



# Cape Town: Sanitation project

## Current challenges / Possible solutions

## Executive Summary

This narrative is the result of 3 months of “on line” (off the field) research about sanitation issues which might exist at the bottom of the pyramid (Slums in India, Favelas in Brazil, townships in South Africa, technical solutions for sanitation services), followed by a one-week on the ground experience during which we interviewed several stakeholders to better understand the current situation of sanitation services in Cape Town townships.

Our “on line” research focused mostly on identifying the nature of the issue which was analyzed using different angles:

- Sanitation services scope: beyond the sole defecation, hygiene, drinkable water access, sewages and grey/dark water treatment,
- Sanitation and health concerns,
- Sanitation and human dignity concerns,
- Sanitation: economy and technology,

Which provided us with a sense of the complexity of the sanitation services provisioning and delivery.

However, this remote envisioning of the sanitation services issue was far from being complete as we quickly discovered from the field exposure in Cape Town.

Maybe, unlike any other place in the world, Cape Town crystallizes several other complexity layers

inherited from recent history of the Apartheid:

- Politics (Democratic Alliance in charge of the town and Province, African National Congress “in charge” of townships),
- Governance structure and lack of integration between nationwide institutions down to ward council and street committees within townships,
- Constitutional promised land rhetoric and absence of any incentive for private initiative,

All these dimensions being interdependent with the others, creating a full mesh dependency network which is quite “confusing” and possibly inhibiting for anyone who would try to solve the issue.

However, despite this multilayered complexity, we tried to identify some principles, some transformational initiatives which could help to structure the reflection about the sanitation issue, by exceeding a narrow-minded envisioning of the issue and proposing a framework embracing housing, urbanism, city planning concepts as well as a programmatic approach based on experimentation to change the game in the sanitation services for Cape Town and South Africa.



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# INTRODUCTION

## Context

Within the class of Entrepreneurship Opportunities in Emerging Economies of Pr Angus Kingon, we selected the « Sanitation in informal housing » subject, as we felt this subject was complex, had deep impact of the daily life on people within townships, and that technical solutions did exist which could be applied in that specific context.

We have been asked to review the products which were available worldwide, do research about other area experiences such as « slums » in India or « favelas » in Brazil, determine which may be appropriate in the particular context of townships of the Cape Town area, and eventually propose an inclusive business model for the supply and distribution of these products.

## But what is sanitation about ? What is the actual issue of sanitation within the Cape Town townships ?

General Household Survey 2010 (Stats SA), defines a “functioning basic sanitation facility” as a “flush toilet connected to a public sewerage system or septic tank or a pit latrine with ventilation pipe”. According to the survey, in 2010, 70% of households in South Africa have access to basic sanitation...However, more than 3 million households were using an unventilated pit latrine, a bucket system or had no toilet at all [2].

Although officially South Africa has achieved the

Millenium Development Goals for sanitation, local government faces problems in the implementation and protests analyzed by the University of Western Cape show complaints about the lack of access to clean water and adequate sanitation [2].

Especially, Khayelitsha (30km from Cape Town) population is about 800'000 people, 46 informal settlements have rather low access to water supply and sewerage despite the Constitution of the Republic of South Africa, in the Bill of Rights which states that **“everyone has the right to have access to adequate housing”**... what requires **“appropriate services such as the provision of water and the removal of sewage...”** [3].

So despite a strong commitment of the government, huge investments, ambitious plans (the target for universal access to basic sanitation of 2010 was

postponed to 2015 which is still very ambitious given the current state), there is still a huge access issue to basic sanitation services within Cape Town informal settlements.

## Is there a technical issue ?

Our online research has shown evidences of multiple workable solutions (from a technical perspective).

“ [...] the difficulty is not in providing flush toilets in slums. That bit is rather easy actually. **The difficulty is in connecting those toilets to the water, sewer and treatment plant infrastructure that make them work.** A conventional flush loo with no sewer is of little use to anyone... And to retrofit sewer systems into informal settlements is nearly impossible without displacing thousands of people [...]” [4].



[...] A systems approach to sanitation might start with function – **dignity, safety and health**. Then it might consider resource cycles: the water cycle, treatment demands, nutrient availability (and potential use), durability and privacy. It might demand a solution that is cyclical, as there is no ‘away’ for waste to be sent, and no resource to carry it there (being disconnected from conventional water infrastructure too). It might also consider input from all the stakeholders – professionals, entrepreneurs, citizens, health departments and civil society [...]” [4].

Last quote suggested that beyond the sole technical solution, a supportive ecosystem might be put in place, and that urbanism, and city planning was also at stake, possibly involving « Off Grid » solutions.

### Is there an economic issue ?

Our discussions with Reprocity (Cape Town consulting firm assisting us in our research) have shown that the township was not a « monolithic » reality but a broad spectrum of situations, ranging from the informal settlement shack (bottom of the pyramid) to the Reconstruction and Development Program (RDP) house which is formal and hosts middle class people within specific areas of the townships (see the lovely small houses on the picture, some with shacks in the backyard).

A trial conducted in Lesotho with Ventilated Improved Pit (VIP) latrines, showed that it could be built for ~\$400 US, and that 90% of people could finance it without subsidies. [5]



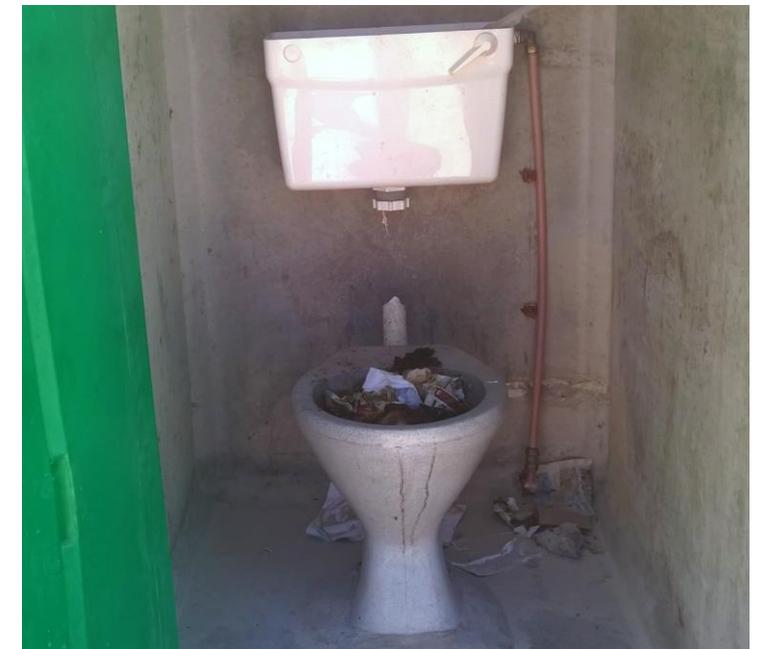
Compost toilets such as the “Crapper” [6] can be built within the township for less than \$100 as an “off-grid” solution.



So economic issue might be overcome with

appropriate solutions. **However, our group chose to focus on the “bottom of the pyramid”, i.e. the informal settlements** with very limited connection to the “fluid” grid (water supply, sewage connection...) for which the economic model is critical for wide adoption and sustainability.

Were the vandalism evidences found during our online research were the symptom of a grey economy for “parts” reselling (which relates to the economic issue) ? Or the symptom of a dissatisfaction of the population ? And if so, for which reasons ? Were there some ethnographic/cultural issues related to this behavior ?



## Is there an ethnographic issue ?

Obviously, as sanitation issue was definitely tied to **human dignity**, we expected to have a lot of ethnographic/cultural « issues » when dealing with sanitation access.

Among different thing, we identified security concerns especially for women based on our research on slums in India [7]. We were also questioning ourselves about the « sanitation ritual »: water/paper ? Sitting/squatting ? Intimacy and privacy ?



And above all... how could we approach these dimensions while visiting the townships with the appropriate distance and respect to inhabitants ? How could we develop the required intimacy with these people in one week time, so we can really understand their daily issues, pain points, feelings, and dreams ?

## Is there a service delivery issue ?

To comply with the constitution and to fulfil the promise made by the African National Congress (ANC) to the people of South Africa, public services invest a lot to generalize access to drinkable water (public tap) and to

sanitation. However, the “Poo War” demonstrates growing dissatisfaction of informal settlements people with regards to the sanitation services provided by the municipality [8]. We identified the need to interview the municipality, some sanitation services providers but also the Social Justice Coalition (SJC) [9] to better understand what was at stake, and whether there were options for improvement in sanitation services delivery.



On the municipality side, service delivery goes through private service providers/contractors, whether it is for deploying Mshengu chemical toilets (the blue ones) or to build block of flush toilets with connection to the « fluid grid » *i.e.* drinkable water and sewages.

Eventually this relates to budget forecasts and program management. Given the informal nature of the settlements at the Bottom Of the Pyramid, it is by essence very hard to plan for their needs.

We asked our Navigator M. Tobela Thembani why the site we were visiting in Khayelitsha (meaning “new home” in Xhosa) was named « France ». He told us it was because it was created during the Soccer World Cup in 1998 when France won the cup (and not the Soccer Word Cup in 2010 when the French Team was

on strike in their bus in South Africa). This means that a huge number of people built their shacks within a few weeks (sometimes it even takes a few days) in an empty sandy place, with neither coordination with public services nor planning to provide them basic services such as (sanitations and public water taps). And then, the municipality has to comply with the housing constitutional laws, while budgets are already defined mostly for formal settlements. Khayelitsha average population density is ~10'000 inhabitants/km<sup>2</sup> (with no storey buildings) and it is 43 km<sup>2</sup> wide [14]. Khayelitsha is one of the largest township in South Africa (~500'000 to ~800'000 inhabitants).

## What about city planning then ?

The authorities created Khayelitsha in response to the immense pressures for some kind of home from migrants moving to the Cape and from those forced out of Crossroads (near the international airport of Cape Town). Initially planned as four towns of 30,000 people with 4150 serviced plots (water and toilet) and 13,000 rented small block-built houses by 1990 the population had mushroomed to 450,000. Unemployment was 80% and 86% of the population lived in serviced or unserviced informal dwellings. Pressures on Khayelitsha only grew after the 1994 election of an ANC government as influx controls were abolished. Khayelitsha had a population of 406,000 in 2005, of whom 40% were under 19 years of age [14]. Hopefully, dark days of the Apartheid are off and people can move freely (influx controls are abolished), but then the rich Western Cape region attracts lots of migrant from the Eastern Cape rural areas and from other provinces in South Africa.



*Service Plots for temporary relocation area at Delft 34kms north east of Cape Town [14]*

South African poverty has a strong rural bias: the main income sources of the rural homeland population are wages (often earned in urban area) 52%, social transfers (18%) and remittances (14%). « *The force of migration is probably the most neglected dynamic in South Africa's social policy. Few factors have done more to change the context of opportunity for the poor, yet little is known about how people move from place to place* » [15]. **This migration dynamic (+48'000 per annum [19]) is yet to be understood and taken into account for proper city planning.**

### **What are the possible health issues (of the lack of access to sanitation services) ?**

Clearly, given these water and sanitation conditions, health risks are everywhere. 'Water supply, sanitation and health

are closely related,' states the World Bank website. 'Poor hygiene, inadequate quantities and quality of drinking water, and lack of sanitation facilities cause millions of the world's poorest people to die from preventable diseases each year. Women and children are the main victims.'

Lack of access to basic sanitation services force people to release themselves in their close environment (see appendix 4). Issue is that human excreta also contain pathogens causing infectious diseases (cholera, hepatitis, typhoid, schistosomiasis, diarrhea) through fecal/oral contamination. Helminthes (worm parasites) cause gastrointestinal infections that make up part of the excreta-related global health burden [17]. One third of the world population has intestinal worms. The loss of blood from human hookworm leads to iron-deficiency anemia and protein malnutrition. The discharge of untreated sewage into water resources provides a vector for pathogens capable of sickening humans and animals. This is somehow limited in the context of Cape Town as drinkable water found at public tap come a long way (mostly mountain lakes) to the water treatment plant.

### **So what is the genuine issue with sanitation ?**

Following our online research period, it appeared that the sanitation issue was far more complex than initially estimated. As stated above, **we chose to focus on sanitation service access issue for informal settlement people at the bottom of the pyramid within the townships.**

A lot of very smart people including scientists, engineers, rich philanthropists tried to address the

issue mostly from a technical perspective. As the issue is still around, it reinforced our intuition about the fact that the sanitation issue was beyond the sole technical dimension.

A lot of Non-Governmental Organizations (NGO) also tried to address the issue, and while they have been successful at local scale, it seems there are still scalability issues when moving from the pilot phase to the generalization phase. What is missing for scalability ?

Eventually the South Africa government, provinces, municipalities and districts spend quite a lot of money to comply with their unique constitution, but the issue is still very significant. Is there any broader issue behind such as demographic dynamic ? Political/institutional efficiency ?

**Our online research raised more questions that it answered, and it was time for us to confront the reality from the ground, to better understand the dynamic of these complex problem, to map its dependencies to identify some major principles/patterns to mark out possible ways to address it more efficiently in the future, and feed the innovation funnel for next cohorts of the IE Brown Executive MBA.**





## Methodology

### On-line research to scope the issue

As first, our on-line research focused on technical solution which could be appropriate for the context of the Bottom of the Pyramid (BoP) within informal settlements in Cape Town.

But soon, we enlarged our research to concepts such as « human dignity », « security », « constitutional rights », ultimately leading to concepts such as « city planning », « off-grid solutions », « sustainability ».

We were critically aware that all preparatory research and calls with [Reciprocity](#) (M. Pierre Coetzer) in Cape Town would not be enough to familiarize and give us a complete view of the problem. We also needed the perspective of the people involved, especially, the residents at the township. There was a set of ethnographic invisible – their understanding, their pains, their expectations... that we would need to explore and learn about South African culture, recent history, politics, etc. We were both anxious and excited about all that was to come and the upcoming learning opportunities. We also wanted to confront our vision of the sanitation service access issue for the BoP to the vision of different stakeholders.

In order to maximize our learning experience in Cape Town, we identified Key Informants (in the ethnographic meaning) which could provide us with critical insights to better understand the problem. Thank to our wonderful partner in Cape Town, [Reciprocity](#) (M. Pierre Coetzer did a fantastic job), we were able to efficiently schedule appropriate meetings withing a very short time.



### Stakeholders ‘ selection for interviews

To build a broader view of the complex interconnections between race and inequality with the problems of sanitation and housing, we tried to be attentive to different perspectives. We focused most of our interviews in Khayelitsha Township – France area, where we first met a group of pretty young people, all in their early twenties, most of them formally unemployed, living in an informal settlement or recently moved to a RDP house. We also talked to householders and kids in another settlement trying to capture some of their impressions as well. Additionally, we talked to a street committee representative (a local

facilitator recognized and chosen by his community within the informal settlements).

To complete the perspectives of the township residents, we interviewed NGO’s representatives, some of them also inhabitants of informal settlements. ‘On the other side of the table’, we talked to representatives of the City of Cape Town’s Reticulation Department (the unit in charge of water and sewage grids) and to contractors, currently providing their toilet systems at Khayelitsha, or were interested in doing so. Eventually, to complete our list of interviewees, we talked to academia, in the person of the UCT representative for the African Centre for Cities, Pr. Edgar Pieterse.

Except from the chemical toilets provider that came to see us at our site at UCT Business School, we were the ones visiting. We met them in the streets of their informal settlements, we visited their houses, the offices of the NGOs, of the African Centre in University of Cape Town and of the Reticulation Unit.

List can be found on appendix 1.

### Interview Methodology

We wanted people to feel comfortable but there were challenges towards this objective. For starters, we are a group of foreign, all caucasian, Exec MBA students, clearly from a different social class, walking over their communities, entering their houses and even more difficult, talking about their toilets and sanitation habits which was making us felt quite awkward. How could we make ourselves less strange or more familiar to them?

## Methodology

We progressively opted for a semi-structured interview. Hopefully due to the very good preparation done by M. Pierre Coetzer and M. Tobela Themrani our so precious « Navigator » (both from Reciprocity) who was very instrumental for developing relationships quickly and putting us into a position to pose hard questions, we asked a short series of questions such as:

- How would you state the problem of sanitation?
- What is your evaluation of the current solutions (temporary different solutions of toilets in informal settlements, RDP housings...)?
- What is your perception on the level of satisfaction from informal settlement residents? What are the main issues?
- What other solutions have been tried, which failed or are newly being considered? (dry toilets, housing improvement programs etc)
- What are the challenges in the relationships with communities/city representatives/NGOs? How do you engage with them?
- How do you think it would be possible to create more ownership of sanitation solutions from the side of the households?
- What is the process followed while implementing solutions? How do you decide which area to work, which families to contemplate? How do you communicate with other parties?
- What are the plans regards the implementation of



new backbones of grid and regards the operations of sanitation services? (Specific to Cape City representatives)

- What is your view on a possible program to formalize existing settlements into structured plots with their respective property deeds? (as an alternative to the RDP program)
- How could a program involving basic infrastructure, vouchers for materials and training could help improve upgrade the actual shacks? What would we need to make it viable?

These questions were followed (as much as we could, and we did improve during our stay in Cape Town), by our careful and active listening to answers made. Often the answer moment was less structured as basically our opened question triggered something broader.

In order to develop a 'clearer picture' in our minds, using what we have seen and listened to, we took notes and pictures individually. At the end of every field trip, we shared our findings in the group. Comparing to the experience of making participant observation individually, this sharing of information was very important, because it gave us the opportunity to find common notes, common perceptions and highlight underlying patterns, which in turn helped a lot in terms of improving our understanding of the effects of such conditions informal settlement people daily life.

Our participative observation of the different sub-groups of Capetonians helped us realize the complexity of the topic and that each sub-group had a completely different set of perspectives on race, poverty, sanitation and housing.

This analysis was done along three main dimensions:

- 1) The beliefs, expectations and attitudes of the township residents towards sanitation and housing;
- 2) The perspectives of city representatives and service providers;
- 3) The state of alignment and relationships between the subgroups and the interdependencies between their expectations and current perception of the sanitation access issue.

**Eventually, the complexity of the issue alienated our will to find a « one fits all solution », but rather we wanted to map this complexity, and identify patterns and principles to mark out possible « transformation programs » to address this issue.**



## Way Point #1

### **Problem to address:**

The informal settlement people (Bottom of the Pyramid) within Cape Town townships lack access to basic sanitation services despite the fact it is a constitutional right, and despite the fact the Government and public services investments to comply with the constitution and to provide sanitation services.

### **Objectives :**

Initially, as stated in the syllabus of the « Entrepreneurship Opportunities in Emerging Economies », the objective was to identify a technical solution which could fit the situation/constraints of Cape Town townships and be the foundation for an inclusive business development within the townships.

Discovering the complexity of this multi-dimensional « issue », we stepped back and tried to better understand and capture its every dimensions, tried to « map them » within a dependency network to eventually identify patterns and general principles to act upon it in a more efficient way. Our ambition is to provide a framework to better understand the complexity and scale of the issue, to mark out some program ideas for the following cohorts of the IE Brown Exec MBA, and to provide foundations for local private initiatives possibly catalyzed by Reciprocity.



## INTERVIEWS : People of the Khayelitsha – France site

*"We just want an average standard of living. Decent toilets, decent housing, decent jobs. We might live in these shacks, but we are just asking for those basics — security, safety, dignity. We're not asking for much."*

Accompanied by M. Tobela Thembani, we visited the Khayelitsha – France site in order to better understand informal settlement people daily life related to drinkable water and sanitation services access.



First contact with sanitation services was with the « porta porta » [see appendix 2].

MM. Joseph Lesibane, Batlokwa Lesibane and Anele Lesibane shared with us their experience of sanitation within Khayelitsha – Site France.

We could find in there mostly flush toilets on the borders on the side close to N2, a lot of « porta porta » (as shown above), and some bucket toilets (maintained by the Municipality through service providers). [See appendices 3 and 4].

Thank to them, our understanding of the sanitation services issues within informal settlements increased a lot during our visit on the first day.

### We listened

- « We want flush toilets, they are the best toilets »
- « Why is it not possible to have clean flush toilets just like those in Sea Point ? »
- « We don't want to pay for proper sanitation services, Government has to provide them for free (they promised in the constitution) »
- « It's dangerous to go to the toilet especially at night, women can be raped, you can be attacked »
- « There are gun shots at night, you can hear it »
- « Porta Porta is for children and women at night.. But we prefer to go to flush toilets, mostly at day »
- « Chemical toilets are too smelly and not hygienic »
- « Families near the flush toilets privatize them with the agreement of the street committee, but lockers don't have enough keys to share »
- « When you child is having diarrhea at night, you don't want to walk 300m or 400m because it is dangerous »
- « Some people build their own flush toilets but it is forbidden »
- « There is not enough toilets, people are queueing » *although we did not see it during our visit... as we did not have this insecurity feeling... but violence is clearly on of the biggest issue in townships.*

### Improving our understanding

People in informal settlement don't want to pay for sanitation services access (even good quality ones), because their understanding is that the government has to provide it for free (it is written in the constitution, and *there is a feeling like "they have to pay for the Apartheid"*).

Violence and desire for security is very high within these informal settlements: not only women, but also men are concerned by violence (gun shots at night).

Most of the population think « porta porta » is not healthy because of chemicals and it smells bad.

The flush toilet is the 1<sup>st</sup> choice of the population *with a feeling like « we are not second zone citizen, we want the same sanitation services than the whites have at Sea Point »*. Dignity and privacy are mandatory.

***We want to have access to sanitation services which are secured, hygienic, practical to use at anytime, day and night and are preserving our dignity.***

Current solutions provided are not inline with people's expectations which explains the tensions and the « poo war » [13]



## INTERVIEWS : Reticulation Services – Municipality of Cape Town

*”We provide the people of informal settlement with the best sanitation services”*

Accompanied by M. Tobela Thembani, we interviewed the M. Pierre Maritz, head of Cape Town Reticulation Services which are responsible to link households to the grid (electricity, water, sewages, sanitation access).

M. Pierre Maritz came with his team comprising civil engineers and project managers and welcomed us in a new municipality building.

M. Pierre Martiz is at the head of reticulation department (~2000 people) in charge of the maintenance of the aging infrastructure is also in charge of delivering basic sanitation services to the informal settlements and to comply with the constitution.

The Reticulation Department deals locally with the Ward councilor who is the official representative of the municipality to gather the needs of her/his community (see appendix 6).

Then based on its framework (land classification, technical constraints, budget constraints) the reticulation services define the most appropriate sanitation solutions for the given community (to be chosen between different kinds of solutions – see appendix 2,3,4 and 5). Very objective, factual framework, but disconnected from « feelings » and user experience.

The reticulation department strategic objectives is to implement ISO 9001 for all services in 2015/2016, to provide basic water to all residents in the city by 2015/2016, to achieve 90% customer satisfaction in all services by 2015/2016. [18].

### We listened

« We delivered 12’500 units for the RDP housing program in 2014 which is above budget [...] ». *Note: A RDP house is ~90’000 rands to build and quality is an issue [31]*

« [...] however it is true that the waiting list for RDP is an average 10+ years and it is not sustainable »

« We are above targets for compliance to the constitution (*one tap and one toilet for 10.8 households average which is above Cape Town City standards (1:25) which are above national standards*) »

« We deliver the best sanitation solutions to people in informal settlements »

« I need to manage my assets with an aging infrastructure... pipes at Sea Point (richer Cape Town) are 60 years old and often breaks.. So I’d favor fixing them over fixing leakage in Khayelitsha »

« Population density is an issue when you have to plan for 2030-2050 »

« South Africans just want to braai (BBQ) and live with just the sky above their heads » *answering a question about whether « high rise buildings » might be an acceptable solutions to population density issues.*

« I know your dream is to have flush toilets, but let me tell you this will not happen that soon » *answering to our Navigator, M. Tobela Thembani who expressed the wish of every people in the townships.*

### Improving our understanding

The Reticulation Services have not only to provide basic sanitation access to people within the informal settlements, but also to maintain the backlog of an aging infrastructure while ensuring long-term sustainability of water supply under constrained budget.

While their statistics show they out perform what is constitutionally expected from them, their « engineer culture » is far from the daily user experience. They say they deliver the best sanitation services, but forgot to add « given the technical and economic constraints » and « at the moment ».

We discovered also a new stakeholder which is the « Ward Councilor » which has not been mentioned in the township which underlines a potential governance issue around representativeness and legitimacy of institutions within the townships.

City Planning *versus* dynamic of informal Settlements is also key as to explain the expectation gap between public services and informal settlement people.





## INTERVIEWS : Mshengu Chemical Toilets

*"I am proud to deliver a workable sanitation solution for people of the informal settlements"*



M. Harold Manus, CEO of Mshengu Toilet hire came to visit us at the University of Cape Town Business School Campus to share with us his experience, insights and solutions to the sanitation issue in Cape Town townships.

Mshengu Toilet Hire was established in 2000 and originated in the township of Gugulethu in the Western Cape S.A. The company has since evolved expanding its sanitation services and products developing itself to take advantage of opportunities in the mainstream of the industry. The company is now recognized as a competent provider of sanitation services and products to the building and construction industry, special events, government and commerce.

The company won the tender against the giant « SANITEC » to provide « porta loo's » *i.e.* chemical toilets + purge and maintenance. SANITEC is still the provider of « porta » and a sub-contractor of Mshengu to service Mshengu toilets (~6000 units deployed) 3 times a week.

M. Harold Manus sounded very passionate about his work despite it was clear for him the situation was not ideal, but that he provided a workable solution. His team is dedicated to maintain the service levels of Mshengu toilets whenever he is aware of something wrong about them.

Mshengu originated in the Western Cape townships and M. Harold Manus is very emotionally attached to this area.

### We listened

« If a chemical toilet has a problem (not cleaned, not purged, door missing,...), call my number and we shall fix it within one hour »

« I was very proud when I won the tender against SANITEC to service the population of Cape Town »

« I know about Social Justice Coalition.. But they also use the medias. One day they threw/tumble our toilets and then they call the press to tell they do not work »

« I never deliver a porta loo without any door, dignity is key for me »

« Vandalism is a high cost for my company, my service provided to Cape Town municipality is all inclusive and fixed fee »

« One day they burn toilets + sanitation truck.. What a pity ! R1.5M .. And up to 4 months to get another truck »

« Toilets are put on a wooden base for stability »

« Solution to sanitation issue, is economic »

« In some areas when the truck is not there by 9am on Friday I got an immediate call... in other areas, I have no information at all»

### Improving our understanding

On one side we have the CEO of Mshengu toilets who tells us that while not ideal his solution is workable despite these are temporary solutions for a long lasting temporary settlements. Mshengu's staff sound to be very keen on maintaining high level of service quality.

On the other side, people from township tell these toilets stink and are often filthy... and that they prefer full-flush toilets.

NGO such as Social Justice Coalition says that the contractor failed to deliver quality service to the community.

As we visited some Mshengu toilets, we found them quite clean and not too smelly (although smelling chemicals). So once again there is an expectation gap and a user experience gap to investigate.





## INTERVIEWS : Social Justice Coalition

*"Safety and Security for all – Defend the rule of law – Advance the constitution"*

We visited the Social Justice Coalition (SJC) whose buildings had just been "burglarized" (SJC thought it could have been organized by people they embarrass).. So we met in the office of another NGO.

Formed in 2008, the Social Justice Coalition (SJC) is a coalition of civil society organizations in the informal settlement of Khayelitsha in Cape Town, South Africa. In response to reports from residents about the inadequate and unsafe conditions of sanitation facilities in the settlement, the SJC therefore launched the Clean and Safe Sanitation Campaign in 2010. The campaign aimed to ensure that the City Council properly maintained existing toilets and also provided additional clean and safe sanitation facilities in informal settlements. SJC's campaign had several concrete achievements, such as the City's introduction of a janitorial service for regular maintenance of flush toilets and standpipes. To achieve these gains, SJS relied on a multifaceted approach including extensive research, a legal strategy, media publicity targeting both poor and wealthy communities, protest, and some budget work [20].

With 14 active branches, 2000 members, the SJC promotes active citizenship through education, policy and research, and community organizing to ensure government (and its service providers) is accountable, open and responsive.

### We listened

« We set-up social audits to measure the service level of the sanitation services within informal settlements »

« The social audit is a model that has been used successfully in India. It entails analyzing the Service Delivery Agreements (SDAs), training residents and doing physical verification on the actual service »

« The city pays hundreds of millions Rands to service providers [...] which is only 1.8% of its Water and Sanitation overall budget »

« Service Providers failed to deliver the service level described in their contracts »

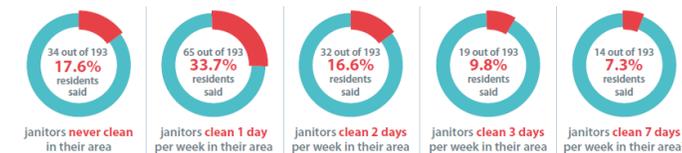
« During our last audit, 2/3 of the Mshengu toilets were broken, missing door, broken seat covers, missing ventilation pipe »

« Mshengu toilets should be fixed when they are placed because they fall and are unstable ».

### A third of residents say that janitors clean their toilet only one day per week

The City's Project Initiation Document states that janitorial services will include: 'Weekdays, Saturdays, Sundays and Public holidays'.

We asked residents how often janitors clean in their area. The social audit found that:



### Improving our understanding

The SJC social audits raise the question of "Service Delivery Agreements" (SDA), "Service Quality" and "Service Level Management".

To be efficient, Public Private Partnership, especially the delegation of public services delivered by private contractors must be monitored and tender's *postmortem* should be done to improve the quality of service.

Such NGO could provide the missing data about informal settlements to enable public services to be more proactive in addressing the needs of these populations.

However with so many unemployed people, it should be possible to hire people to take good care of the toilets (Mshengu and Flush) : Janitorial Services.





## INTERVIEWS : African Sanitation

*“ We deployed our solutions for 150 rural households and it works as long as appropriate change management is done upfront”*

african Sanitation  
DIGNITY FOR ALL

African Sanitation Outsourcing (Pty) Ltd. Co. Reg. No. 2007/022516/07

We visited “African Sanitation” who designed and build the AfriSan™ Toilet.

The AFRISAN Toilet is primarily a dehydration / Aerobic On-Site 1:1 Basic Sanitation Technology which includes a lesser secondary composting process. The dehydration capacity of the technology is derived from a power supply unit (solar or electric) and a ventilator, for rapid treatment of excreta without the need for flush water or hazardous chemicals. The ventilator expels odors from the toilet, quietly and effectively. The 4 (four) week aerobic process/cycle produces a safe to handle mature inoffensive compost-like material.



### We listened

« The unit is delivered with compostable bags which were made available through Spaza shops »

« You need to manipulate the lever to select urine or faeces. The faeces go to the compostable bag while urine goes to the solar powered dehydrator »

« The bag must then go to the composter which is a local facility to finalize the faeces transformation into usable compost »

« We did a pilot for 150 households in rural area. Adoption of the solution was easy through appropriate change management »

« During the pilot we had less than 3% of failure, *i.e.* misuse or non-adoption of the compost toilets »

« The full cabin with compost toilet and its solar panel is ~12'500 Rands (~\$1000) »

« Change management is key because not only it has to be adopted, but to be maintained. Previous projects with inappropriate change management were complete failures... people need to be trained to establish the ecosystem/process around the toilet unit »

“We can produce fertilizers out of our toilet unit, mostly coming from the urine dehydration system”.

### Improving our understanding

From our online research, we found that the technical solution for townships would be « off grid » solution.

Dry Compost toilets provide this « off grid » feature :

- They do not require sewage connection, but the bags must be put into the local composter, and downstream use of this compost in necessary (winery, agriculture..)
- They do not require drinkable water to flush the excreta which is a complete non sense but though it still happens billions time a day in modern developed countries.

However these toilets have some « constraints »

- Adoption might be problematic as it might be considered as a sanitation solution for second zone citizen (as whites at Sea Point don't use it)
- Requires trained people. It is a dynamic biological system which does not support « over load », it must be sized end to end (including the composter capacity).
- From a usage perspective it is alike taking care of your « cat litter », but instead it is yours.

Such solutions should be investigated through pilots and promoted if it makes sense and we believe it does



## INTERVIEWS : African Center for Cities (ACC) Pr Edgar Pieterse

The **African Centre for Cities (ACC)** is an interdisciplinary research and teaching program focused on quality scholarship regarding the dynamics of unsustainable urbanization processes in Africa, with an eye on identifying systemic responses. The specific strategic goals of the ACC are to:

- Produce credible new knowledge on the drivers of urban crisis in mainly African cities with an eye on systemic solutions.
- Provide tailored capacity development products/services based on new knowledge about the unique dynamics of urban development in Africa and the global South.
- Strengthen durable knowledge institutions and networks in Africa to undertake urban research and training (ACC being one).
- Undertake targeted advocacy with influential development agencies that shape the urban development agenda in Africa and the global South.

Pr. Edgar Pieterse is an urban scholar, writer and creative agent whose interests include the theory and practice of policy discourses and interventions to make the African city more just, open and accessible. He holds the South African Research Chair in Urban Policy at the University of Cape Town and is director of the African Centre for Cities. We met him at his office in UCT so he can share with us his deep academic knowledge about this complex situation we are facing.

### We listened

« The high density of these urban areas, and the flammability of the materials used to build in them, make spontaneous and rapidly spreading conflagrations a constant threat » [21]

« Violence is the actual plague within townships. It is everywhere... can you imagine a 12 Yo girl going to school having in mind she could be raped on her way to school ? Can you imagine the fear of her mother ? »

« An approach to regulating informal settlements called “re-blocking” consists in defining structure to facilitate the delivery of essential services and access for emergency vehicles. »

« Overall governance and structure of programs are not efficient, too many layers, some overlaps. Anti-corruption checks make the implementation of a program very long, too long »

« Experience in Harare with the Violence Prevention through Urban Upgrade (VPUU) program demonstrated that urbanism upgrade can change the game when involving the local community » [22]

« Probable statistical trends with regard to work and living conditions indicate that the majority of urban dwellers in Africa will find themselves in conditions of insecurity and informality. These trends create a negative spiral that perpetuates slum urbanism. »

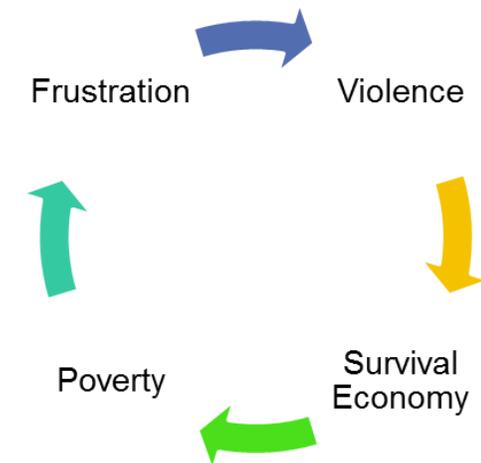


### Improving our understanding

There's a vicious circle which maintains people at the Bottom of the Pyramid and which perpetuates slum urbanism.

Urbanism upgrade approach can make a difference as shown by the Harare experience implementing the VPUU program.

Some NGO are involved in that approach (South African Alliance of Slum Dwellers International) and Pr Pieterse suggested us to visit them, to better understand impact of « re-blocking » on daily life within the communities.





## INTERVIEWS : South African Alliance Slum Dwellers International/Informal Settlement Network (NGO)

« Re-blocking informal settlements can be a solution to reduce violence, improve daily life and empower people to develop their own businesses »

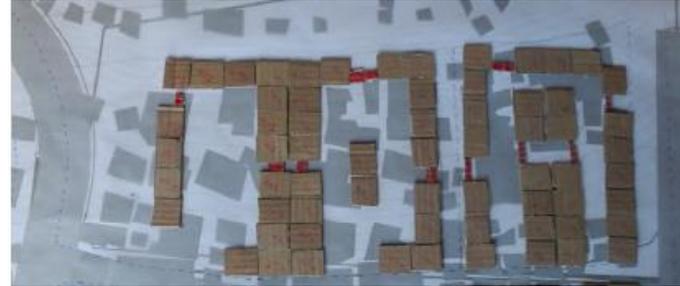


Shack/Slum Dwellers International (SDI) is a network of community-based organizations of the urban poor in 33 countries in Africa, Asia, and Latin America. It was launched in 1996 when “federations” of the urban poor in countries such as India and South Africa agreed that a global platform could help their local initiatives develop alternatives to evictions while also impacting on the global agenda for urban development. In 1999, SDI became a formally registered entity [23].

In each country where SDI has a presence, affiliate organizations come together at the community, city, and national level rooted in specific methodologies. SDI's mission is to link urban poor communities from cities across the South that have developed successful mobilization, advocacy, and problem solving strategies. Since SDI is focused on the localized needs of slum dwellers, it has developed the traction to advance the common agenda of creating “pro-poor” cities that address the pervasive exclusion of the poor from the economies and political structures of 21<sup>st</sup> century cities. Further, SDI uses its global reach to build a platform for slum dwellers to engage directly with governments and international organizations to try new strategies, change policies, and build understanding about the challenges of urban development.

We met M. Aditya Kumar in the SDI offices in Cape Town to tell us more about their initiatives and experience with sanitation access issue.

### We listened



« You must engage the community, planning by the community for the community »

« Given the rhythm of RDP housing program (~12000 units/year) it would take more than a century to provide such to the current informal dwellers, not taking into account the growth of this population »

« Land and service first ! But this has to be incremental.. Avoiding moving population away, breaking communities, breaking local economy (by moving people away from their jobs, transportation..) »

« You need proper governance at the local scale, you need to build community leadership »

« You need mapping, statistics, for proper planning »

« We don't collect money, we collect people. Savings is not only about collecting money but to bolster social cohesion »

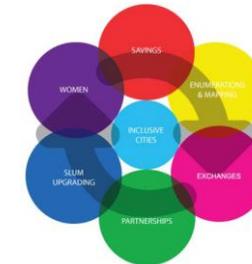
### Improving our understanding

This interview was really refreshing because it provided a precedence in what we thought to be needed so far: *i.e.* informal dwellers taking their own life in hand, and deciding collectively to improve it...not waiting for the government to do something... but creating partnership, becoming owners (savings contribution) of the change (plan by, plan for the community) [24].

Freeing space enabled the implementation of service points with sanitation, including showers. While people still don't want to pay for sanitation services, they are willing to pay 5 to 10 rands for shower access.

**Clearly the « reblocking » thing was just inline with our emerging motto: turn the informal into formal and implementing “service points” (including municipality public services).**

**The last thing to address would have been the scalability of this approach: in this « poo/poverty war, we only saw commandos.. Where is the army ? ».**





## Way Point #2



### Sanitation Services Access issue....as many issue's envisionings as stakeholders

Initially focused on the Sanitation Services Access issue... we now embrace a far more complex reality since this was only the « emerging and visible part of the iceberg » mixing history (Apartheid), economy (macro and micro), urbanism, city planning, psychology, violence... forming a complex network of interdependencies making it extremely difficult to comprehend, and to act upon efficiently.

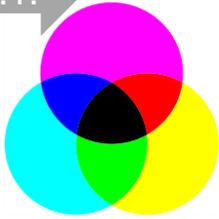


### Is there a way to structure this dependency network in an actionable way ?

We shall try to structure it using the Cranfield University Benefit Dependency Network (BDN) approach in order to structure this complex network (see appendix 7)

Starting from the beginning, the first feeling we had after the interview of Khayelithsa Site France people, and the Reticulation Department : a huge expectation gap with politics in the background, a mistrust built upon missed promises and poor communication between stakeholders.

Beyond expectations, beyond sanitation, is there a possible global response to these issues ?



## NEW INSIGHTS : Different visions of the same issue, Expectation Gaps, complex environment

### Mis-understanding of the genuine nature of RDP program

There is a wrong understanding of what the RDP program was about [25]. For people in the shacks, people in public services, RDP is now all about providing a small « one fits all » house to the poorer for free... But RDP did not mean a one fits all needs small house, it was a larger and more ambitious program, including people empowerment dimensions.

« Current » RDP is fully subsidized and hence cannot be sustainable in the long-term. The one fits all approach does not fit the various situations encountered in informal settlement (families, singles..), and it generates a population density issue: RDP house must be built away from the city economic center, forcing people into long commuting whenever there are public transportations around. The waiting list is 10+ years now, and the awarding of these houses break the communities: people are moved out of their community “randomly” and bribery is said to be quite common in the awarding process. People are also moving from a shack to a RDP for which maintenance fees are higher (while their income did not increase). At the end, RDP awarded people often rent their RDP to the “middle class” and build a shack in the backyard, or even keep their shack within informal settlement.

RDP program and constitutional laws (or rather their “understanding” by people especially in informal settlements)

create very high expectations (free small house with no charges but pre-paid electricity) which inhibit private initiative :

“Government should pay for sanitation” (heard multiple times). “I wait for the government to paint the walls of my living room” (heard by the owner of a RDP house behaving as if she was a tenant). So people “prefer” to wait 10+ years hoping to be awarded with a free house (which might be far away from job areas and/or logistics).

RDP program should be reinforced within its original «mind set » through appropriate communication plan. It has very little to do with « free one fits all house ». However, the African National Congress has lost the original spirit of the RDP program for a « promised land » rhetoric, spreading this false understanding of what the RDP program is about, which is not sustainable (100% subsidized).

The RDP program nationwide has improved the life of millions of people (~2 millions houses built) but it is a never ending Danaids’ barrel: the more RDP houses built, the more people will migrate from rural zones to urban zones.

A new approach such as the Social Renting Housing (see appendix 8) sounds more « practical » as it is by nature a medium density rental housing which is typically well located in terms of its access to urban

areas. It is usually a multiple storey housing due to the fact that it is built on prime land where land price are high. SRH sounds more sustainable (medium/high density housing) with good access to urban areas (economic sustainability).

**It is time for something more sustainable (economic and environmental sustainability) which will educate people about basic economic concepts: there’s no lunch for free in the long-run.**

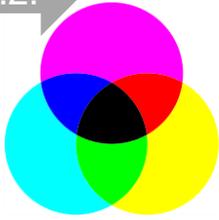
### Ownership as the key driver for people empowerment

There’s a vicious circle which maintains people at the Bottom of the Pyramid and which perpetuates slum urbanism. One of the root cause of this vicious circle is about “ownership” and “private property right”.

It is a basic economic law, with no private property rights enforced by a legal framework, there is no investment (not even talking about Foreign Direct Investments).

By essence, informal settlements are built on lands which are either owned by the government, or by private owners. However, one can challenge the value of private land with an informal settlement built on it. Cape Town municipality framework describes up to 7 kinds of land occupied by informal settlements.

People will not invest their small savings in upgrading their shacks if they have no guarantee that this investment



## NEW INSIGHTS : Different visions of the same issue, Expectation Gaps, complex environment

will not be destroyed by the government « cleaning » occupied zones by moving the population.

When visiting Khayelitsha we saw a strong desire for « private property » as a lot of shacks had fences « claiming » their ownership of their land. These fences are allowed by the street committees which decides where the fence should be placed.

However seen from the Government / Public Services these informal settlements are **temporary**, although all know that this situation has been there for decades and will still be there for decades. **Informal should be turned into more formal settlements *in situ*.**

Economists such as Hernando De Soto [34] argues that the poor hold huge assets in the form of houses, buildings, lands and small businesses and that the problem is that the holdings are not adequately documented, and thus, « cannot readily be turned into capital and cannot be traded outside the narrow local circles, cannot be used as collateral for loan. De Soto thinks that to « capitalize the poor », a formal framework to legalize their extra-legal property is mandatory.

In our « Formalizing the informal » approach, we are inline with De Soto. However, some voices [35] say that this approach oversimplify the informal economy by assuming that « informal property » means individual private property. According to these, De Soto does not acknowledge that numerous titling programs have failed to produce the results he predicts.

Instead of achieving formalization via integration into the existing system of private property (which is not the answer for large number of people), much more attention should be paid to support existing social practices that have widespread legitimacy, rather than expensive solutions that try to replace them: some features of extra-legal property regimes found in South Africa's informal settlements provide a key to the solution.

Instead of investing huge amounts of money into the RDP program (a RDP house is ~90'000 rands, and with surrounded services up to ~200'000 rands), the Government could give official ownership of land to the informal settlement people. This would require mapping and appropriate land registry service, but as written above, this private property should be managed by informal community governance and not “pushed top down” from the outside. Communities must be deeply engaged and their informal “institutions” must be taken into account as the mandatory foundation of the future “formalization”.

Coupled with informal settlement re-blocking (as discussed with Pr. Peitense and the ISN) this could be the foundation for a new momentum.

### **Violence should be eradicated**

During our visits to Khayelitsha we did not feel this violence as we were visiting it during day light with our

wonderful Navigator. However, it was implicit in many quotes we collected during the interviews, the most clear was the one from Pr. Peitense.

Based of the success of what has been done in Harare through the VPUU, and based on the experience in Brazilian favelas, investing to put more « public services », more « public presence » in informal settlements can be a game changer. In Brazil, they hire local police forces who lived in the favelas, very alike the proximity police put in place in France for poor suburbs in big cities.

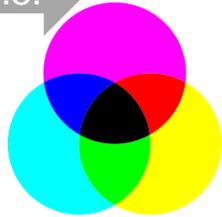
As demonstrated by the VPUU in Harare, creating places for « public services presence » could be a great thing to do.

### **Communities should be genuinely involved**

As it was demonstrated in Harare, or in the ISN experimentation about informal settlements reblocking, it is crucial to promote a community true leadership and to partner with it.

NGO have to play a major role in that relationship building as they are close to the communities and can act as a relay with public services.

During our interviews we were hit by the poor interfaces between the Municipality which went through its council structure, *i.e.* the ward councilor...and the informal dwellers referring to their street committees and local councilor (which is an informal « institution embryo »).



## NEW INSIGHTS : Different visions of the same issue, Expectation Gaps, complex environment

Talking with M. Bonga Mabuya, street committee of Khayelitsha / France, he told us that he had no meetings with the Ward Councilor, confirming our feeling of a dual channel governance, with no proper interface between public services and informal dwellers.

Once again, proper governance should deeply involved informal community leaders as the official channels (ward councilor) does not seem to have the same legitimacy.

### Political issues

Furthermore, in Cape Town, the political situation makes things worse. The Democratic Alliance (DA) has the majority and the African National Congress (ANC) is in minority... and there is a political deadly game for vote catching, i.e. to appear as the one doing something for the bottom of the pyramid, and to show the other party did nothing.

*« We haven't really been seeing the ANC's work here... The DA has really helped in terms of housing and I don't think it is fair that we are not taking this into consideration when we vote » [26]*

*"The mayor is focusing in areas where there are DA ward councilors, where there are ANC councilors nothing is moving thus making all the ANC led wards seem useless" [27]*

Such political « games »/dynamic is counter productive as the DA and ANC fight for vote catching instead of focusing on informal settlement people's daily life issues.

### People Empowerment

Firs initiative in here has already been identified: eradicate the violence. You cannot expect people who live in such situation « insecurity » and « informality » to get involved in building/shaping their future. They are engaged in a daily survival economy in which there is no room for planning in the mid/long-term.

Discussing with M. Harold Manus (CEO Mshengu) whose company is engaged in Corporate Social Initiatives [28] about creating jobs in the townships, he told us that he hired "janitors" to take care of the Mshengu toilets, but that the guy started his day at 11am instead of 8am, was drunk, did not perform his job appropriately...and that there was a lot of work to do to empower these people.

Note! Given the state of some of the sanitation units, the issue might be beyond « janitorial services », but also education of people about proper usage of toilets, and once again to develop an ownership mindset which creates an incentive to maintain the toilets. As explained by our navigator, most of "public toilets" (whether they are full-flush or Mshengu) are privatized to be shared by some families with the "informal" agreement of street committees (they put a locker on the door). This privatization makes those families more accountable for toilets maintenance.

There is a lot of ingenuity in the townships (just have a look to the power supply) but this is "informal". Turning "informal" into "formal" is also about education and professional certifications not only enable people "Doing It Yourself" (DIY) but also to get the money from "Sea Point" by selling their expertise outside of the township boundaries.



### Principles to go beyond...

As we were thinking about the sanitation issue, we touched very quickly broader issues such as urbanism and city planning for sustainability both economic and environmental.

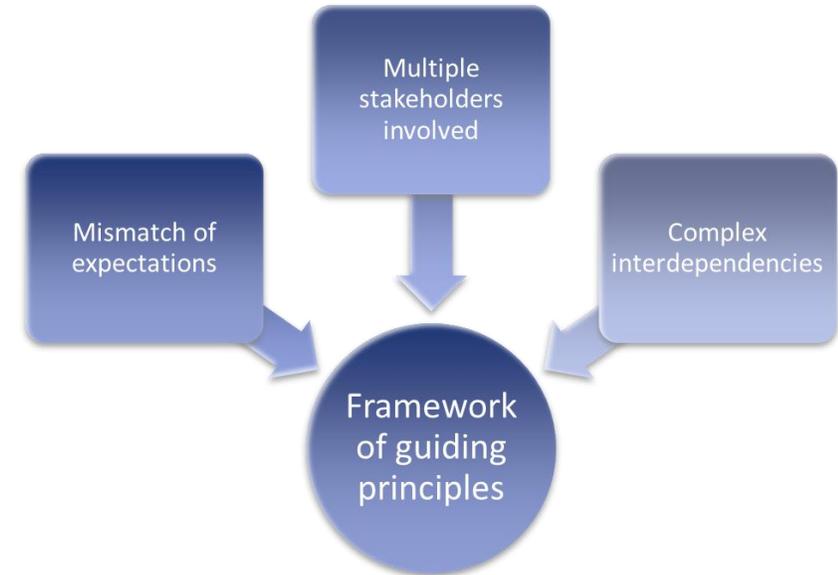
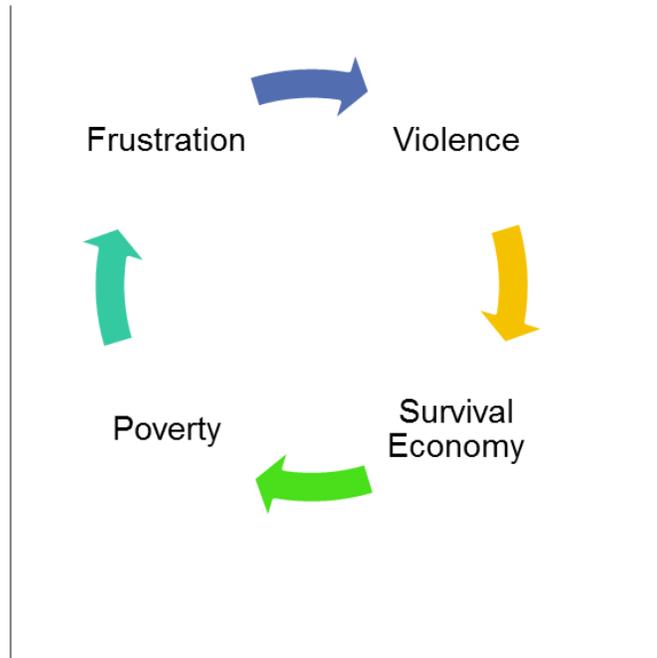
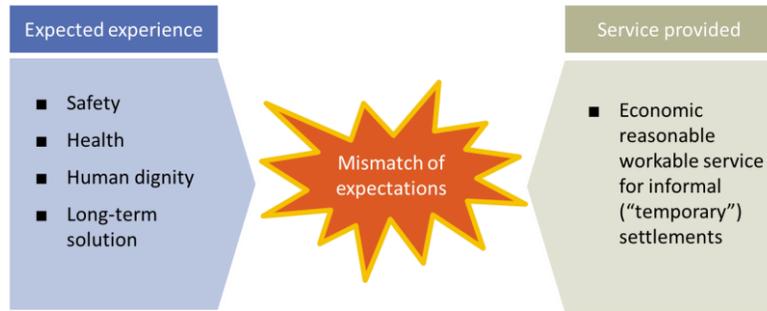
In such a complex environment, with a strong feeling of « *Status Quo* », there is not « one fits all » solution, but a set of principles to be followed to break this *status quo* / the vicious circle of the slum urbanism.



### Way Point #3

**Sanitation Services Access issue....is so complex that there is no “one fits all” solution, and it could only be addressed through a set of “principles” to serve as major directions to structure response programs.**

In such a complex environment, with a strong feeling of « *Status Quo* », there is not « one fits all » solution, but a set of principles to be followed to break this *status quo* / the vicious circle of the slum urbanism.





## Proposed set of Principles to address this complex situation



### Learn from past experience

- Build on Harare experience / Informal Settlement Network experiences
- Create precedence, narrate vicarious experiences
- Share best practices



### De-politicize communities

- Build strong leadership within communities
- Leverage the NGO (select them based on their expertise and efficiency)
- Identify « trade-offs » to shift the *status quo*



### Foster partnership & proactive mindset

- Public Private Partnerships are key but...
- They need appropriate governance and...
- Robust Service Delivery Agreement checks (easily available to the people)



## Proposed set of Principles to address this complex situation



### Embrace innovation & experimentation

- Stop leaving on « false unsustainable promises »
- Leverage the entrepreneur network around sanitation issues
- Fail quick and cheap... and do it again



### Acknowledge sustainability challenges

- Do not persue unsustainable programs (RDP)
- Leverage the « South Africa » brand about « wild life preservation » and extend it to the « Eco Nation »
- Embrace ecological solutions for African Urbanism (do better than the developed countries)

## How do we go beyond principles ?

Those principles require a framework to make them actionable programmatically. The “Benefit Dependency Network” which reframes the dependencies into actionable initiatives with perspective can help us structure a programmatic approach (see appendice #7). Let us present some of the possible initiatives to enhance the daily life of people at the BoP within Cape Town townships.



## Experimentation: Incremental Upgrade of Shacks

### Concept

Instead of investing in unsustainable RDP housing program which :

- Do not satisfy all people because of variable quality of building materials and building itself,
- Break the community by dispatching people in remote locations,
- Break the micro-economy by moving people away from the job areas and logistics,

Let us use this budget to :

- Provide private land ownership to informal dwellers (land registration service, strong local governance...)
- Give them vouchers (possibly with an investment ratio, they put 1 rand, they get a 10 rands voucher) only to buy building materials to upgrade their shacks
- Involve building materials retailers to train people empowering them through DIY approach (possibly extend this to professional certifications)

### Win/Win/Win approach

- Government spends more efficiently the money. For 1 RDP house (up to 200'000 Rds) it could finance 10 to 20 shack upgrades (or more if private investment leverage)
- Informal dwellers are turned into formal dwellers – No community social and economic disruption
- Building Materials retailers have more business

- Professional certifications creates new businesses...enabling the government to get more taxes in return.

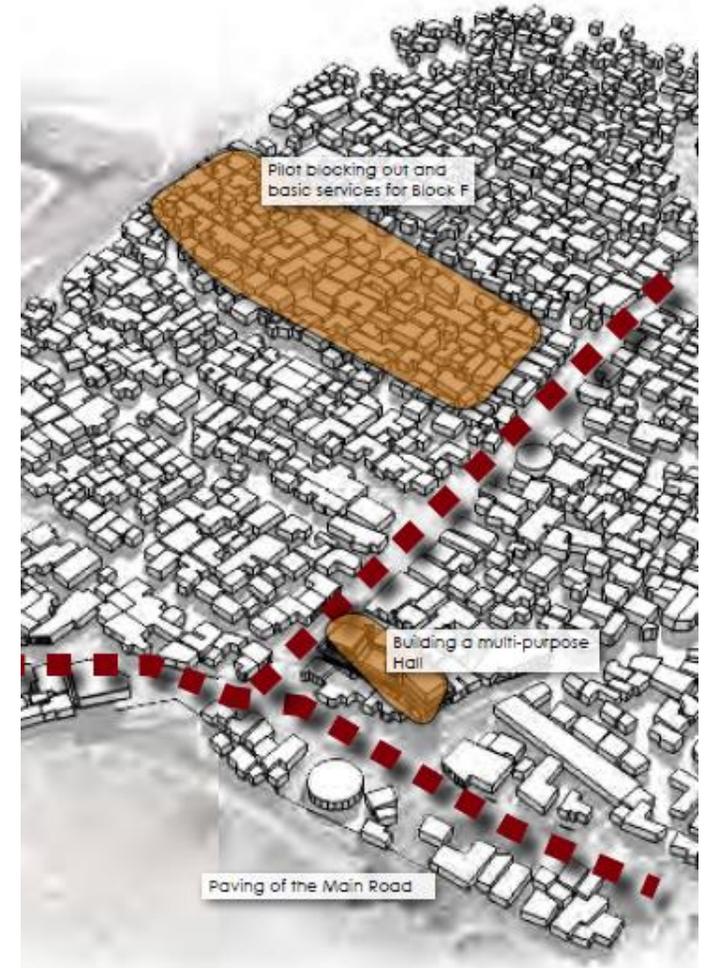
### Re-blocking must be part of the game

In order to improve daily life of people, and to create a “business friendly” environment, a reblocking policy/approach of the shack upgrade should be the “urbanism governance backbone”.

- Enable the creation of “public services delivery points” within the informal settlements (day nursery, sanitations, showers, libraries, healthcare center...)
- Free space for infrastructures (sewages, etc..) when possible
- Create security islands within the township : a group of shacks with a shared courtyard in the middle and one entry/gate
- Free some space for a vegetable garden (as some people come from rural zones) which could be fertilized by the « poo compost » produced by their shared composter + dry toilets.

### NGOs and Private Companies to be leveraged

Informal Settlement Network (ISN) is experienced in such reblocking and should be part of this venture. Possibly, corporations having a Corporate Social Responsibility program could invest in such venture. There should be space here for some “business coordination” (consultancy, business cases, lobbying...).





## Experimentation: Dry Toilets deployment within Shacks

### Concept

Due to the high density of townships and the absence of structure, it is very hard (and sometimes impossible) to deploy a service grid (including electricity, water supply, sewages).

In such environments, an « Off Grid » solution is more sustainable (both economically and environmentally) to deploy.

Regarding sanitation issue, dry toilets + composter could be an affordable technical solution (dry toilet itself is < \$200)

See appendix 10 about human excreta valorization.

### Caveats

As stated by African Sanitation, proper change management must be done to ensure the success of this technology:

- A complete eco-system must be put in place (including the composter and the downstream valorization channel)
- People must be trained to operate this kind of toilet
- Some resistance might exist because of the perception surrounding this kind of toilet : I want a full flush toilet, not a toilet for 2<sup>nd</sup> zone citizen. See [29]
- This toilet is a bioreactor turning the faeces into compost; it must be operated within limits to be efficient.

### Leveraging the South Africa brand

South Africa has a strong reputation about wild life preservation (which is a strong touristic asset). We suggest to go beyond, and to embrace environmentally sustainable solutions for its development.

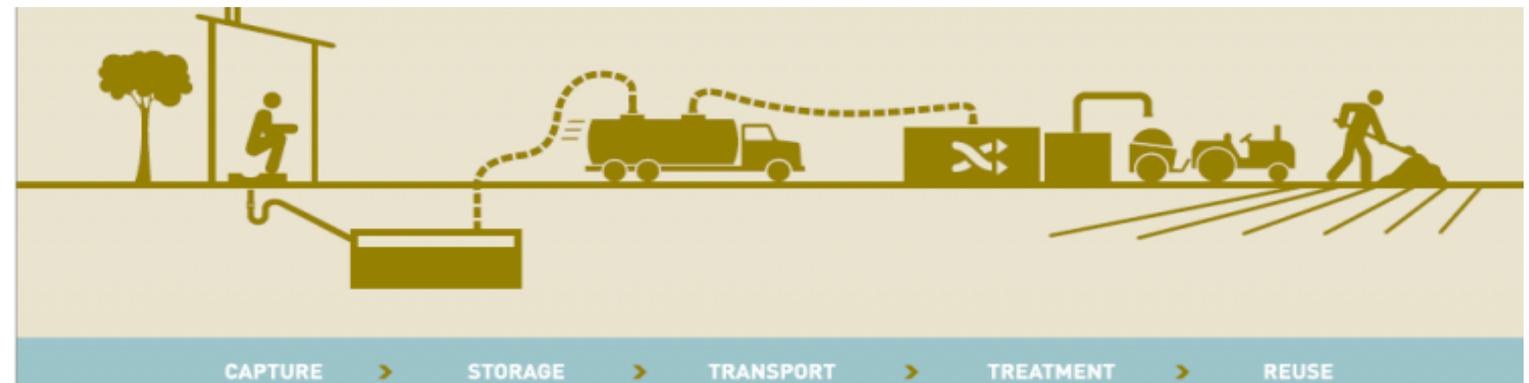
- Cape Town to be the “Eco City” of the world
- Create 5 stars “Eco lodges” to promote the use of dry toilets
- Create a 20 rands tax at international Airport to fund “Eco Solutions deployment”

### Couple this deployment with an economic valorization of compost

Soil in the Cape Town region is rather poor and needs to be fertilized for agriculture, possibly including wineries.

Therefore, it could be possible to develop a vertical integration valorization channel for « poo compost » to fertilize soils in the Cape Region. Another usage could be for aquaculture, but is less appropriate for the Cape Town region.

Once again, it is not only a technical issue, but an ecosystem to deploy. We already mentioned the vegetable gardens within townships as a local solution for compost. It should be integrated in the reblocking scheme, although some legal constraints do exist that prevent this usage (for human food vegetables) [37].





## Experimentation: Create a Soap Opera about the life in townships

### Concept

We identified the need to change the mindset of people within the townships, and to manage their expectations to favor more sustainable and inclusive solutions to their problems.

We want to trigger private initiative, to embrace innovations and experimentation... while we also understand that this is hardly possible in such an insecure and informal environment.

However, we strongly believe in precedence and vicarious experiences to change people's mindset through an inspiring narrative.

Inspired by what could have been done elsewhere, we would like to suggest the creation of a Soap Opera about the life in the townships.

There are already several « soap opera » in South Africa [30] but none about life in townships, specifically design to convey messages for and to these communities.

### Mass conveyor of best practices and vicarious experiences

In order to change the mindset of people we need strong narratives about vicarious experience in order to share best practices.

Leveraging the creativity, singing and acting capabilities of students of the school we visited, but also the resources of the UCT School of Opera, it could be possible to produce a show such as « glee » with singing and acting performance,

to create popular songs which would ensure the success of the show.



This show would also give the opportunity to richer population to really understand the daily life in townships: this is the reason why this show should be popular (with appropriate « marketing mix ») to address all audiences.

Slum Dwellers International (NGO) which strategy is to share best practices initiatives might be part of the venture (Bollywood in India).

### Leveraging UCT School of Opera

We do think that UTC could play a major role in starting this venture, associating /creating new curriculums

such as School of cinema, School of literature, etc..

Such a show through the vicarious experience it would vehicle could be the catalyst of a new momentum in social improvement for the people of the townships.





## Closing Remarks

It has been a long journey for us:

- From the sanitation services access issue (from a rather technical perspective) to the urbanism and sustainable city planning which will be critical in the coming decades, especially for Africa which population will double reaching 2 billions inhabitants within one generation, 65% of them moving to urban centers for jobs.
- From our respective countries to Cape Town South Africa, Jérôme & Rainer from Europe, Paula from Japan, and .. Well Ricardo was the African of the group !
- From our own beliefs and shallow knowledge about sanitation issue, which is often seen from our comfortable positions as a subject for jokes,

This journey can be yours now, wherever you are and wherever you live. We do hope that our journey will make yours easier, and thinking about the next IE Brown Executive MBA cohort, we do hope you will find in this journey, interesting propositions for your own journey to come.

## Bibliography

- [1] Status of Sanitation in South Africa Report (Dept. Of Water Affairs, March 2012)
- [2] Socio-economic rights institute of South Africa (SERI) “*Basic Sanitation in South Africa: A Guide to Legislation, Policy and Practice*”. 2011
- [3] [http://www.hivaid-s-wc.org.za/docs/posters2013/Access\\_to\\_water\\_and\\_sanitation-LenaStofile.pdf](http://www.hivaid-s-wc.org.za/docs/posters2013/Access_to_water_and_sanitation-LenaStofile.pdf)
- [4] <http://futurecapetown.com/2013/07/part-1-an-innovative-approach-to-sanitation-in-cape-town/#.VEQUHkccRD8>
- [5] [www.Accesssanitation.org](http://www.Accesssanitation.org)
- [6] [https://www.engineeringforchange.org/news/2012/11/18/high\\_tech\\_toilets\\_what\\_we\\_need\\_is\\_a\\_low\\_tech\\_toilet\\_revolution.html](https://www.engineeringforchange.org/news/2012/11/18/high_tech_toilets_what_we_need_is_a_low_tech_toilet_revolution.html)
- [7] <https://sanitationupdates.wordpress.com/2013/05/13/india-bihar-rapes-caused-by-lack-of-toilets/>
- [8] <http://psai.org/the-poo-wars-in-cape-town-south-africa/>
- [9] <http://www.sjc.org.za/social-audits>
- [10] <http://www.news24.com/SouthAfrica/Politics/Cape-Town-porta-loos-provide-dignity-20130605>
- [11] <http://allafrica.com/stories/201411190962.html>
- [12] <http://www.sabc.co.za/news/a/86ffbc004568f8ff868ba7c7c599c9eb/E-Cape-bucket-toilet-eradication-on-track:-MEC-20140909>
- [13] <http://archived.thisisafrica.me/opinion/detail/19915/pooing-on-your-parade-toilet-wars-and-the-gap-between-us-and-them-in-cape-town>
- [14] <http://www.fergusmurraysculpture.com/south-africa/cape-townships-6-pages/history-of-cape-town-townships/>
- [15] <http://www.csae.ox.ac.uk/conferences/2002-upagissa/papers/leibbrandt-csae2002.pdf> (Cross *et al.* 1999)
- [16] <http://www.wilsoncenter.org/publication/low-cost-sanitation-overview-available-methods>
- [17] [http://www.pseau.org/outils/ouvrages/earthscan\\_ltd\\_domestic\\_wastewater\\_treatment\\_in\\_developing\\_countries\\_2003.pdf](http://www.pseau.org/outils/ouvrages/earthscan_ltd_domestic_wastewater_treatment_in_developing_countries_2003.pdf)
- [18] [https://www.capetown.gov.za/en/Water/WaterservicesDevPlan/Documents/WSDP\\_201011\\_Exec\\_Sum\\_11may10\\_1\\_print\\_version.pdf](https://www.capetown.gov.za/en/Water/WaterservicesDevPlan/Documents/WSDP_201011_Exec_Sum_11may10_1_print_version.pdf)
- [19] <http://www.waterdialogues.org/south-africa/downloads/case-studies/CapeTown-CS-Summary.pdf>
- [20] <http://internationalbudget.org/wp-content/uploads/Full-SJC-Update-Final.pdf>
- [21] [http://www.0860dryloo.co.za/Why%20the%20Afrisan\\_GFV\\_Final.pdf](http://www.0860dryloo.co.za/Why%20the%20Afrisan_GFV_Final.pdf)

- [21] <http://www.irinnews.org/fr/report/97313/south-africa-searches-for-solutions-to-shack-fires>
- [22] <http://www.oecd.org/dac/povertyreduction/48869536.pdf>
- [23] [http://sasdialliance.org.za/wp-content/uploads/2013/10/CUFF-Project-Report\\_Masikhase\\_Web-Version-2013.pdf](http://sasdialliance.org.za/wp-content/uploads/2013/10/CUFF-Project-Report_Masikhase_Web-Version-2013.pdf)
- [24] [http://www.sdinet.org/media/upload/documents/Langrug\\_Booklet.pdf](http://www.sdinet.org/media/upload/documents/Langrug_Booklet.pdf)
- [25] <https://www.nelsonmandela.org/omalley/index.php/site/q/03lv02039/04lv02103/05lv02120/06lv02126.htm>
- [26] <https://www.freedomhouse.org/sites/default/files/Twenty%20Years%20of%20South%20African%20Democracy.pdf> page 31
- [27] [http://groundup.org.za/article/khayelitsha-councillor-city-ignores-my-community\\_424](http://groundup.org.za/article/khayelitsha-councillor-city-ignores-my-community_424)
- [28] <http://mshengutoilethire.co.za/csi/>
- [29] <http://www.wsp.org/sites/wsp.org/files/publications/WSP-What-Influences-Open-Defecation-Global-Sanitation-Review.pdf>
- [30] [http://en.wikipedia.org/wiki/Category:South\\_African\\_television\\_soap\\_operas](http://en.wikipedia.org/wiki/Category:South_African_television_soap_operas)
- [31] <http://www.dispatchlive.co.za/news/new-focus-on-quality-rdp-homes-is-painful-for-many/>
- [32] <http://www.housingfinanceafrica.org/blog/will-the-extended-housing-subsidy-in-south-africa-work/>
- [33] [Cost Benefit Analysis : Social Renting housing](#)
- [34] [http://en.wikipedia.org/wiki/Hernando\\_de\\_Soto\\_Polar](http://en.wikipedia.org/wiki/Hernando_de_Soto_Polar)
- [35] [http://www.capri.cgiar.org/pdf/brief\\_land-10.pdf](http://www.capri.cgiar.org/pdf/brief_land-10.pdf)
- [36] AUSTIN A and DUCKER L (2002) Urine-Diversion Ecological Sanitation Systems in South Africa. CSIR Building and Construction Technology, Pretoria, South Africa.
- [37] [http://www.protosh2o.org/sites/default/files/library\\_assets/361.1\\_MNK\\_E21\\_fertiliser\\_value.pdf](http://www.protosh2o.org/sites/default/files/library_assets/361.1_MNK_E21_fertiliser_value.pdf)
- [38] <http://www.theguardian.com/environment/2013/nov/06/nutrient-recovery-fertiliser-human-excrement-slough>

## Appendices



## Appendix 1: Stakeholders/Interviewees list and their context/perspective

Local residents (France, Site B)	• Joseph Lesibane & Batlokwa Lesibane	<p>We wanted to express here our deep gratitude to all these people, to have dedicated some time to talk openly with us around a tough subject such as sanitation access issue for informal settlement people in the Cape Town area.</p> <p>Thank you for sharing your experience, your insights, your feelings, your hopes and expectations so we could have a better understanding of your daily life/business conditions.</p> <p>A special « Thank You Tobela » to M. Tobela Thembani, our navigator who assisted us in this so enriching venture.</p> <p>A big « Thank You Pierre » to M. Pierre Coetzer for his so efficient interview preparation and schedule, and for being our « deputy navigator ».</p> <p>With such a crew, our trip was really enriching for all of us... and we do hope this report will help you moving things forward.</p>
Township Navigator	• Tobela Thembani	
Construction worker	• Anele Lesibani	
Social Justice Coalition	• Axolile Notywala	
COURC – Informal Settlement Network	• Aditya Kumar	
Street Committee Rep (France, Site B)	• Bonga Mabuya	
City of Cape Town Reticulation Unit	• Pierre Maritz & team	
Mshengu Toilet Hire	• Harold Manus (CEO)	
African Sanitation	• Geo Heyns (CEO)	
UCT - African Centre for Cities	• Edgar Pieterse	



## Appendice 2 - Available sanitation solutions: #1 Portable Flush Toilets (PFT) known as « Porta Porta » or « Porta Loo's »

This is the « in shack » solutions provided by the municipality of capetown when it cannot opt for other solutions, *i.e.* flush toilets (need connection to the « fluid management » grid), Chemical toilets such a Mshengu' ones, or Bucket toilets.



Municipality has deployed ~12'000 units within Cape Town townships [10].

It is all in plastic and composed of a « toilet seat », and a « 21L tank beneath ». Pressing the lever under the seat flushes the poo into the sealed tank in which chemicals provide some « deodorant » and « disinfectant » features.

PFT is the replacement for « bucket toilets ».

Every family equipped with a PFT solution has been provided with 2 tanks which are serviced 3 times/week: you need to bring your « tank » to the local area for pick-up. Then the full tanks are emptied in the



industrial zone near the Airport (where SANITEC is located). In that place, the smell of human waste and chemicals is unbearable. Inside, about 100 people are in charge of emptying PFTs down a big central drain (which goes to the treatment plant), while others clean the floor [11].

Note that in the « poo war », some activists stole « Porta Porta » in shacks to drop the poo on cars, or even at the International Airport.

According to the municipality, PFT are the key solution to sanitation services access within informal settlement as it preserves « human dignity ». According to the Mayor of Cape Town, Mrs. De Lille, « "A PFT provides the same privacy, dignity and safety as a normal full-flush toilet," [10]. "PFTs are allocated to a single household for use within that household and are, therefore, largely protected from vandalism." »

Seen from the end-users, there's no privacy (mostly because shacks are small, with 1 or 2 principal rooms) meaning you have to release yourself in front of your family members. Sometimes, shacks are too small to accommodate for a PFT.

No wonder, that in such confined environments, PFT stinks a lot... chemical « deodorant » is perceived as being unhealthy, some people even report « rash ». Furthermore during the austral summer, the temperature inside the shacks can enhance the « stinky smell » of Porta Loos.

However, some people recognized it is better than nothing, and most people would use it at night for children and women, when it is unsafe to go outside as M. Bonga Mabiya (street Committee member at Khayelitsha France) told us.



## Appendice 3 - Available sanitation solutions: #2 MShengu Chemical Toilets (Porta Loos)

This kind of blue toilets can be seen quite often in informal settlements. They are provided by M. Shengu company who won the Municipality of Cape Town tender for sanitation services providing.



M. Shengu deployed ~6000 units of these in Cape Town informal settlements.

M. Shengu company ensures their deployment in coordination with the Municipality, and the Ward councillor (official representative of informal settlement people) : basically Mshengu's trucks require an access to deploy these and ensure their maintenance.



Mshengu toilets are emptied and cleaned 3 times a week.

Meanwhile, anyone can call the number printed on the Mshengu toilet to have it cleaned or fixed.

However, these are still « chemical toilets ».

As stated by a little girl we interviewed in Khayelitsha near a Mshengu toilet and a flush toilet installed by the Municipality, “Can you ask them to take these [chemical toilets] out of here? They smell really bad!”. As we kept on the conversation, referring to the different toilets, how they are maintained, which one she used and preferred. She finally said: “I prefer these ones [flush toilets] because the others, even when they are clean, they smell bad.”





## Appendice 4 - Available sanitation solutions: #3 Bucket toilets

These are the « first generation » of toilets deployed in the informal settlements. As their name states it, it is composed of a toilet seat, and a large bucket underneath.

These are not chemical toilets and the tank is not sealed. The bucket is large with greater capacity than the PFTs.



On the left, bucket toilet maintained by the « municipality » (purge and treatment). On the right, bucket toilet built into informal settlements. You can see some organic matter (wood chips) to initiate poo « composting ».

Our navigator, M. Tobela Thembani has one shared with his neighbors in his yard. Service Providers empty the bucket 3 times a week (Monday, Wednesday, Friday).

These bucket toilets do not require connection to the « fluid grid » (water supply and sewages).

The collection of poo tanks for treatment is not always the case, especially when such systems are home-built and used in informal settlements (see « bucket toilet on the right) with no « coordination » with the municipality for « maintenance », *i.e.* purge + treatment of effluents.



In Eastern Cape region, the use of these systems increased from 38'000 to 52'000 due to increase of the population in these informal settlements since June 2012 [12]. Issue is then the municipality cannot budget for the maintenance of these systems and has always to react to a poorly « managed » dynamic situation.

In formal settlements (where it has more accurate figures), the Municipality started to eradicate « bucket toilets » with the deployment of « PFTs ».

The bucket toilet is the « simplest » (and cheapest) toilet and it can be built locally with « parts » coming from « circular economy ». Although it is not hygienic, it can address some « privacy issues » as it is installed in the back yard of shacks when possible (and not in the shack itself). However, some do not feel safe at night to walk a short distance to reach the bucket toilet.

Issue is about absence of effluent treatment (black water) which can cause some health issues, especially in the case of a pandemic burst of Cholera like the one happened in Haiti recently (especially given the density of population in these area). Ground pollution with parasites (nematode eggs in urine) could also be an issue.





## Appendice 5 - Available sanitation solutions: #4 Flush Toilets, the dream of informal settlement people

These are the most demanded toilets in the informal settlements (as it is the toilet kind used by most population worldwide especially in developed countries).

These toilets are installed by contractors once the reticulation services have defined the feasibility of such a deployment as it requires connection to the water supply and sewages networks.



These toilets require concrete foundations, connection to the « grid » (water supply + sewages), and are often built with concrete enclosures. They are the most expensive ones to build and to maintain.

Water tap is provided for hygiene purpose for the block of flush toilets aside the block.

During our interviews with the « Social Justice Coalition » (SJC) and some other stakeholders including reticulation services of Cape Town, we have been told that in a specific location, 20 flush toilets were to be deployed... and the « contractor » suggested that they would be delivered without enclosures, to reduce the costs and to increase the number of toilets to be delivered to the community. The idea was to let people finish the toilets *i.e.* build the enclosures. At the end, the contractor built the concrete foundations (with approval of the Ward councillor) + connections... and the day after, people from informal settlements destroyed the whole thing.



Due to « grid » constraints, very alike « logistics » constraints for Mshengu chemical toilets, these flush toilets cannot be installed anywhere in the informal townships as they require sewage connection.

Hence, usually these flush toilets are « privatized » by nearest families with a locker on the door. Issue is these lockers are provided with 3 keys... while more than 10 families shared the toilets.

This privatization is somehow « organized » by the street committee, and provide some incentive to maintain the flush toilet (clean, maintenance).

Maintenance is key, as when something is broken, the toilet is often mis-used and then vandalized to provide parts for the grey economy. Maintenance and cleanliness are key to enable sustainable usage of these toilets. => it requires trained janitorial services.





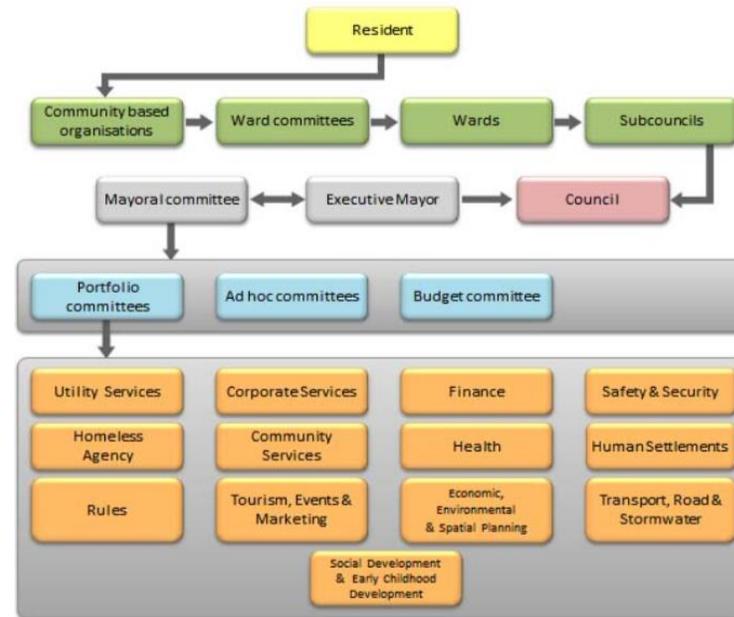
## Appendix 6 – Cape Town political governance framework

The City of Cape Town provides residents with a variety of municipal services such as health, water, wastewater and sewerage systems, roads and traffic safety services, and housing sites and services. To judge whether it is doing this effectively, the City needs to listen to what residents have to say. It does this via its sub councils - specialized decentralized governmental structures that give residents a say in local government.

There are 24 sub councils in Cape Town. Collectively, these exercise over 90 functions and powers delegated directly to them by the City Council. Some of these include:

- Encouraging residents to get involved in decisions on the City's policies and legislation, such as draft by-laws, proposed policies, its annual budget and its 5 year plan,
- Monitoring City service delivery, resolving residents' complaints and enquiries
- Supervising the spending of ward allocations (money that the City gives to sub councils) on service delivery issues
- Dealing with referrals from the City's portfolio committees about policies, by-laws and regulations
- Making recommendations to Council on matters affecting their areas
- Authorizing business licenses
- Adopting rules of order (English, Afrikaans, Xhosa)

Each ward may have a ward committee of up to 10 persons. The Ward Councilor is the chairperson of the ward committee. All committee members must regularly consult their sectors and advise the ward councilor on needs and priorities, including the budget, and make recommendations to the sub council or other committees of Council.



Source :  
<https://www.capetown.gov.za/en/subcouncils/Pages/Home.aspx>

Cape Town City Council	
	3rd Unicity Council
Type	Unicameral
Leadership	
<b>Speaker</b>	Jacobus "Dirk" Smit, Democratic Alliance since 15 March 2006
Structure	
<b>Seats</b>	221
Political groups	<ul style="list-style-type: none"> <li>DA (135)</li> <li>ANC (73)</li> <li>ACDP (3)</li> <li>COPE (3)</li> <li>AMP (1), AJ (1), CMC (1), NPSA (1), PAC (1), UDM (1), VF+ (1)</li> </ul>

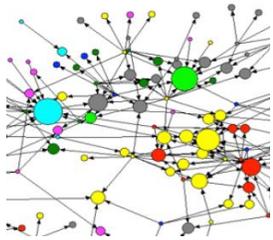
Source :  
[http://en.wikipedia.org/wiki/Cape\\_Town\\_City\\_Council](http://en.wikipedia.org/wiki/Cape_Town_City_Council)!

The City Council is the legislative body of the City of Cape Town. It is composed of 221 councilors elected by a system of mixed member proportional representation. 111 councilors are elected by first-past-the-post voting, one from each of the 111 wards of the City, while the other 110 are elected from party lists to create overall proportionality. The mayor of the City is elected by the City Council.

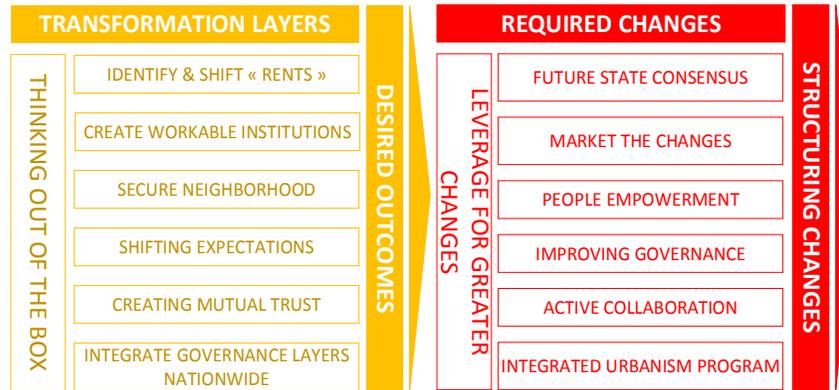
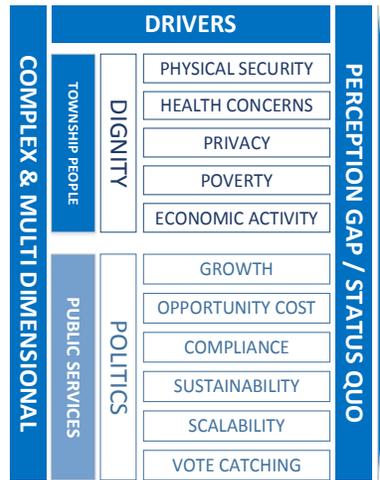
The overall Cape Town region is divided into Wards (111 Wards) with 11 ward councilors. In Cape Town, unlike most of other cities in South Africa, it is the Democratic Alliance (DA) which leads the city and the Africa National Congress (ANC) is in minority.

Ward Councilors are official representatives of the municipality and are relays of the central administration in the ward they are responsible of.

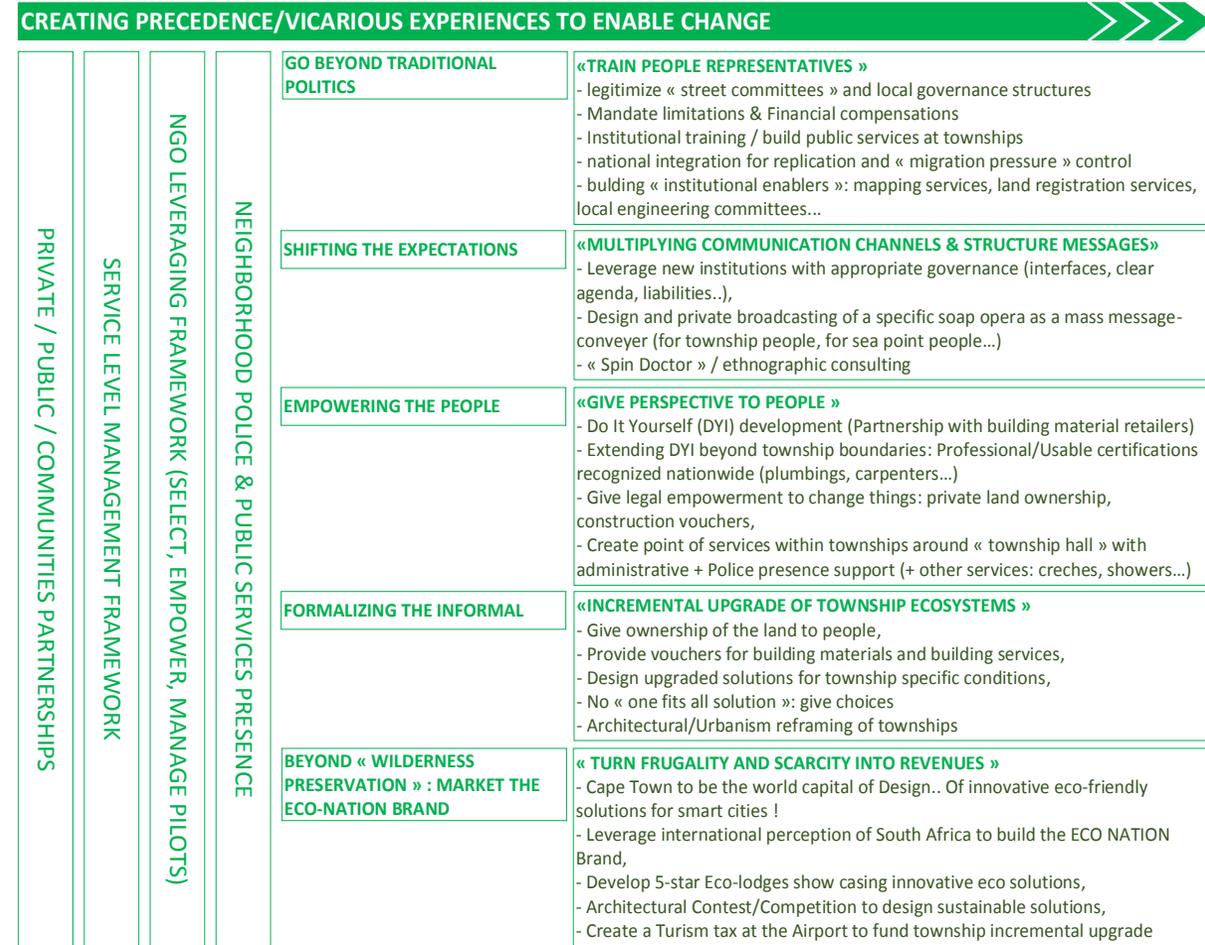
Ward Councilors have a budget for their ward (allocations, funding's) they can decide to invest locally.



## Appendix 7: Benefit Dependency Network



Inspired from the Cranfield University “Business Dependency Network” we tried to structure the complex network dependency of sanitation services access issue, and put it into “perspective” with a programmatic approach. This implies building precedence between initiatives, deciding what is a cause, and what is a consequence given the perspective we wanted to build. Here is the BDN built from our observations and possible related solutions.



## Appendix 8: The SANIFOAM framework [29]

FIGURE 2: SANIFOAM CONCEPTUAL FRAMEWORK



FIGURE 3: SANIFOAM OPPORTUNITY FACTORS FOUND TO INFLUENCE RURAL SANITATION BEHAVIORS



**Access and availability:** If an individual does not have access to a latrine at work or in the homestead, open defecation is the usual alternative, given that having access to a latrine is a precursor to being able to use a latrine. Furthermore, defining a household (or individual) as owning a latrine does not ensure that there is access to a working latrine. Latrines are commonly described as being full or in need of repair, and this serves as a barrier to latrine use.

**Access and availability (supply-side perceptions):** Knowing a supplier who stocks a variety of sanitation hardware and a mason who can assist with latrine construction are central to making latrine upgrades and improvements. Often these factors serve as barriers to moving up the sanitation ladder, given that materials for improved latrines are perceived as unavailable and costly.

**Product attributes:** There are negative perceptions regarding the quality, safety, comfort, durability, and hygiene of latrines. Open defecators describe their behavior as a more pleasant and comfortable experience. The negative product attributes, which are usually in reference to unimproved latrines, serve to reinforce open defecation and hinder decisions to build or invest in latrines.

**Social norms:** Family members, peers, and others in the community defecate in the open, making this a common behavior that is rooted in culture and tradition and learned since childhood. These norms, which are held more strongly by open defecators, serve as a barrier to latrine acquisition and use.

## Appendix 9: Reconstruction Development Program (RDP) & Social Rental Housing (SRH)

The provision of subsidized housing has been one of the cornerstones of the South African government's broad social welfare program since 1994. SRH and RDP are current offerings.

SRH is defined as a form of medium density rental housing which is typically well located in terms of its access to urban areas. It is usually a **multiple storey** housing due to the fact that it is built on prime land where land prices are high. SRH effects intend to contribute to Urban restructuring, improve and contribute to the overall functioning of the housing sector.

On the other side, RDP housing is mainly low-density, low-cost housing, located at the periphery of urban centers. Single storey housing.

South Africa policy regime includes a substantial subsidy providing **free housing** for the 60% of the population with a household income of less than R3500 (about US\$450) per month. [32]

RDP house costs anywhere between R100 000 and R200 000, depending on area and infrastructure, to build the government-subsidised house that is given away for free to households earning less than R3500 per month.

The government-subsidy house is also a 40m<sup>2</sup> structure with formal services. With such a house being given away for free, no developer or bank will risk offering a similar house on the market with a 20 year loan obligation.





## Appendix 10 – Use of human excreta as a fertilizer

Ecological sanitation is a system that, unlike the traditional waterborne sewerage and pit toilet systems, regards human excreta as a resource to be recycled rather than as a waste.

Most rural and peri-urban households in South Africa are not yet connected to a sanitation system for proper management of their wastes. Both financial and water resources are also scarce in some of these areas making a water-carrier sewage system inappropriate because it requires lots of water and is costly to install [36].

"Without fertilisation from phosphorus, wheat yields will fall by more than half".

"[...] Human manure resulted in higher cabbage yields than goat manure but was out-yielded by inorganic fertiliser. The greater effectiveness of human manure when compared with goat manure was attributed to the fact that it was a better source of K and P for plants as it maintained higher levels of these nutrients in soil than goat manure. For greater agronomic effectiveness, the human manure should be co-applied with some inorganic N fertiliser as it proved to be a poor source of nitrogen. The human manure increased soil pH and therefore has potential for improving crop growth in acidic soils through its liming effects as well. The dry human manure was evaluated as comparable to Type B sludge in South Africa with respect to microbial content and could therefore be used to fertilise some crops/plants provided stipulated restrictions to minimise human exposure are adhered to [...]" [37]

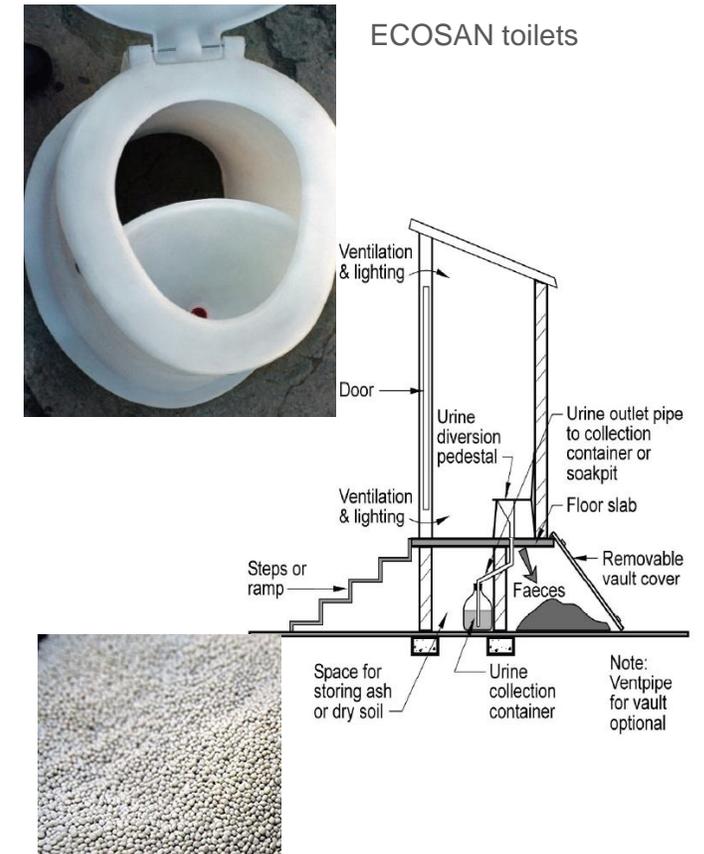
While the recycling of human manure through use as a soil amendment may reduce the need for chemical fertilisers in some soils, it also has the inherent risk of recycling pathogens found in human excreta if appropriate precautions are not taken. This concern is even greater in developing countries where faecal material has high pathogen contents. Dry faecal material extracted from UD toilets in the eThekweni region of South Africa had a microbial content comparable to sludge classified as Type B in current South African regulations (WRC, 1997). In terms of these regulations, Type B sludge may not be used for:

- Household vegetables consumed raw or cooked or for tobacco production
- Private gardens (lawns, shrubs and vegetables).

It may, however, be used for other types of crops with some restrictions to minimise human exposure. These other crop types include vineyards and fruit trees (excluding private gardens), cereals and sugar cane, public gardens and traffic islands. [37]

In the UK a company treating the human excreta to produce fertilizer expects to make over \$ 300'000 by a combination of selling 150 tons of its fertilizer to farmers and gardeners and by infrastructure savings (as less "loaded" sludge will not harm the pipes) [38].

There is a business potential to be investigated here, possibly at a larger scale with the municipality Water department and private partnership to build the plant.



Fertilizer "pearl" after treatment of sludge.