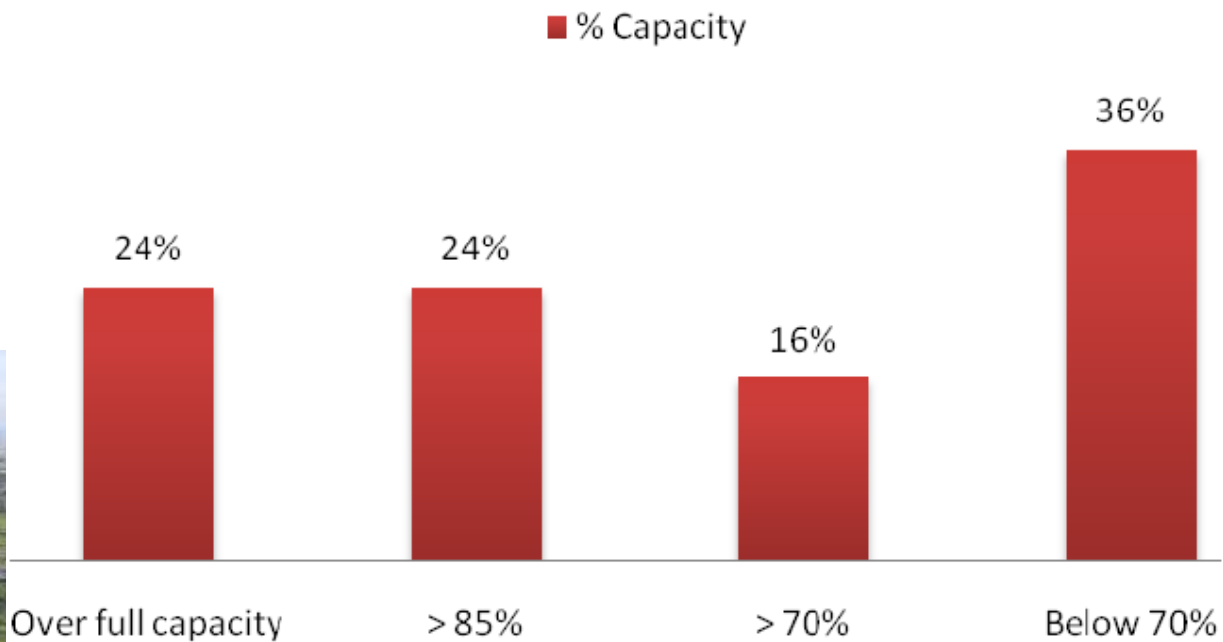


Water supply availability





WWTW Capacity



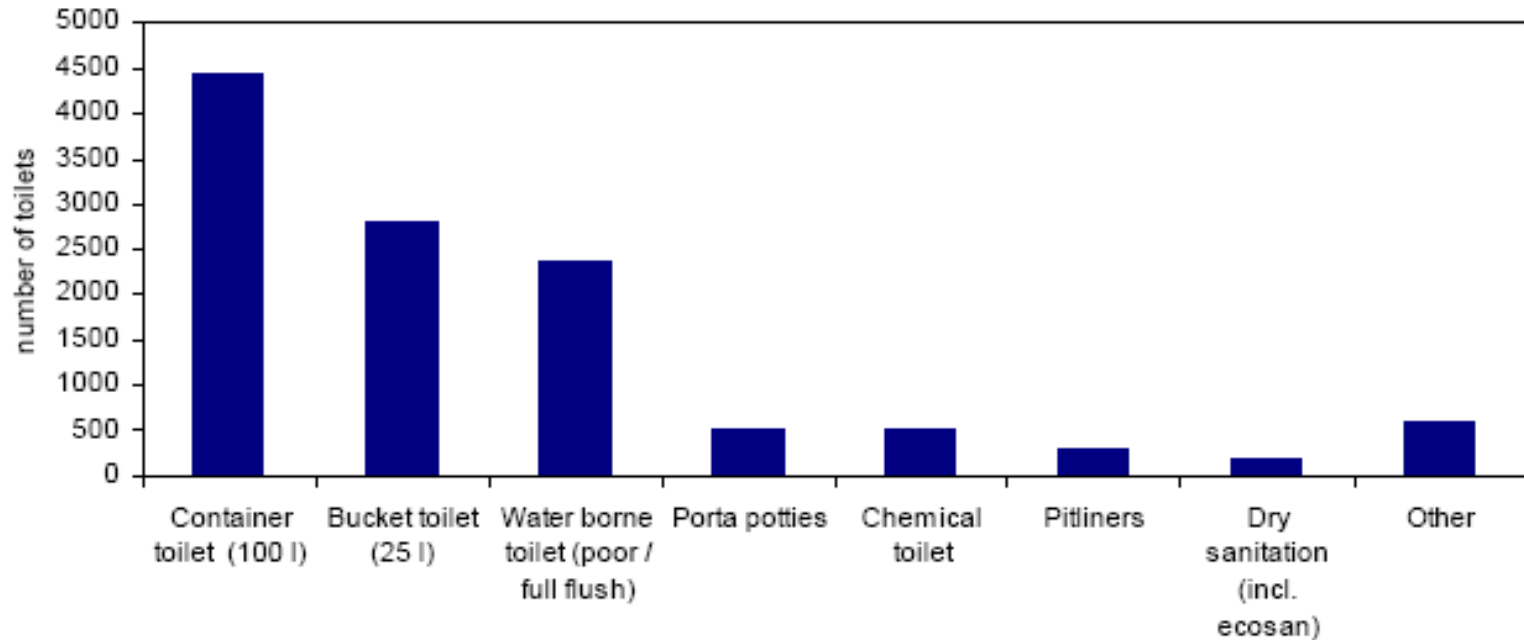
Anal Cleansing Method



Hard or Bulky materials



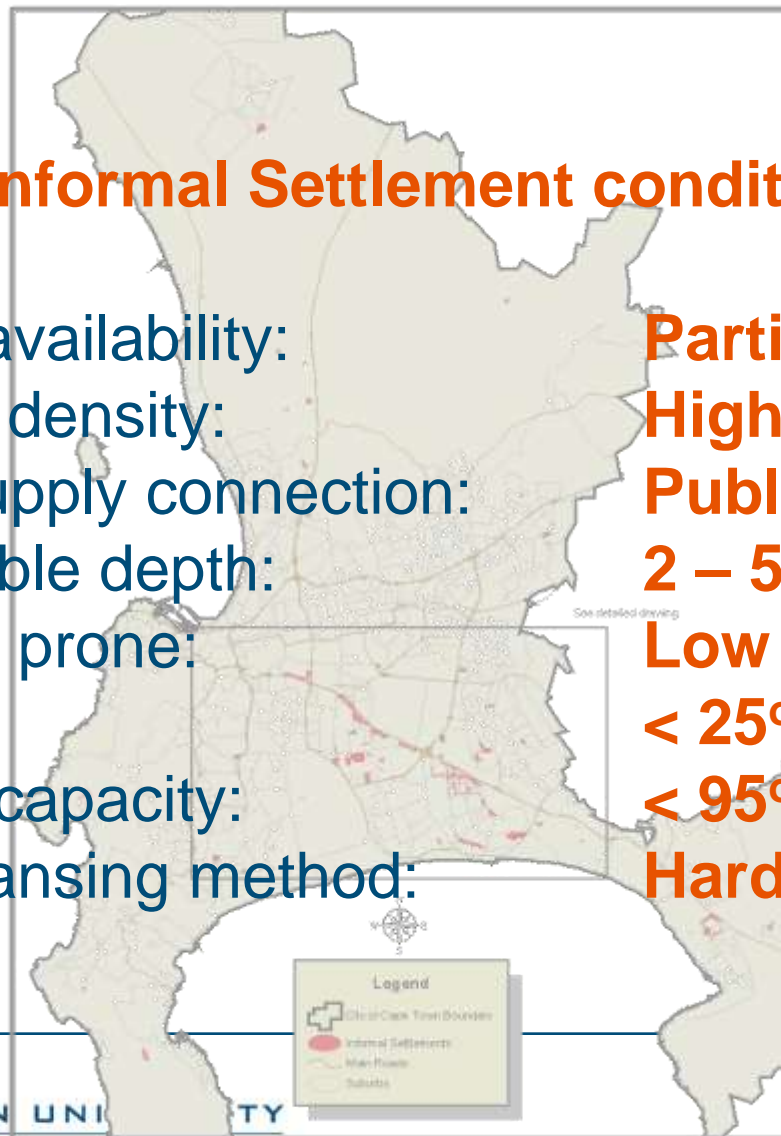
Sanitation Availability



Evaluation

Common Informal Settlement conditions:

- Access availability: **Partial**
- Housing density: **High**
- Water supply connection: **Public standpipe**
- Water table depth: **2 – 5 meters**
- Flooding prone: **Low laying area**
- Slope: **< 25°**
- WWTW capacity: **< 95°**
- Anal cleansing method: **Hard or bulky**



Evaluation

		Settlement Aspects from Database								Technical Feasibility	
		Partial	High	Communal standpipe	2 - 5m	Loam/Sand	Low laying areas	< 25	< 95		hard or bulky materials
		Access Tracks	Density	Water supply	Water table depth	Soil type	Flooding prone	Slope	WWTW Capacity (%)		Anal cleansing method
1	Container + Manual emptying + WWTW										Feasible
2	Chemical + Mechanical emptying + WWTW										Feasible
3	VIP + Mechanical emptying + WWTW										Unfeasible
4	VIDP + Manual emptying + Reuse										Unfeasible
5	Composting/Urine diversion + Manual emptying + Faecal matter composting + Urine drainage/reuse										Unfeasible
6	Double Composting/Urine diversion + Manual emptying + Faecal matter composting + Urine reuse/reuse										Unfeasible
7	Pour-flush + Lined Pit + Mechanical emptying + WWTW										Unfeasible
8	Pour-flush + Aquaprivy + Soakaway + Mechanical emptying + WWTW (sludge)										Unfeasible
9	Pour-flush + Conservancy Tank + Mechanical emptying + WWTW										Unfeasible
10	NOWAC + Anaerobic upflow filter + Soakaway + Mechanical emptying (sand)										Unfeasible
11	Full flush + Conventional sewer + WWTW										Unfeasible
12	Full flush + Septic Tank + Small bore sewer + (Conventional sewer) + WWTW + Mechanical emptying										Unfeasible
13	Full-flush + Septic Tank + Soakaway + Mechanical emptying + WWTW (sludge)										Unfeasible
14	Low-flush + Shallow sewer + (Conventional sewer) + WWTW										Unfeasible

Conclusions

- ❑ **Housing density** is a major limitation for the suitable performance of most of the sanitation options included in the system.
- ❑ **Cleansing methods** play a strong role in this example, being the only aspect limiting the suitability of conventional and shallow sewerage.
- ❑ In highly dense settlements as well as where land comprises some type of restriction **public facilities**, provided with proper and well organised maintenance could **allow for better sanitation services**.
- ❑ **Lack of alternatives** to provide sanitation for temporary settlements or under uncertain situation.

Barriers to the implementation of Sanitation Systems

- Rapid urbanization, population growth, strong migration patterns and increasing water demand
- Increasing shortage of water resources
- Settlements' ambiguous socio-economic conditions
- Irregular, unplanned and complex site lay-outs
- Unsuitable grounds, uncertain situation of the settlements and lack of land tenure
- Ageing, corroding and leaking water and wastewater infrastructure
- Overloaded wastewater treatment works and poor effluent quality
- Insufficient Capital and Operational budget
- **Difficulty to find appropriate sanitation solutions**

Pilot project


Mobile Sanitation Facility for the Informal Settlements in Cape Town

MobiSan®



CITY OF CAPE TOWN | ISIXEKO SASAKAPA | STAD KAAPSTAD



Landustrie 



Background

- ❑ **Innovation & demonstration project 80% financed by Partners for Water**

- ❑ **Partnership between:**

- ❑ **Consortium:**
 - ❑ W.S.Department Cape Town: beneficiary and local provider
 - ❑ Landustrie Sneek: project leader and constructor
 - ❑ Vitens-Evides International: local network and experience
 - ❑ LeAF: knowledge, network and advise

Pilot site (Pook Se Bos)



3

PLEASANT

TEEN

MOUNTAIN

Pilot site (Pook Se Bos)

- ❑ **Land ownership:** Private
- ❑ **Population size:** 125 dwellings
- ❑ **Area:** 1.25 ha
- ❑ **Population density:** 100 du/ha
- ❑ **Water supply:** standpipe Number: 3 Ratio: 42 du/standpipe
- ❑ **Sanitation system:** Container Number: 34 Ratio: 4 du/toilet
- ❑ **Sewer availability:** No
- ❑ **Solid waste:** Yes **Electricity:** No
- ❑ **Service:** Emergency
- ❑ **Flooding Prone:** Low laying area

Existing situation



Existing situation



Existing situation



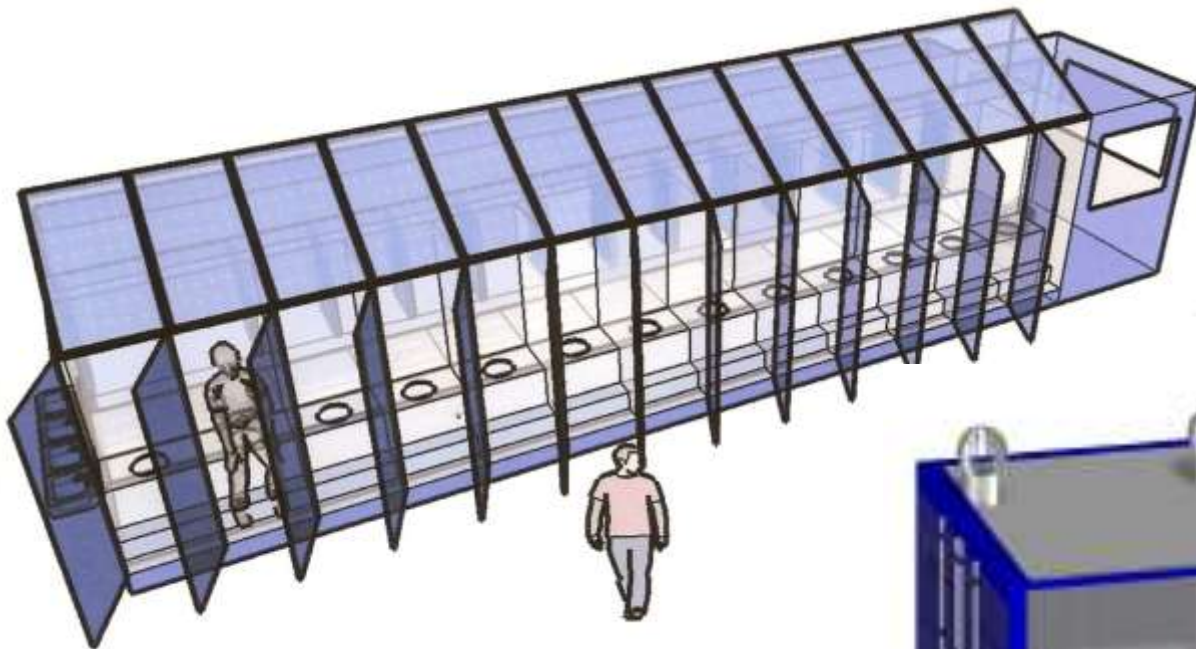
Existing situation



Objective demonstration project (2008-2009)

- ❑ **Provide an alternative sanitation solution**
- ❑ **Packed and functional**
- ❑ **Matching the characteristics of the informal settlements:**
 - ❑ Temporary, dynamic, emergency services or unsuitable land
 - ❑ Not dependent on sewer networks, water supply, electricity, groundwater table, type of soil or cleansing materials
- ❑ **Provide a Basic Sanitation Facility to serve approximately 500 people**
- ❑ **Low operation and maintenance requirements**
- ❑ **Competitive price and costs with existing sanitation options**

MobiSan unit under construction



showers)

er:

- ❑ Emptying service required once every 24 hours
- ❑ Removal of urine once every 24 hours
- ❑ Care taker/shop room available
- ❑ 10-20% cheaper than current units



MobiSan Test Unit



Presented in the Sanitation Challenge International Conference 19-21 May in Wageningen, The Netherlands

MobiSan Test Unit



Improving water supply and sanitation for a better life !!



Thanks for your attention

